



## Clean drinking water for homes in Africa and other less developed countries

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women's coronary vessels tend to be smaller than those of men, which makes them more difficult to revascularise percutaneously as well as surgically.<sup>8</sup> And, because of late presentation, women more often need urgent intervention.

Although the absolute mortality for women undergoing percutaneous and surgical revascularisation seems to be improving,<sup>7,9</sup> it remains higher than for men. Most studies have shown that mortality in hospital is similar in men and women undergoing coronary revascularisation after adjustment for the increase in overall risk among women.<sup>7,9</sup> The wider use of drug eluting stents and adjunctive medical therapy such as glycoprotein IIb/IIIa inhibitors, as well as improved techniques such as off-pump surgery and minimally invasive coronary surgery, may help to improve outcomes in women having coronary revascularisation.<sup>10,11</sup> For example, paclitaxel eluting stents reduce clinical and angiographic restenosis in both sexes.<sup>10</sup> And a recent large study found that women who had off-pump coronary artery bypass surgery had 32.6% lower mortality, a 35.1% lower complication rate owing to bleeding, a 118.6% lower rate of neurological complications, and a 49.3% lower rate of respiratory complications than women having on-pump surgery.<sup>11</sup>

Women continue to be under-represented in research on heart disease. They account for less than 30% of the participants in most studies and trials in cardiology. It is difficult, therefore, to draw conclusive evidence on managing cardiovascular disease in women. Despite differences between the sexes in risk factors, presentation, and response to treatment, women continue to receive similar treatments to men on the basis of trials that include mainly male participants. To remedy this, participants' sex must be considered in the design and analysis of cardiology studies.

Better awareness and education, earlier and more aggressive control of risk factors, and appropriate access to diagnosis and treatment are desperately needed to tackle this potentially fatal disease. To raise awareness the American Heart Association has launched the extensive "Go Red for Women Campaign," and in 2004 the association published

guidelines for preventing cardiovascular disease in women,<sup>12</sup> while the US National Heart, Blood, and Lung Institute runs "The Heart Truth Campaign."<sup>13</sup> The European Society of Cardiology is soon to publish a scientific statement on the management of women's heart disease and will launch this month its Women at Heart Initiative to alert medical professionals to the burden and underappreciation of heart disease in women.

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## Clean drinking water for homes in Africa and other less developed countries

*Flocculant-disinfectant treatment with bleach is effective and acceptable*

More than 1 billion people in developing countries lack access to safe water, and 2.2 million die annually of diarrhoea.<sup>1</sup> Unfortunately, communities where diarrhoea is a leading cause of morbidity and mortality often lack the capacity and the resources to establish and sustain centrally purified water free from sewage.<sup>2</sup>

Contamination of water during collection, transport, and storage at home presents a serious risk to health for millions of households in developing countries. Several studies have shown an increased risk of

diarrhoea because of inadequate water storage.<sup>3</sup> Regardless of where or how the water is collected, storage vessels with wide openings such as pots or buckets are easily contaminated with faeces, through the introduction of cups, dippers, or hands. Water might also be contaminated by flies, cockroaches, and rodents.

Several organisations have adopted a three pronged approach for treating water at the point of use.<sup>4</sup> This includes using simple household bleach (sodium hypochlorite) to disinfect the water, using narrow mouthed storage vessels, and working with

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communities to educate people about the causes and prevention of diarrhoea.<sup>5</sup> It has proved difficult to convince people to add bleach to drinking water because it affects the taste.<sup>2</sup> Moreover, bleach may not be effective in water that is turbid or contains chlorine resistant organisms such as *Cyclospora cayentanensis* or *Cryptosporidium parvum*.<sup>6</sup>

Until recently, interventions to improve the safety of water and sanitation have focused on safe disposal of excreta and proper use of water for personal hygiene rather than on paying attention to water quality.<sup>7</sup> The focus is now changing.<sup>8</sup> A recent review by the World Health Organization found that low cost simple and acceptable interventions in households can improve the biological quality of water stored in the home and hence reduce the risk of diarrhoea and death.<sup>2</sup> Such interventions include boiling, chlorination, and coagulation-flocculation. Unfortunately, boiling consumes a lot of energy (it takes 1 kg of wood to boil 1 litre of water) and the cost may be prohibitive, particularly in the developing countries where wood and other biomass fuels are not always available. Moreover, burning wood can lead to deforestation with serious environmental degradation.<sup>2</sup>

Various interventions may remove particles and microbes from water. Although cloth has been found to remove zooplankton and phytoplankton carrying *Vibrio cholerae*<sup>9</sup> and is used extensively for the eradication of guinea worm, cloth is not recommended for routine treatment of water in the home because its pores are too large to remove bacteria and viruses. Chemical precipitation (coagulation and flocculation) removes particles and microbes. It can be used in households to reduce transmission of diarrhoeal disease but its use in developing countries has been limited by issues of safety, effectiveness, cost, and sustainability.<sup>10</sup>

This is why the paper by Crump et al in this week's *BMJ* is an important advance in treating water in households.<sup>11</sup> In a randomised controlled trial, the authors compared standard practice with flocculant-disinfectant treatment of drinking water with sodium hypochlorite (bleach) in homes in a rural area of western Kenya, where the water is highly turbid and contaminated with faecal bacteria. The treatment lowered the turbidity of drinking water, improved the acceptability of water treatment at home, and reduced the prevalence of diarrhoea by 25% among participants.

The authors also report fewer deaths in the intervention group than in the control group. It is not

clear, however, whether the study had enough power to detect a significant difference in mortality, and these results on mortality reduction need to be confirmed in an appropriately powered, randomised controlled trial. The authors claim that, if the flocculant-disinfectant treatment were available in the marketplace, the visible effect on water turbidity might lead families to treat water in their homes. Yet there is no evidence to show that, in this community or indeed in other communities in the region, people would be encouraged by such results to purchase.

This study is, nevertheless, an important addition to the list of randomised controlled trials on the effect of flocculant-disinfectant on the quality and acceptability of drinking water. The challenge now is to demonstrate affordability, sustainability, and the feasibility of scaling up such interventions to reach the millions of households in developing countries that lack safe drinking water.

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## Avoiding rabies

*Get vaccinated before travel, avoid animals, and get help urgently if bitten*

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The death from rabies of a British woman, bitten by a dog in Goa, reported in the news<sup>1</sup> and in an article in this week's *BMJ*,<sup>2</sup> highlights the issue of rabies prophylaxis for people who travel to and live in endemic areas. Rabies is an acute, incurable, viral encephalomyelitis caused by a bullet shaped RNA rhabdovirus.<sup>3</sup> It is a zoonosis, an animal disease that is

transmissible to humans. Worldwide, most of the 30 000 to 70 000 human deaths annually result from dog bites, although cats and wild animals such as foxes, jackals, wolves, mongooses, racoons, skunks, and bats are the other culprits.<sup>4 5</sup>

Around 90% of deaths from rabies occur in the developing world, with more than half in the Indian

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