Research Brief

Drinking water is not sufficiently tested for microbial contamination in sub-Saharan Africa

Monitoring for Safe Water (MfSW) is an action research program that promotes drinking water safety through improved monitoring. MfSW was launched with a grant from the Bill & Melinda Gates Foundation to the Aquaya Institute (Aquaya). Partners have included the African Water Association (AfWA), the International Water Association (IWA), and the World Health Organization (WHO).

INTRODUCTION

On the 25th of September 2015, the member States of the United Nations adopted the 2030 Agenda for Sustainable Development, which includes a target of universal and equitable access to safe and affordable water for all by 2030. Water quality data is essential for both guiding and measuring progress towards this ambitious objective.

To clarify how water quality data is currently collected in sub-Saharan Africa, MfSW researchers have recently published an in-depth analysis of regulated monitoring activities:

> Peletz, R., Kumpel, E., Bonham, M., Rahman, Z., & Khush, R. (2016). To What Extent is Drinking Water Tested in Sub-Saharan Africa? A Comparative Analysis of Regulated Water Quality Monitoring. *International Journal of Environmental Research and Public Health,* 13(3), 275.

This brief summarizes the results of their analysis.

In most countries, institutional responsibilities for water quality testing fall into two categories: 1) operational monitoring by licensed water suppliers; and 2) surveillance or compliance monitoring by an independent agency, usually responsible for public health.

MAIN FINIDINGS

1. Most water suppliers and surveillance agencies in sub-Saharan Africa conduct some testing of microbial water quality.
2. Most of these institutions do not achieve the testing frequencies specified by national standards or WHO Guidelines.
3. Larger institutions are more likely to meet regulatory requirements for testing frequency.
4. Regulated water testing in Africa is focused on piped distribution networks in large cities.
5. Water and health agencies must prioritize testing and risk management of small piped supplies and water point sources.

Figure 1: 72 institutions (water suppliers and health surveillance agencies) from 10 countries participated in the study

METHODS

Following a call for participation in MfSW in 2012, 37 water suppliers and 35 surveillance agencies (representing the countries of Benin, Burkina Faso, Ethiopia, Ghana, Guinea, Kenya, Senegal, Tanzania, Uganda, and Zambia) provided information on their water quality testing activities. Forty-eight of the institutions included microbial water quality test results from

the previous year. To evaluate monitoring performance, researchers compared testing levels for microbial indicators of fecal contamination. Fecal contamination is the main cause of waterborne disease and is the primary public health risk associated with drinking water.

37
WATER SUPPLIERS

POPULATION SERVED FROM 15,600 TO 3,900,000

35
SURVEILLANCE INSTITUTIONS

POPULATION COVERED FROM 43,500 TO 20,000,000

WATER SUPPLIERS AND SURVEILLANCE INSTITUTIONS

Water suppliers were defined as regulated institutions responsible for providing treated water through piped distribution networks. Operational monitoring requirements generally prioritize measurements of pH, residual chlorine, turbidity, and indicator bacteria to guide corrective actions. National water quality standards usually require testing of additional water quality parameters.

Most of the surveillance agencies were District Health or Water Offices operating in rural settings. However, regional laboratories established by both public health and water supply agencies were also included in the surveillance category. Regulatory requirements and applicable standards for surveillance monitoring are not always well established.

RESULTS

All of the piped water suppliers included in the study were located in urban areas. In contrast, 77% of the surveillance agencies were located in rural areas. Most of the water samples (67%) tested by water suppliers were collected from consumer taps connected to piped distribution networks. Consumer taps also represented the largest fraction (31%) of samples tested by surveillance agencies. Most (88%) of the surveillance agencies were responsible for monitoring both piped and non-piped water supplies. As shown in Figure 2, water suppliers were more likely than surveillance agencies to both test microbial water quality and meet WHO recommendations for testing frequency.

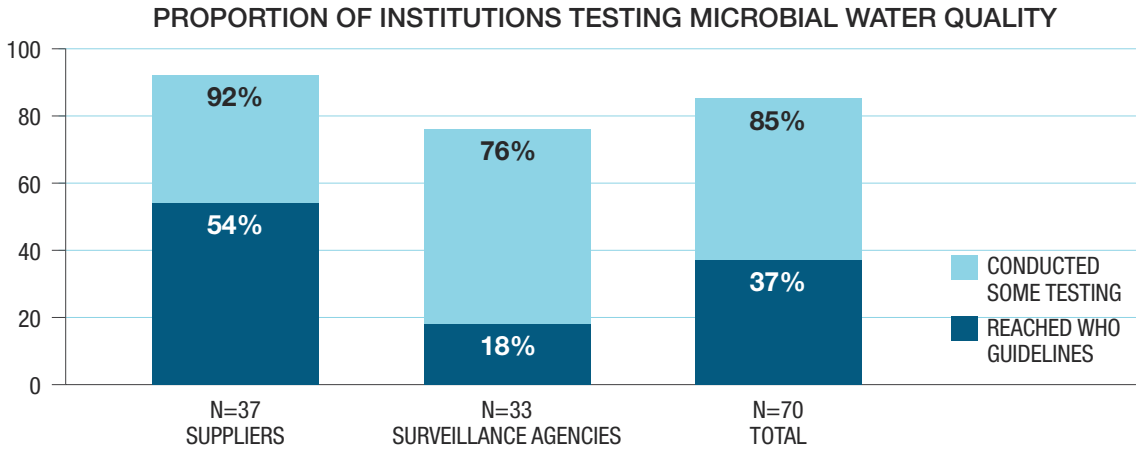

Figure 2: Monitoring performance of institutions, based on testing for microbial indicators of fecal contamination.

For both suppliers and surveillance agencies, size was a key determinant of monitoring performance. This is demonstrated by the factors that were associated with higher levels of monitoring performance:

1. Provision or oversight of water supplies for large populations (>500,000).
2. An annual water quality budget of at least US$0.05 per person.
3. Operations at national or regional rather than lower administrative levels.

In contrast, the following factors did not appear to influence monitoring performance:

1. The number of water quality staff per people served.
2. The number of years in operation.
3. The presence of an independent water sector regulator.
4. Documented national standards for either operational or surveillance monitoring.

CONCLUSIONS

Most regulated water suppliers and surveillance agencies in sub-Saharan Africa are conducting some microbial water quality testing of drinking water supplies. However, most of their efforts are focused on piped distribution networks in large cities.

To better target resources for improving water safety and to measure progress towards safe water targets, regular water quality monitoring of smaller piped distribution systems and non-piped water supplies such as hand pumps and dug wells are important priorities. Responsibilities for testing these supplies generally lie with surveillance agencies, which are usually under-resourced and overworked public health offices located in rural areas.

As noted in other studies, providing more resources and training to support water quality testing by public health officers is essential, but it will take a long time to build surveillance monitoring capacities across Africa. Therefore, it is also necessary to apply risk management methods, such as Sanitary Surveys and Water Safety Plans for promoting drinking water safety, particularly in small towns and rural settings.

Peletz, R., Kumpel, E., Bonham, M., Rahman, Z., & Khush, R. (2016). To What Extent is Drinking Water Tested in Sub-Saharan Africa? A Comparative Analysis of Regulated Water Quality Monitoring. *International Journal of Environmental Research and Public Health,* 13(3), 275.

The full text can be found at: http://www.mdpi.com/1660-4601/13/3/275

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