



Simple sari cloth holds key to better health

Women are literally wearing the answer to cleaner water and better health, according to a study in Bangladesh.

Using the simple sari to filter household water protects not only the household from cholera, but reduces the incidence

of disease in neighbouring households that do not filter. "During an earlier study, this filtering method was field tested in Matlab, Bangladesh, and proved to reduce the incidence of cholera by 48%. This latest follow-up study, conducted five years later to see whether filtering by sari has persisted, showed that nearly a third of the village women continued to filter water for their households, with both an expected and unexpected benefit," explains Rita Colwell of the University of Maryland, a researcher on the study.

Over 7 000 village women collecting water daily for their households in Bangladesh were selected from the same population used in the previous study. Survey data showed that 31% continued to filter their water, of which 60% used a sari. "This is a clear indication of both

compliance with instructions and the sustainability of the method, but it also shows the need for continuing education in the appropriate use and benefits of simple filtration," notes Colwell.

The researchers also looked at the incidence of cholera in households during the follow-up period. While not statistically significant, they found the incidence of hospitalisation for cholera during the five-year period between studies reduced by 25%. "With the lower rate of filtration in this follow-up study, it is not surprising that the observed reduction in disease was not as high as the 48% observed in the original trial, suggesting that active reinforcement would have been effective in ensuring higher protection," says Colwell.

Researchers also found an indirect benefit. Household that did not filter their water, but were located in neighbourhoods where water filtration was regularly practiced by others also had a lower incidence of cholera. "Results of this study showed that the practice of filtration not only was accepted and sustained by the villagers but also benefited those who filtered their water, as well as their neighbours not filtering water for household use, in reducing the incidence of cholera," concludes Colwell.

UN declares access to clean water and sanitation a human right

Safe and clean drinking water and sanitation is a human right essential to the full enjoyment of life and all other human rights, the General Assembly of the United Nations (UN) has declared.

The 192-member Assembly also called on UN member states and international organisations to offer funding, technology and other resources to help poorer countries scale up their efforts to provide clean, accessible and affordable drinking water and sanitation to all. The text of the latest resolution expressed deep concern that an estimated 884-million people lack access to safe drinking water and more than 2.6 billion people do not have access to basic sanitation. Studies also indicate that about 1.5 million children under the age of five die each year and 443 million school days are lost because of water- and sanitation-related diseases.



Malaria-proof mosquito a world first

The creation of genetically-altered mosquitoes that cannot infect humans with malaria is providing new hope to countries where millions of people die from the disease each year.

University of Arizona (UA) entomologists, who created the mosquitoes which are completely immune to the malaria parasite, *Plasmodium*, aim to one day replace wild mosquitoes with lab-bred populations unable to act as vectors. "If you want to effectively stop the spreading of the malaria parasite, you need mosquitoes that are 100% resistant to it. If a single parasite slips through and infects a human, the whole approach will be doomed to fail," says Prof Michael Riehle of the UA's College of Agriculture and Life Sciences, who led the research effort.

Riehle's team used molecular biology techniques to design a piece of genetic information capable of inserting itself into a mosquito's genome. This construct was then injected into the eggs of the mosquitoes. The emerging generation carries the altered genetic information and passes it on to future generations. For their experiments, the scientists used *Anopheles stephensi*, a mosquito species that is an important malaria vector through the Indian subcontinent.

When the researchers studied the genetically modified mosquitoes after feeding them malaria-infested blood, they noticed that the *Plasmodium* parasites did not infect a single study animal. "We were surprised how well this works," reports Riehle. "We were just hoping to see some effect on the mosquitoes' growth rate, lifespan or their susceptibility to the parasite, but it was great to see that our construct blocked the infection process completely."

The research has been published in the July 15 edition of the journal *Public Library of Science Pathogens*. For more information, go to www.plospathogens.org/home.action.

Waterborne diseases could cost US over \$500-m a year

Hospitalisations for three common waterborne diseases cost the American healthcare system as much as US\$539-million a year, according to researchers from the Centre for Disease Control and Prevention.

"These cost data highlight that water-related diseases pose not only a physical burden to the thousands of people sickened by them each year, but are also a substantial burden in healthcare costs, including direct government payments, reports Michael Beach, who led the study.

At present, there are well-documented data on the total healthcare costs associated with all waterborne diseases. However, using data from a large insurance claims database between 2004 and 2007,

Beach and his colleagues estimated the hospitalisation cost of three common waterborne diseases in the US, namely Legionnaires' disease, cryptosporidiosis and giardiasis. For each case of disease, they calculated the cost paid by the insurer, the out-of-pocket cost to the patient and the total amount paid.

Total estimated costs for hospitalisation for the three diseases was between US\$154-million and US\$539-million. In-patient hospitalisation costs per case averaged more than US\$34 000 for Legionnaires' disease, about US\$9 000 for giardiasis and more than US\$21 000 for cryptosporidiosis. "When people think about these diseases, they usually think of a simple case of diar-

rhoea, which is a nuisance but quickly goes away. However, these infections can cause severe illness that often result in hospital stays of more than a week, which can quickly drive up healthcare costs," notes Beach. Other symptoms can include rashes, eye and ear infections and respiratory or neurological systems, and can be fatal in severe cases.

Modest investments in preventing these diseases could lead to reduced disease and significant healthcare cost savings, maintains Beach. Some examples of possible, low-cost interventions include public education campaigns, appropriate maintenance of water systems, and regular inspection of pools and other recreational water facilities.