



Issue 184 | March 27, 2015 | Focus on Water Safety Plans (WSP)

A United Nations research brief states that Water Safety Plans are the most effective means of consistently ensuring the safety of a drinking water supply through the use of a comprehensive risk assessment and risk management approach that encompasses all steps in water supply from catchment to consumer.

This issue features an upcoming course and studies from the UNC Water Institute, reports from the Asian Development Bank, the World Health Organization (WHO), and WSP country studies from the Dominican Republic, Ethiopia, India, and other countries.

Next week's issue of the Weekly will be on food hygiene so please contact WASHplus if your organization has recent studies or resources that can be featured.

COURSES

Water Safety Plans: A Distance Learning Program by The Water Institute at the University of North Carolina at Chapel Hill. [Link](#)

The Water Institute runs a distance learning course on WSPs aimed at those in the water industry with management, engineering, or operational responsibilities. This distance learning course offers: skill and capacity building in global best practice to ensure consistent safety and acceptability of drinking water through WSPs, flexibility so you can learn and apply WSP principles and practices where you work, and professional recognition of enhanced expertise. Contact The Water Institute for more information or to register for the September 2015 course.

GENERAL OVERVIEW/WSP RESOURCES

Water Safety in Distribution Systems, 2014. WHO. [Link](#)

Water quality deterioration in distribution systems, mainly caused by inappropriate planning, design, and construction or inadequate operation and maintenance and water quality control, has been linked to a significant proportion of the burden of waterborne and water-related illness. Stresses on these systems caused by rapid urbanization, population growth, and aging infrastructure further exacerbates the problems. This reference tool has been developed to help water suppliers and regulators who are familiar with the WSP approach enhance their risk assessment and management and investment planning for their water distribution systems.

Water Safety Plan Resources. WHO. [Link](#)

The WHO Guidelines for Drinking-Water Quality recommend WSPs as the most effective means of consistently ensuring the safety of a drinking water supply. WSPs require a risk assessment encompassing all steps in water supply from catchment to consumer, followed by implementation and monitoring of risk management control measures. WSPs should be implemented within a public health context, respond to clear health-based targets, and be quality checked through independent surveillance.

Mainstreaming Water Safety Plans in ADB Water Sector Projects: Lessons and Challenges, 2014. Asian Development Bank. [Link](#)

WSPs change the way water supply systems are managed. Traditional drinking water guidelines are reactive, based on infrequent testing that detects contamination only after exposure and fails to completely protect water consumers from harm. In contrast, WSPs adopt a preventive approach, failures are detected early, and predefined corrective actions are completed in response to process failures to protect consumers before they are exposed to contamination.

Development of Indicators for Measuring Outcomes of Water Safety Plans. *Jnl Wat San Hyg Dev*, 4(1) 2014. G Lockhart. [Link](#)

Using the Centers for Disease Control and Prevention's WSP framework as a foundation and incorporating various existing performance monitoring indicators for water utilities, the authors developed a set of approximately 25 indicators of institutional, operational, financial, and policy changes within the WSP context. These outcome indicators hold great potential for the continued implementation and expansion of WSPs worldwide.

Global Assessment of Exposure to Faecal Contamination through Drinking Water Based on a Systematic Review. *Trop Med Intl Health*, Aug 2014. R Bain, The Water Institute at University of North Carolina at Chapel Hill. [Link](#)

Microbial contamination is widespread and affects all water source types, including piped supplies. According to this article, global burden of disease estimates may have substantially understated the disease burden associated with inadequate water services.

Microbial Contamination of Drinking Water and Human Health from Community Water Systems. *Current Env Health Reports*, Jan 2015. N Ashbolt. [Link](#)

A relatively short list of viral, bacterial, and protozoan pathogens appears adequate to assess microbial risks and inform a system-based management of drinking water. Nonetheless, data gaps exist. Where disinfection is the only treatment and/or filtration is poor, cryptosporidiosis is the most likely intestinal disease to be identified during waterborne outbreaks, but generally nonhuman infectious agents are also present even when fecal contamination from humans or animals is not. Treatment efficacy of culture-based methods is exaggerated and reduces our ability to identify pathogens/indicators; however, next-generation sequencing and polymerase chain reaction approaches are on the cusp of changing that.

Coliform Bacteria as Indicators of Diarrheal Risk in Household Drinking Water: Systematic Review and Meta-Analysis. *PLoS One*, Sept 2014. J Gruber. [Link](#)

Current guidelines recommend the use of *Escherichia coli* (EC) or thermotolerant (fecal) coliforms (FC) as indicators of fecal contamination in drinking water. Despite their broad use as measures of water quality, there remains limited evidence for an association between EC or FC and diarrheal illness: a previous review found no evidence for a link between diarrhea and these indicators in household drinking water. Findings from this study, based on a review of

the published literature, suggest that these two coliform groups have different associations with diarrhea in household drinking water. The results support the use of EC as a fecal indicator in household drinking water.

COUNTRY/REGIONAL REPORTS

An Examination of the Potential Added Value of Water Safety Plans to the United States National Drinking Water Legislation. *Intl Jnl Hyg Environ Health*, In press. R Baum, The Water Institute at University of North Carolina at Chapel Hill. [Link](#)

Systematic evidence from Iceland indicates that WSPs are a preventive approach for delivering safe drinking water and health benefits. To date, however, U.S. authorities have not widely adopted WSPs. In this study, the authors examine the added value of WSPs in comparison with U.S. drinking water regulations. While fairly well-aligned, gaps exist in team formation and training, risk management, and management procedures and plans. The authors conclude that WSP implementation by U.S. authorities could close the gaps and improve water quality and human health.

Developing a National Framework for Safe Drinking water – Case Study from Iceland. *Intl Jnl Hyg Environ Health*, Mar 2015. M Gunnarsdottir, University of Iceland. [Link](#)

The national framework for safe drinking water in Iceland sets out legislated roles and responsibilities for key actors. In this study the authors analyze implementation performance and conclude the main components are in place, including water quality surveillance and mandatory water safety plans. However, enforcement of legal requirements and guidance by central authorities need improvement. Lessons are transferable to other European nations and provide insight into the development of national frameworks for water safety.

Analysis of Water Safety Plan Costs from Case Studies in the Western Pacific Region. *Water Sci & Tech: Water Supply*, Sept 2013. ZK Chang, The Water Institute at University of North Carolina at Chapel Hill. [Abstract/order info](#)

The WHO promotes WSPs as the most effective means of ensuring the safety of a drinking water supply. In this study, authors estimated the costs of WSP implementation and determined the cost effectiveness of suppliers. The results show that more developed suppliers incur lower costs compared to developing suppliers, which also have high variability in cost. Rather than characterizing WSP costs directly, this research characterizes costs of securing safe water, providing a theoretical basis for larger scale costing studies.

Assessing the Microbial Quality of Improved Drinking Water Sources: Results from the Dominican Republic. *Am Jnl Trop Med Hyg*, 90(1) 2014. R Baum, The Water Institute at University of North Carolina at Chapel Hill. [Link](#)

This study analyzed microbial drinking water quality data from 409 households in 33 communities. Results showed that 47 percent of improved drinking water sources measured high to very-high risk for water quality, and therefore unsafe for drinking. This study provides evidence that the current estimate of safe water access may be overly optimistic, and microbial water quality data are needed to reliably assess the safety of drinking water.

Application of a Basic Monitoring Strategy for Cryptosporidium and Giardia in Drinking Water. *Water SA*, April 2014. M Sigudu. [Link](#)

In the present study, a strategy for monitoring Cryptosporidium and Giardia in drinking water was developed in an effort to ensure that the risk of exposure to these organisms and the risks of noncompliance to guidelines are reduced. The methodology developed will be applicable

to all water supply systems irrespective of size and complexity of the purification works. The protocol can also be integrated into the water safety plans to optimize compliance.

Ethiopia: Kebele Water Safety Plans (KWSP), 2014. J Teun Visscher. [Link](#)

The KWSP approach aims to contribute to the important steps of the Ethiopian government to improve the water supply and sanitation coverage and functionality as well as good household level hygiene and sanitation as outlined in the WASH Implementation Framework (WIF), which promotes decentralized management of rural water supply schemes and sanitation systems. The main approach adopted under the WIF is that household clusters and other user groups (e.g., health posts, schools, churches, farmer training centers, mosques, and market associations) using the same water system establish a water, sanitation, and hygiene management committee by electing members among the users to develop, implement, and manage the WASH systems.

Water Deterioration in Rural Honduras: An Examination of Three Communities.

Rural and Remote Health, Oct 2014. G Halder. [Link](#)

Data suggest that water safety plans may optimize water handling in rural communities because they consider local needs and resources. Furthermore, household water treatment technologies may offer a solution to water and sanitation in rural areas where the implementation of tailored systems is limited by scant resources.

Water Quality Management for Domestic Rainwater Harvesting Systems in Fiji. *Wat Sci Tech*, Sept 2014. J Kohlitz. [Abstract/order info](#)

WSPs use an approach to manage water quality that has shown signs of success with public and communal water supplies, but relatively little research has been done to investigate the application of WSPs to self-supply systems. The aim of this paper is to investigate the primary issues surrounding appropriate water quality management of domestic rainwater harvesting systems in Fiji and consider how the principles of WSPs can be applied in this context.

Water Safety Plan as a Tool for Improved Quality of Municipal Drinking Water in Nigeria. *Jnl Env Protec*, June 2014. E Ezenwaji. [Link](#)

This study found that out of six urban areas only two are faring well regarding the development and implementation of WSPs. As a result of the magnitude of the health problems associated with waterborne diseases, every effort should be made to have all urban areas develop and implement WSPs as part of their water supply policy framework for the delivery of potable water to consumers.

A Study of Water Safety Plan (WSP) for Environmental Risk Management of a Modern North Indian City. *IOSR Jnl Environ Sci Tox Food Tech*, Sept 2014. H Saini. [Link](#)

The hazard analysis and critical control points plan from which this water safety plan has been extracted is scoped to cover the entire water system from catchment to tap. It is a dynamic document continually evolving as increased knowledge and experience present opportunities for improvement.

WASHplus Weeklies highlight topics such as Urban WASH, Household Air Pollution, Innovation, Household Water Treatment and Storage, Hand Washing, Integration, and more. If you would like to feature your organization's materials in upcoming issues, please send them to Dan Campbell, WASHplus Knowledge Resources Specialist, at dacampbell@fhi360.org.



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About WASHplus - WASHplus, a five-year project funded through USAID's Bureau for Global Health, supports healthy households and communities by creating and delivering interventions that lead to improvements in access, practice and health outcomes related to water, sanitation, hygiene (WASH) and household air pollution (HAP). WASHplus uses at-scale, targeted as well as integrated approaches to reduce diarrheal diseases and acute respiratory infections, the two top killers of children under five years of age globally. For information, visit www.washplus.org or email: contact@washplus.org.