

STATE BUDGET CUTS and Drinking Water Quality Impacts

By Kelly A. Reynolds, MSPH, Ph.D.

Justification for costs associated with disinfection of drinking water supplies in Wisconsin has come under attack. State lawmakers have introduced two new Senate bills, repealing a requirement for disinfection, that water quality experts fear will have significant public health impacts.

Wisconsin's water

Wisconsin residents receive their water from a variety of sources. According to the Department of Natural Resources, the state has 1.2 quadrillion gallons of groundwater in addition to drinking water sources from the Great Lakes and Lake Winnebago. There are approximately 11,400 public water systems in the state, serving a population ranging from tens of thousands to hundreds of thousands of people.¹

According to the testimony of Jill Jonas (Director of the Bureau of Drinking Water and Groundwater, Wisconsin Department of Natural Resources) before the Senate Committee on Environment in July 29, 2009, the state began protecting water as early as the 1930s and was the first in the country to establish well-construction standards. In her testimony, Jonas continued to point out that Wisconsin was a leader in the passing of the state's *Groundwater Protection Act* in 1984.² The state is again on the forefront of water quality news but this time due to proposed changes that are likely to reduce the safety of drinking water.

Wisconsin is already known for the largest documented waterborne disease outbreak in the United States, where approximately 403,000 people (about half of the community served) were sickened, with 104 fatalities. The historical 1993 outbreak was from a surface-water supply in Lake Michigan, where increased rainfall events and contaminant runoff from agricultural operations resulted in unusually high turbidity levels at the treatment plant. Another potential confounder was a recent change in the water treatment system. It is presumed that these combined effects resulted in spiked levels of the human pathogenic protozoan *Cryptosporidium*, in Milwaukee's drinking water.

USEPA has set and enforced federal standards and regulations for over 80 drinking water contaminants. Implementation of the *Safe Drinking Water Act*, the *Surface Water Treatment Rule* and the *Groundwater Disinfection Rule* has minimized the risk of waterborne contaminants. Federal standards requiring the disinfection and filtration of surface-water sources are designed to remove microbes, such as human viruses and *Cryptosporidium*, respectively. All surface-water supplies are required to be treated prior to consumption.

The current Senate bill propositions affect a different type of exposure risk, namely those associated with groundwater supplies. As per the 2006 *Groundwater Disinfection Rule*, federal treatment requirements related to groundwater are more

subjective, meaning individual utilities are required to increase monitoring and conduct a sanitary survey of the source water to identify contamination or contamination potentials. The rule applies to more than 147,000 US public water systems and, according to US EPA, is expected to prevent 42,000 infections per year—a 23-percent reduction from current baseline estimates.³ Although 88 percent of the communities in Wisconsin currently disinfect, in question are the remaining 12 percent that do not.

Political problems

According to a report by *The Capital Times*, the politicians proposing the controversial bills (Republican Senator Sheila Harsdorf and Representative Erik Severson) reason that the Department of Natural Resources rule (December, 2010) requiring Wisconsin municipal governments to enforce the disinfection of drinking water supplies, was too expensive and more stringent than federal groundwater standards.⁴ State Representative Brett Hulsey, D-Madison, reportedly countered that the GOP's bill should be called the *Poison Our Drinking Water Act*.⁴

Experts fear that efforts to balance state and federal budgets, by cutting water treatment expenses, may backfire. Although we are living in times of fiscal crises and a national debt of \$14 trillion (check out the ever-increasing National Debt Clock, www.usdebtclock.org/), one has to ask what the consequences will be if necessary water treatments are minimized. What is the health, or life, of an individual worth? Is a savings related to water disinfection cost-effective in the long run, considering the costs of acute (i.e., gastroenteritis, diarrhea, meningitis, hepatitis, etc.) and chronic (i.e., diabetes, reactive arthritis, heart disease, liver/kidney ailments, etc.) waterborne diseases?

Groundwater contamination

Numerous studies have been conducted, especially over the last decade, demonstrating the vulnerability of groundwater contamination with respect to disease-causing microbial organisms. Several of these studies have been conducted on water supplies in Wisconsin. Dr. Mark Borchardt, a microbiologist at the US Department of Agriculture and US EPA Scientific Advisory Board Member, is a recognized leader in waterborne disease transmission and has directed many of the studies in Wisconsin. He is currently conducting research focused on the impact of Wisconsin's municipal groundwater supplies on the risks of acute stomach infections in children. In the ongoing study, 43 percent of untreated groundwater samples tested positive for at least one human virus.⁵ Every well was positive at least twice in the six wells surveyed. Additional studies provide compelling evidence for the inevitable contamination of groundwater supplies from leaking sewer pipes, septic tanks and surface contaminants, significantly worsened by snowmelt and rainfall events.⁶

Threats to groundwater may be continuous or intermittent. Water quality is impacted by changes in climate, weather events, land and water use, temperature and other influences. Just as climatic variations are difficult to predict, so is the quality of the source water. What is known, however, is that the costs for necessary upgrades to Wisconsin's water-related infrastructure are estimated to reach \$6 billion (USD) by 2023. Although the current political debate on water quality needs is occurring in Wisconsin, the outcome of this state's commitment to clean water is expected to lead other states to examine of their own public health priorities.

POU solutions

Although not conducted at the point of use, a recent study looked at the benefits of ultraviolet light disinfection of drinking water at the municipality level. Researchers documented a 13-percent reduction in gastroenteritis (i.e., diarrhea and vomiting) in consumers. The study involved more than 1,700 participants from 621 households in 14 Wisconsin communities served by 36 wells. During the course of the study, 34/36 (94 percent) of the wells tested positive for human viruses.⁷

Treatment technologies employed at the tap can be used to target a wide range of contaminants simultaneously. While non-disinfected water supplies infer a risk of microbial hazards, particularly viruses, other contaminants can also impact groundwater, including nitrates, phosphates, arsenic and more. As the political debate on water treatment continues, options for the consumer to circumvent the dynamic and changing issues related to water quality, health impacts and policy, include point-of-use solutions.

References

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