

## Environmental Health Update – June 2, 2010

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### JOURNAL ARTICLES

1 - *BMC Public Health* 2010, 10:219doi: 10.1186/1471-2458-10-219

#### **Impact on diarrhoeal illness of a community educational intervention to improve drinking water quality in rural communities in Puerto Rico**

Full-text: <http://www.biomedcentral.com/1471-2458/10/219>

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**Background** - Waterborne disease is a major risk for small water supplies in rural settings. This study was done to assess the impact of an educational intervention designed to improve water quality and estimate the contribution of water to the incidence of diarrhoeal disease in poor rural communities in Puerto Rico a two-part study was undertaken.

**Methods** - An educational intervention was delivered to communities relying on community water supplies. This intervention consisted of student operators and administrators supervising and assisting community members who voluntarily "operate" these systems. These voluntary operators had no previous training and were principally concerned with seeing that some water was delivered. The quality of that water was not something they either understood or addressed. The impact of this intervention was measured through water sampling for standard bacteriological indicators and a frank pathogen. In addition, face-to-face epidemiological studies designed to determine the base-line occurrence of diarrhoeal disease in the communities were conducted. Some 15 months after the intervention a further epidemiological study was conducted in both the intervention communities and in control communities that had not received any intervention.

**Results** - Diarrhoeal illness rates over a four week period prior to the intervention were 3.5%. Salmonella was isolated from all of 5 distributed samples prior to intervention and from only 2 of 12 samples after the intervention. In the 15 months follow-up study, illness rates were lower in the intervention compared to control communities (2.5% vs 3.6%%) (RR = 0.70, 95%CI 0.43, 1.15), though this was not statistically significant. However, in the final Poisson regression model living in an intervention system (RR = 0.318; 95%CI 0.137 - 0.739) and owning a dog (RR = 0.597, 95%CI 0.145 - 0.962) was negatively associated with illness. Whilst size of system (RR = 1.006, 95%CI 1.001 - 1.010) and reporting problems with sewage system (RR = 2.973, 95%CI 1.539 - 5.744) were positively associated with illness.

**Conclusions** - Educational interventions directed both at identified individuals and the community in general in small communities with poor water quality is a way of giving communities the skills and knowledge to manage their own drinking water quality. This may also have important and sustainable health benefits, though further research preferably using a randomised control trial design is needed.

2 - *Journal of Water and Health* Vol 08 No 3 pp 417–430 2010

#### **Quantitative Microbial Risk Analysis to evaluate health effects of interventions in the**

## **urban water system of Accra, Ghana**

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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.

3 - *Journal of Water and Health* Vol 08 No 2 pp 334–345 2010

## **Knowledge of measures to safeguard harvested rainwater quality in rural domestic households**

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Given the possibility of waterborne diseases caused by inappropriate rainwater harvesting systems, a survey was conducted in Uganda to assess existing knowledge of both physical and non-physical measures that safeguard harvested rainwater. Households who had received rainwater tanks were assessed on issues related to harvested rainwater quality. The study shows that 84% of respondents were aware of various sources of rainwater contamination, but only 5% were aware that they needed to adjust use of rainwater, depending on whether they cleaned the tank or not. Most of the respondents were not aware that gutter cleaning was necessary to improve water quality. Indeed, as the water from the collection surface is channelled through gutters, a number of measures need to be taken to control the entry of contaminations and subsequent growth of pathogens in the tank, e.g. first flush diverts, installation of filters, chemical use and mesh cleaning. The majority, however, did not take adequate care of the gutters and this impacts on health and social livelihood. Overall, the findings emphasize the need to provide more information to households when installing water harvesting tanks to ensure that the harvested rainwater is of high quality.

4 - *Journal of Water and Health* Vol 08 No 2 pp 387–398 2010

## **An international review of the challenges associated with securing buy-in for water safety plans within providers of drinking water supplies**

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Since publication of the 3rd Edition of the World Health Organisation (WHO) Drinking Water Quality guidelines, global adoption of water safety plans (WSPs) has been gathering

momentum. Most guidance lists managerial commitment and 'buy-in' as critical to the success of WSP implementation; yet the detail on how to generate it is lacking. This commentary discusses aspects of managerial commitment to WSPs. We argue that the public health motivator should be clearer and a paramount objective and not lost among other, albeit legitimate, drivers such as political or regulatory pressures and financial efficiency.

5 - *Journal of Water and Health In Press, May 27, 2010*

### **Health gains from solar water disinfection (SODIS): evaluation of a water quality intervention in Yaoundé, Cameroon**

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In developing countries, the burden of diarrhoea is still enormous. One way to reduce transmission of pathogens is by water quality interventions. Solar water disinfection (SODIS) is a low-cost and simple method to improve drinking water quality on household level. This paper evaluates the implementation of SODIS in slum areas of Yaoundé, Cameroon. Promoters trained 2,911 households in the use of SODIS. Two surveys with randomly selected households were conducted before (N = 2,193) and after (N = 783) the intervention. Using a questionnaire, interviewers collected information on the health status of children under five, on liquid consumption, hygiene and other issues. Prior to the intervention, diarrhoea prevalence amounted to 34.3% among children. After the intervention, it remained stable in the control group (31.8%) but dropped to 22.8% in the intervention group. Households fully complying with the intervention exhibited even less diarrhoea prevalence (18.3%) and diarrhoea risk could be reduced by 42.5%. Multivariate analyses revealed that the intervention effects are also observed when other diarrhoea risk factors, such as hygiene and cleanliness of household surroundings, are considered. According to the data, adoption of the method was associated with marital status. Findings suggest health benefits from SODIS use. Further promotional activities in low-income settings are recommended

6 - *J Environ Manage. 2010 Jun; 91(6): 1316-23.*

### **Personal, social, and situational factors influencing the consumption of drinking water from arsenic-safe deep tubewells in Bangladesh.**

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Naturally occurring arsenic in groundwater in Bangladesh poses a well-known public health threat. The aim of the present study is to investigate fostering and hindering factors of people's use of deep tubewells that provide arsenic-safe drinking water, derived from the Protection Motivation Theory and the Theory of Planned Behavior. Structured personal interviews were conducted with 222 households in rural Sreenagar, Bangladesh. Multiple linear regressions were carried out to identify the most influential personal, social, and situational behavior determinants. Data revealed that social factors explained greater variance in the consumption of drinking water from deep tubewells than did situational and personal factors. In an overall regression, social factors played the biggest role. In particular, social norms seem to strongly influence deep tubewell use. But also self-efficacy

and the perceived taste of shallow tubewell water proved influential. Concurrently considering other important factors, such as the most mentioned response cost (i.e., time needed to collect deep tubewell water), we propose a socially viable procedure for installing deep tubewells for the extended consumption of arsenic-safe drinking water by the Bangladeshi population.

*7 - Environmental Health Perspectives, June 2010*

### **Urban Area Disadvantage and Under-5 Mortality in Nigeria: The Effect of Rapid Urbanization**

<http://ehp03.niehs.nih.gov/article/fetchArticle.action?articleURI=info%3Adoi%2F10.1289%2Fehp.0901306>

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**Background:** Living in socioeconomically disadvantaged areas is associated with increased - childhood mortality risks. As city living becomes the predominant social context in low- and middle-income countries, the resulting rapid urbanization together with the poor economic circumstances of these countries greatly increases the risks of mortality for children < 5 years of age (under-5 mortality).

**Objective:** In this study we examined the trends in urban population growth and urban under-5 mortality between 1983 and 2003 in Nigeria. We assessed whether urban area socioeconomic dis-advantage has an impact on under-5 mortality.

**Methods:** Urban under-5 mortality rates were directly estimated from the 1990, 1999, and 2003 Nigeria Demographic and Health Surveys. Multilevel logistic regression analysis was performed on data for 2,118 children nested within data for 1,350 mothers, who were in turn nested within data for 165 communities.

**Results:** Urban under-5 mortality increased as urban population steadily increased between 1983 and 2003. Urban area disadvantage was significantly associated with under-5 mortality after adjusting for individual child- and mother-level demographic and socioeconomic characteristics.

**Conclusions:** Significant relative risks of under-5 deaths at both individual and community levels underscore the need for interventions tailored toward community- and individual-level inter-ventions. We stress the need for further studies on community-level determinants of under-5 mortality in disadvantaged urban areas.

**Editor's Summary -** Living in socioeconomically disadvantaged areas is associated with increased childhood mortality. As city living becomes the predominant social context in low- and middle-income countries, the resulting rapid urbanization—together with the poor economic circumstances of these countries—greatly increases the risk of mortality for children < 5 years of age (under-5 mortality). Antai and Moradi (p. 877) examined trends in urban population growth and urban under-5 mortality between 1983 and 2003 in Nigeria and associations with socioeconomic disadvantage in these areas. Urban under-5 mortality increased as urban population steadily increased between 1983 and 2003. Urban area disadvantage was significantly associated with under-5 mortality after adjusting for individual child- and mother-level demographic and socioeconomic characteristics. The authors conclude that their findings underscore the need for community- and individual-level interventions. Additional studies are needed on community-level determinants of under-5 mortality in disadvantaged urban areas.

## REPORTS

### USAID Hygiene Improvement Project

- Testing Small Doable Actions to Improve Hygiene Practices in...  
<<http://www.hip.watsan.net/page/4396>>
- Focus Group Discussions and In-depth Interviews to identify "...  
<<http://www.hip.watsan.net/page/4395>>
- Sanitation Marketing Programme: Catalogue of Affordable Latri...  
<<http://www.hip.watsan.net/page/4392>>
- Sanitation Marketing Programme: Masons Training Manual. March...  
<<http://www.hip.watsan.net/page/4391>>
- In-depth Consumer Assessment Report for Sanitation Marketing...  
<<http://www.hip.watsan.net/page/4390>>
- Monitoring and Evaluation Indicators for Tracking WASH Activi...  
<<http://www.hip.watsan.net/page/4381>>

### IRC International Water & Sanitation Centre

- **Briefing note on life-cycle costs approach, June 2010.** This briefing note describes the cost components in the life-cycle costs approach. Life-cycle costs (LCC) represent the aggregate costs of ensuring delivery of adequate, equitable and sustainable WASH services to a population in a specified area. These costs include the construction and maintenance of systems in the short and longer term, taking into account the need for hardware and software, operation and maintenance, capital maintenance, the cost of capital, source protection, and the need for direct and indirect support, including training, planning and institutional pro-poor support. The delivery of sustainable services also requires that financial systems are in place to ensure that infrastructure can be replaced at the end of its useful life and to extend delivery systems in response to increases in demand. This is the 'life-cycle' at the heart of this approach - what is needed to sustain, repair and replace a water (or sanitation) system through the whole of its cycle of wear, repair and renewal. <<http://www.irc.nl/url/36664>> .

### Rural Water Supply Network

**Accelerating Self Supply - A Case Study from Zambia, 2010.** Zambia has a very low density rural population, which makes the establishment of sustainable community water supplies a particular challenge. Previous piloting of improvements to traditional water sources showed both a demand for and an impact from low cost up-grading (Sutton 2002). UNICEF, with RWSN technical support, has been encouraging improvements to water supplies in some of the poorest districts of Luapula Province. Remarkably, these have been achieved with zero subsidy. All hardware costs (labour and materials) are covered by householders; the donor input being only in capacity building through training and marketing.  
Download - <http://www.rwsn.ch/documentation/skatdocumentation.2010-05-31.8746646807>

### WaterAid

- **Abandoning open defecation: Comparison and adaptation of social change dynamics.** A social transformation study briefing note from WaterAid's Ghana country programme. WaterAid Ghana, May 2010.  
<<http://www.wateraid.org/other/startdownload.asp?DocumentID=448&mode=plugin>>

- **Report on NCPD Workshop on Mainstreaming Disability Issues in Water, Sanitation and Hygiene Services.** Report on a one-day workshop for stakeholders in the water, sanitation and hygiene (WASH) sector to share experiences around issues of disability mainstreaming in sector policies, strategies and implementation guidelines, and more importantly on how service providers are translating these policies and guidelines into practice. WaterAid Ghana, May 2010

<<http://www.wateraid.org/other/startdownload.asp?DocumentID=445&mode=plugin>>

- **Think local, act local II: Impediments to effective financing of sanitation services in Ethiopia: The case of three local governments.** Think local, act local II is the second in a series of WaterAid Ethiopia written reports based on a research conducted focusing on sanitation and hygiene financing. The first report, Think local, act local, provides an understanding of local government financing of water supply. This report is thus a follow-up of the first one aimed at providing a more complete picture of WASH financing at local level through analyzing local budgets and financing mechanisms.

WaterAid Ethiopia, May 2010

<<http://www.wateraid.org/other/startdownload.asp?DocumentID=446&mode=plugin>>

## WSSCC

- **Facilitating 'Hands On Training' Workshops for Community-Led Total Sanitation: A Trainers' Training Guide.** Community-Led Total Sanitation (CLTS) is spreading fast in many countries in different regions, and there is growing demand for facilitators and trainers of facilitators. This guide, produced by WSSCC and the CLTS Foundation, and authored by the distinguished Kamal Kar, fulfills the need for a resource that will support the creation of a strong cadre of trainers for front-line CLTS work. 40 pages.

<[http://www.wsscc.org/fileadmin/files/pdf/publication/CLTS\\_trainers\\_training\\_guide\\_2010.pdf](http://www.wsscc.org/fileadmin/files/pdf/publication/CLTS_trainers_training_guide_2010.pdf)>

- **Hygiene and Sanitation Software: An Overview of Approaches.** Since the 1970s, sanitation and hygiene professionals have strived to find ways to engage target groups (individuals, households, communities, institutions or even organisations) in development programmes that facilitate sanitation and hygiene behaviour change, or create a demand for related services. These are 'software' methods or approaches, as opposed to 'hardware' such as toilets and pipes. This new resource presents in one place the latest thinking and most common software approaches for improving the political, legal, institutional, financial and economic, educational, technical and social conditions within which hygiene and sanitation programmes operate.

<[http://www.wsscc.org/fileadmin/files/pdf/publication/Hygiene\\_and\\_Sanitation\\_Software\\_WSSCC\\_2010.pdf](http://www.wsscc.org/fileadmin/files/pdf/publication/Hygiene_and_Sanitation_Software_WSSCC_2010.pdf)>

## WEDC

**Decentralised Wastewater Treatment Systems and Sanitation in Developing Countries (DEWATS): a practical guide, 2010.**

<[http://www.wedc-knowledge.org/wedcopac/opacreq.dll/fullIn?Search\\_link=AAAA:2660:68760624](http://www.wedc-knowledge.org/wedcopac/opacreq.dll/fullIn?Search_link=AAAA:2660:68760624)>

## NEWS FEED UPDATES

### Sanitation Updates - <http://sanitationupdates.wordpress.com>

- CNN – Ghana bags a handy new way to tackle plastic waste  
<<http://sanitationupdates.wordpress.com/2010/06/01/cnn-ghana-bags-a-handy-new-way-to-tackle-plastic-waste/>>
- Africa: self-help sanitation for more than 2 million people  
<<http://sanitationupdates.wordpress.com/2010/06/01/africa-self-help-sanitation-for-more-than-2-million-people/>>
- Nepal: opening of Urine Bank in Siddhipur  
<<http://sanitationupdates.wordpress.com/2010/05/31/nepal-opening-of-urine-bank-in-siddhipur/>>
- From high water table sanitation to music festival latrines  
<<http://sanitationupdates.wordpress.com/2010/05/30/from-high-water-table-sanitation-to-music-festival-latrines/>>
- Sudan: sanitation lessons from Pact’s WRAPP Equatoria Program  
<<http://sanitationupdates.wordpress.com/2010/05/29/sudan-sanitation-lessons-from-pacts-wrapp-equatoria-program/>>
- CRS – Water, Sanitation and Hygiene Considerations in Home-Based Care For People Living with HIV  
<<http://sanitationupdates.wordpress.com/2010/05/28/crs-water-sanitation-and-hygiene-considerations-in-home-based-care-for-people-living-with-hiv/>>
- Sulabh toilets can help reduce global warming  
<<http://sanitationupdates.wordpress.com/2010/05/27/sulabh-toilets-can-help-reduce-global-warming/>>
- World and Africa Cholera Statistics, 2000-2008  
<<http://sanitationupdates.wordpress.com/2010/05/21/world-and-africa-cholera-statistics-2000-2008/>>
- Morinosuke Kawaguchi: a TEDx talk on “geeky” Japanese toilet technology  
<<http://sanitationupdates.wordpress.com/2010/05/20/morinosuke-kawaguchi-a-tedx-talk-on-geeky-japanese-toilet-technology/>>

Links to other information resources include

- Environmental Health at USAID: <http://www.ehproject.org>
- Indoor Air Pollution Updates: <http://iapnews.wordpress.com>
- Sanitation Updates: <http://sanitationupdates.wordpress.com>
- Urban Health Updates: <http://urbanhealthupdates.wordpress.com>
- Cholera Google Group: <http://groups.google.com/group/cholera-control>
- Household Water Treatment Google Group:  
<http://groups.google.com/group/household-water-treatment>