

## PUBLIC HEALTH

## What physicians can do to prevent illnesses related to drinking water

Outbreaks of waterborne illness from *Escherichia coli* in Walkerton and *Cryptosporidium* in North Battleford led to recommendations and actions to prevent additional outbreaks. A panel is currently reviewing the state of drinking water in First Nations communities, in response to recent concerns about the safety of drinking water in Kashechewan and other First Nations communities. Across Canada, changes have been made to provincial legislation to address risks from microbial and chemical contaminants in drinking water. Many water-treatment systems have been upgraded, as have training requirements for operators.

How effective have these responses been? And how sure are we that the health risks associated with drinking water have been targeted correctly and reduced? To a casual observer, the demand for more stringent standards and attendant action by different levels of government may seem to be convincing evidence that the risks of waterborne illness have been adequately addressed. There are, however, reasons to be less sanguine about the potential for recurrences of illness related to our drinking water.

Much of the demand for more stringent standards has focused upon reducing acceptable concentrations of contaminants, both microbial and chemical, in tap water. Although this response is understandable, tightening concentration-based standards is unlikely to be effective in tackling the major part of the risk to consumers from waterborne pathogens. Concentration-based standards are unavailable for important pathogens such as *Cryptosporidium* and *Giardia*. Most of the risk from chemicals in drinking water is associated with only a few key contaminants and remains relatively insensitive to changes in standards for other substances.

Some countries, notably Australia, have recognized that reliance on monitoring for compliance with numerical limits is, by itself, insufficient to assure safe drinking water.<sup>1</sup> To address this, a framework for quality management has been incorporated into the Australian Drinking Water Quality Guidelines. The essence of the framework has been summarized in 6 principles:

- 1) Pathogens pose the greatest and most tangible risk to drinking-water safety; pathogen removal or destruction is therefore the paramount concern.
- 2) Robust, effective multiple barriers to drinking-water contamination are needed to suit the level of contamination in the raw water source.
- 3) Trouble is usually preceded by change; change should therefore be taken as warning to be on the alert for trouble.
- 4) Operators must be capable and responsible.
- 5) Drinking-water professionals (providers, regulators and health officials) must be accountable to consumers.
- 6) Ensuring safety is an exercise in risk management, which requires sensible decisions in the face of uncertainty.<sup>2</sup>

This more holistic approach is also recognized in Canada but has not yet been fully incorporated into Canadian guidelines or practice. Although there is little evidence to suggest that water systems in large communities are a source of high risk, many small water systems still lack adequate treatment.

One of our most serious deficiencies is in good information on the burden of illness associated with Canadian drinking water. We lack good national surveillance data on water systems and on waterborne illness. Without better data, we cannot accurately identify health risks from drinking water or track our progress (or lack thereof) in reducing these risks.

### What can physicians do?

Physicians, particularly those delivering primary care, can play an important role in the early recognition of illness from drinking water. Having a basic knowledge of the sources and level of treatment of drinking water in the communities where they practice should be

part of every physician's background knowledge. We should ask patients about their source of drinking water. Waterborne enteric illness can be more likely after extreme weather or other events, when increased levels of pathogens in source water could overwhelm usually effective water treatment.

Most waterborne illness relates to enteric pathogens. Many provinces rely on laboratory reports as their means to identify outbreaks of waterborne illness. Although valuable, reliance on water analyses often delays the recognition of outbreaks. Syndromic surveillance in emergency departments can play a valuable role in early identification of outbreaks. Current reporting of waterborne illness is incomplete and should be improved.<sup>3</sup> Meanwhile, physicians who recognize an increase in cases of enteric or other illness in their practice should ask whether it could be water-related and, if so, alert public health staff and those responsible for oversight of water systems.

Although chemical-related illness from drinking water is far rarer, it does occur. In British Columbia, episodes have been reported of drinking-water poisoning from arsenic and copper. The arsenic poisoning of water was discovered by 2 alert physicians: a family doctor and a pediatrician. Their diagnosis of water-related arsenic poisoning began a chain of events that led to the discovery of dozens of other wells with high arsenic levels and a much better appreciation of the dangers of arsenic in drinking water across British Columbia. That incident is another example of how good clinical practice can improve public as well as personal health.

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#### REFERENCES

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