

Editorial

Water, Ecology, and Health

The connection between water and health has been an increasingly frequent theme in *EcoHealth*. Readers will note that this issue includes four research reports that address a connection between water—water resources, or aquatic or marine ecosystems—and some dimension of human health. We hope that this reflects a trend not only for the journal but global health research and intervention that acknowledges the irrevocable ecological connections linking water and health.

No environmental issue is so profoundly critical to human health and ecosystem sustainability. Water is a cross-cutting theme linking nearly all major global health challenges, including biodiversity conservation, climate change, poverty alleviation, and infectious diseases. In the case of the latter, we often have to remind ourselves of how water resources management, via the social and ecological dimensions, affects diseases besides those categorized as waterborne.

This point is made in this issue by Pradmanabha et al. whose article can be added to the growing number of studies that indicate the reliability that piped household water is a major factor in dengue transmission. Here, not only is reliable access to potable water a key epidemiological factor, a low-tech intervention, proper water container lid placement in this case, is the most effective means available to interrupt the pathogen transmission cycle.

Thus, despite the remarkable capability of biomedical science and technology, we find human behavior and the use of relatively low-tech solutions, as often as not, is the key determinant of successful disease control. A long-term

cholera research program in Bangladesh recently revealed a similar finding (Huq et al. 2010). In a field trial, *point of use* filtration of water for domestic needs, employing sari cloth, produced a 50% reduction in cholera cases, compared with a control group. Dependence on materials available to any household, along with education and training in the filtering technique, were key to the consistent, sustained use of the technology.

Such appropriate technologies for disease control, i.e., those that can be readily adopted and used consistently without resort to external resources, may be the only means by which the gap in health status can be narrowed within a short timeframe for the more than a billion people without access to safe water. The high cost of engineering solutions (construction of water treatment facilities) and vaccines preclude deployment where most of the need exists.

This points to the value of ecologically oriented, transdisciplinary research and an integrated approach requiring deeper knowledge of host-pathogen biology that is based on both laboratory *and* field studies, including social and behavioral factors (human ecology).

Water plays a larger role in disease than often is appreciated. Many diseases are associated with water. Cholera is perhaps the best-studied example, but there are many protozoan, parasitic, bacterial, and viral diseases, the agents of which are naturally occurring in the environment. Not only is it impossible to eliminate these pathogen reservoirs, it would be highly undesirable were it feasible. Copepods, a natural host of *Vibrio cholerae*, not only comprises one of the most ubiquitous organisms on the planet, they also constitute a major component of biomass and productivity in the world's oceans.

Water quality and safety for the developing world is, indeed, the grand challenge for the 21st century.

Dr. Rita Colwell recently was awarded the 2010 Stockholm Water Prize, sometimes referred to as water's Nobel Prize, for her contributions as one of the most influential voices in science, technology, and policy associated with water and health. She has been Associate Editor of *EcoHealth* since its inception in 2004.

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