

## July 8, 2010 Environmental Health Update

Below are citations and abstracts of 6 recently published journal articles and links to news updates on water, sanitation, hygiene, indoor air pollution and urban health. If you would like to be on the Environmental Health Update mailing list, please send an email to: [dcampbell@usaid.gov](mailto:dcampbell@usaid.gov)

### JOURNAL ARTICLES

1 - *Journal of Water and Health Vol 08 No 3 pp 417–430 2010 doi: 10.2166/wh.2010.02*

#### **Quantitative Microbial Risk Analysis to evaluate health effects of interventions in the urban water system of Accra, Ghana**

Herve Labite, Isabella Lunani, Peter van der Steen, Kala Vairavamoorthy, Pay Drechsel and Piet Lens

[p.vandersteen@unesco-ihe.org](mailto:p.vandersteen@unesco-ihe.org)

A quantitative microbial risk assessment was applied to evaluate the microbial risks of the Accra Urban Water System (AUWS). The exposure assessment was based on the count of indicator organisms in waste water from open roadside drains and in water and sand samples from the beach. The predicted total disease burden generated in a representative catchment of the AUWS (Odaw Catchment) was 36,329 Disability Adjusted Life Years (DALYs) per year, of which 12 and 88% are caused by, respectively, shortcomings in the water supply system and inappropriate sanitation. The DALYs per person per year were above the WHO reference value. The open roadside drain had the highest contribution to the disease burden. Of four possible interventions evaluated for health risk reduction, the highest efficiency in terms of DALYs averted per euro invested would be achieved by providing covers for the open roadside drains.

2 - *Journal of Water and Health Vol 08 No 3 2010 doi: 10.2166/wh.2010.097*

#### **Estimation of norovirus and Ascaris infection risks to urban farmers in developing countries using wastewater for crop irrigation**

Duncan Mara and Andrew Sleight

[d.d.mara@leeds.ac.uk](mailto:d.d.mara@leeds.ac.uk)

A quantitative microbial risk analysis—Monte Carlo method was used to estimate norovirus and Ascaris infection risks to urban farmers in developing countries watering their crops with wastewater. For a tolerable additional disease burden of less than  $10^{-4}$  DALY loss per person per year (pppy), equivalent to 1 percent of the diarrhoeal disease burden in developing countries, a norovirus reduction of 1–2 log units and an Ascaris egg reduction to 10–100 eggs per litre are required. These are easily achieved by minimal wastewater treatment—for example, a sequential batch-fed three tank/pond system. Hygiene improvement through education and regular deworming are essential complementary inputs to protect the health of urban farmers.

### **Too much or too little? A review of the conundrum of selenium**

Fiona Gore, John Fawell and Jamie Bartram

[goref@who.int](mailto:goref@who.int)

Chemical elements such as selenium, fluoride, iron, calcium and magnesium are essential to the human being, although some are toxic when absorbed in high doses. In this paper, the risks associated with insufficient and excessive intake of selenium in the diet are reviewed, focusing on drinking water. Two different approaches are used to derive recommended nutrient intakes (RNI) for adequate nutritional status and guideline values to prevent excessive exposure. The former is based on the daily intake which meets the nutrient requirements of 97.5% of the population. The latter is a value derivation based on an assumed daily per capita consumption at the individual level, a conservative approach used where there is any uncertainty and is related to a negligible risk to health at population level across life stages. There is an increasing need to develop a conceptual framework bringing together aspects of toxicity and essentiality especially for elements apparently exhibiting narrow or overlapping ranges between essentiality and toxicity and to provide guidance on the nature and severity of risks in order to better protect human. While there are a number of frameworks available, these generally only consider food. There is a need to include water, which can be a significant source in some circumstances.

4 - *Journal of Water and Health* Vol 08 No 3 pp 479–486 2010 doi: 10.2166/wh.2010.124

### **Demonstration and evaluation of germicidal UV-LEDs for point-of-use water disinfection**

Christie Chatterley and Karl Linden

[karl.linden@colorado.edu](mailto:karl.linden@colorado.edu)

Ultraviolet (UV) irradiation is a common disinfection option for water treatment in the developed world. There are a few systems installed in developing countries for point-of-use treatment, but the low-pressure mercury lamps currently used as the UV irradiation source have a number of sustainability issues including a fragile envelope, a lifetime of approximately one year, and they contain mercury. UV light emitting diodes (LEDs) may offer solutions to many of the sustainability issues presented by current UV systems. LEDs are small, efficient, have long lifetimes, and do not contain mercury. Germicidal UV LEDs emitting at 265 nm were evaluated for inactivation of *E. coli* in water and compared to conventional low-pressure UV lamps. Both systems provided an equivalent level of treatment. A UV-LED prototype was developed and evaluated as a proof-of-concept of this technology for a point-of-use disinfection option, and the economics of UV-LEDs were evaluated.

### **Investigating the efficiency of solar energy system for drinking water disinfection**

Muna Hindiyeh, Ashraf Ali,

The aim of this study was to evaluate the effectiveness of aluminum foils, lenses and mirrors in association with sunlight as sterilization media on the destruction of Total Heterotrophic Bacteria (THBC) using raw drinking water samples obtained from local wells in northern Jordan.

To achieve this aim, a solar water disinfection with a simple method that is to place the water samples to a direct contact with sunlight that will provide a practical, low-cost approach to the improvement of drinking water quality in developing countries with consistently sunny climates. Microbiological examinations were performed to determine the THBC, Total Coliform (TC) and to detect *Pseudomonas aeruginosa* according to the American standards for drinking water. Results show that, it is possible to achieve a complete decontamination of water samples without any danger of bacterial re-growth, if the disinfected water is properly stored for one week.

The results show that on a conclusion the disinfection process was succeeded and could keep treated water for more than seven days without any further contamination. This implies that solar disinfection will be a promising way for improving water quality in developing countries with low cost and clean energy reliable resource.

6 - *Trop Doct.* 2010 Jul; 40(3): 141-3.

### **Soil-transmitted helminth infection and urbanization in 880 primary school children in Nicaragua, 2005.**

Rosewell A, Robleto G, Rodríguez G, Barragne-Bigot P, Amador JJ, Aldighieri S.

[rosewella@wpro.who.int](mailto:rosewella@wpro.who.int)

The prevalence of soil-transmitted helminthiasis is close to half the population in Central America, with the marginalized peri-urban poor disproportionately affected. Previous single province helminth surveys conducted in Nicaragua have shown *Ascaris lumbricoides* to be the predominant species. In 2005, we conducted a cross-sectional study of 880 children in 10 Nicaraguan primary schools located in four provinces. We aimed to establish the prevalence and intensity of soil-transmitted helminth infections and to investigate the factors associated with helminthiasis. Almost half (46%) of the children were infected with soil-transmitted helminths. *Tichuris trichiura* was the most common infective species (34.7%). The prevalence and intensity of helminthiasis was heterogeneous in the provinces, with children educated in peri-urban schools most affected. Healthy policies are required that favour the peri-urban poor who have inadequate and declining access to water and sanitation.

## WATER IN THE NEWS

Bloggng for nonprofit: IRC's WASH Blogs

<http://www.blogtips.org/bloggng-for-nonprofit-irc-wash-blogs/>, July, 2, 2010 - ...I took the opportunity to have a chat with the man behind the WASH blog initiative: Cor Dietvorst, the editor of Source Weekly at the IRC (International Water and Sanitation Centre)

Water More Than A Thirst Quencher

<<http://www.examiner.com/x-44238-Detroit-Alternative-Medicine-Examiner~y2010m7d7-Water-More-Than-A-Thirst-Quencher>> - Examiner.com - 22 hours ago

Vanderbilt University Medical Center, in Nashville Tennessee, have demonstrated that ordinary water, does have a few physiological results. ...

UN sets new guidelines for packaged salads, melamine in food

<<http://www.google.com/hostednews/afp/article/ALeqM5jHcaFMFod-IXrxKjytds01koxuRw>> -

AFP - July 5 - packaged salads could become contaminated through the water used to irrigate them, said World Health Organisation's food safety department official Jorgen ...

UN Set to Finally Recognize Fundamental Human Right to Water

<http://www.prnewswire.co.uk/cgi/news/release?id=291691> - PR Newswire UK (press release) -

"As this moves forward we are demanding that the language of the resolution remain strong and leave no doubt that water and sanitation are human rights.

Small Steps Create Big Changes for Children in Nepal

<[http://www.huffingtonpost.com/cecil-adhikari/small-steps-create-big-ch\\_b\\_638725.html](http://www.huffingtonpost.com/cecil-adhikari/small-steps-create-big-ch_b_638725.html)> -

Huffington Post (blog) - 13 hours ago, Through its local partner, Nepal Water for Health, Concern recently implemented a program to improve water and sanitation facilities at Lalit's school in an ...

South Africa: Economic Hub Runs Water Shortage Risk

<<http://allafrica.com/stories/201007070033.html>> - AllAfrica.com - Jul 6, 2010, Johannesburg

— SA's economic hub will run short of water should a severe drought occur in the next 10 years, as water losses have not been stemmed and new ...

Africa: Water 'Must Be Foreign Policy Goal'

<<http://allafrica.com/stories/201007020192.html>> - AllAfrica.com. Jul 2, 2010, Johannesburg

— AN EXPERT on water resource management has called on African governments to make water one of the key pillars of Africa's foreign policy. ...

India - levy on bottled water to pay for supply to urban poor

<<http://www.thehindubusinessline.com/2010/07/08/stories/2010070854270100.htm>>, Hindu

Business Line - 19 hours ago ... into public water works as well as into supply of water to the urban poor, said the Maharashtra's Minister for Water Supply and Sanitation Department, ...

## **SANITATION UPDATES - <http://sanitationupdates.wordpress.com>**

WSSCC and Overseas Development Institute Publish Background Note on sanitation and hygiene advocacy

<<http://sanitationupdates.wordpress.com/2010/07/08/wsscc-and-overseas-development-institute-publish-background-note-on-sanitation-and-hygiene-advocacy/>>

Senegal: WSSCC commits US\$ 5 million to sanitation and hygiene work through the Global Sanitation Fund

<<http://sanitationupdates.wordpress.com/2010/07/08/senegal-wsscc-commits-us-5-million-to-sanitation-and-hygiene-work-through-the-global-sanitation-fund/>>

Kenya, Nairobi: lack of sanitation leaves women sick and “prisoners in their homes”

<<http://sanitationupdates.wordpress.com/2010/07/08/kenya-nairobi-lack-of-sanitation-leaves-women-sick-and-prisoners-in-their-homes/>>

USA, Austin, TX: toilet rebates not cost effective, city says in canceling program

<<http://sanitationupdates.wordpress.com/2010/07/08/usa-austin-tx-toilet-rebates-not-cost-effective-city-says-in-canceling-program/>>

Ghana: large urban sanitation research project gets funding

<<http://sanitationupdates.wordpress.com/2010/07/07/ghana-large-urban-sanitation-research-project-gets-funding/>>

South Africa, Cape Town: escaped hippo shipped out of sewerage works

<<http://sanitationupdates.wordpress.com/2010/07/07/south-africa-cape-town-escaped-hippo-shipped-out-of-sewerage-works/>>

USAID Environmental Health – Sanitation Video Contest

<<http://sanitationupdates.wordpress.com/2010/07/06/usaid-environmental-health-sanitation-video-contest/>>

Nepal: famous comedians star in tele-serial on community-led total sanitation

<<http://sanitationupdates.wordpress.com/2010/07/06/nepal-famous-comedians-star-in-tele-serial-on-community-led-total-sanitation/>>

Bangladesh: children smash handwashing world record

<<http://sanitationupdates.wordpress.com/2010/07/06/bangladesh-children-smash-handwashing-world-record/>>

Namibia: Locally Invented Toilet to Improve Lives of Millions

<<http://sanitationupdates.wordpress.com/2010/07/06/namibia-locally-invented-toilet-to-improve-lives-of-millions/>>

Terra Preta sanitation: re-discovered from an ancient Amazonian civilisation

<<http://sanitationupdates.wordpress.com/2010/07/06/terra-preta-sanitation-re-discovered-from-an-ancient-amazonian-civilisation/>>

What's on tap for future programming in water, sanitation and hygiene?: Hygiene Improvement Project (HIP) winding up

<<http://sanitationupdates.wordpress.com/2010/07/05/whats-on-tap-for-future-programming-in-water-sanitation-and-hygiene-hygiene-improvement-project-hip-winding-up/>>

## URBAN HEALTH UPDATES - <http://urbanhealthupdates.wordpress.com>

June 25 launch of USAID Ethiopia urban health program

<<http://urbanhealthupdates.wordpress.com/2010/07/07/june-25-launch-of-usaid-ethiopia-urban-health-program/>>

UK study says trees play major role in urban health

<<http://urbanhealthupdates.wordpress.com/2010/07/07/uk-study-says-trees-play-major-role-in-urban-health/>>

Bamboo and housing for the urban poor

<<http://urbanhealthupdates.wordpress.com/2010/07/07/bamboo-and-housing-for-the-urban-poor/>>

Kenya's slum women risk health to avoid violence

<<http://urbanhealthupdates.wordpress.com/2010/07/07/kenyas-slum-women-risk-health-to-avoid-violence/>>

Knowledge, attitudes and practices of mosquito larval source management for malaria control

<<http://urbanhealthupdates.wordpress.com/2010/07/06/knowledge-attitudes-and-practices-of-mosquito-larval-source-management-for-malaria-control/>>

Improved health outcomes in urban slums through infrastructure upgrading

<<http://urbanhealthupdates.wordpress.com/2010/07/06/improved-health-outcomes-in-urban-slums-through-infrastructure-upgrading/>>

India – USAID initiative on diarrhea prevention

<<http://urbanhealthupdates.wordpress.com/2010/06/28/india-usaid-initiative-on-diarrhea-prevention/>>

Urban Health Bulletin – June 2010

<<http://urbanhealthupdates.wordpress.com/2010/06/24/urban-health-bulletin-june-2010/>>

Dwindling water supply spells grim future for Nairobi

<<http://urbanhealthupdates.wordpress.com/2010/06/16/dwindling-water-supply-spells-grim-future-for-nairobi/>>

ICDDR – Essential healthcare services for urban street dwellers

<<http://urbanhealthupdates.wordpress.com/2010/06/10/icddrb-essential-healthcare-services-for-urban-street-dwellers/>>

Pakistan – Deforestation increases capital's temperature

<<http://urbanhealthupdates.wordpress.com/2010/06/07/pakistan-deforestation-increases-capital%E2%80%99s-temperature/>>

Urban Area Disadvantage and Under-5 Mortality in Nigeria

<<http://urbanhealthupdates.wordpress.com/2010/06/01/urban-area-disadvantage-and-under-5-mortality-in-nigeria/>>

CNN – Ghana bags a handy new way to tackle plastic waste

<<http://urbanhealthupdates.wordpress.com/2010/06/01/cnn-ghana-bags-a-handy-new-way-to-tackle-plastic-waste/>>

**INDOOR AIR POLLUTION UPDATES - <http://iapnews.wordpress.com>**

Nepal – Assessment of Improved Cook Stove in Reducing Indoor Air Pollution

<<http://iapnews.wordpress.com/2010/07/07/nepal-assessment-of-improved-cook-stove-in-reducing-indoor-air-pollution/>>

Nepal & Malawi – Airborne Endotoxin Concentrations in Homes Burning Biomass Fuel

<<http://iapnews.wordpress.com/2010/07/07/nepal-malawi-airborne-endotoxin-concentrations-in-homes-burning-biomass-fuel/>>

Guatemala – Personal child and mother carbon monoxide exposures

<<http://iapnews.wordpress.com/2010/07/01/guatemala-personal-child-and-mother-carbon-monoxide-exposures/>>

Off-grid energy services for the poor – Malawi

<<http://iapnews.wordpress.com/2010/07/01/off-grid-energy-services-for-the-poor-malawi/>>

Biochar: A Panacea for Global Warming Issues

<<http://iapnews.wordpress.com/2010/07/01/biochar-a-panacea-for-global-warming-issues/>>

Feature on USAID Energy

<<http://iapnews.wordpress.com/2010/06/28/feature-on-usaid-energy/>>

Kenya – Ethanol producing alga units to save local forests

<<http://iapnews.wordpress.com/2010/06/28/kenya-ethanol-producing-alga-units-to-save-local-forests/>>

UNDP Releases Report on Energy Access in Nepal

<<http://iapnews.wordpress.com/2010/06/23/undp-releases-report-on-energy-access-in-nepal/>>