



# Overdosed

Do drugs in waterways pose a liability concern?

BY DIANNE SAXE AND JACKIE CAMPBELL

**THE BETTER OUR DETECTION ABILITY BECOMES**, the more things we find in our water. One important group of those things is pharmaceuticals and their metabolites. Pharmaceuticals are specifically designed to affect the bodies, brains and behaviour of humans and other animals, at comparatively low concentrations. Some pharmaceuticals have synergistic effects with other pharmaceuticals, or with other common

substances like grapefruit or Vitamin D. Could vulnerable humans be affected by chronic exposure to unplanned mixtures of pharmaceuticals (and other things) in water that is used for drinking, cooking, bathing, et cetera? If so, should municipalities worry?

## Health effects

Drugs get into water sources in many ways, including via excretion from humans

and animals, disposal of unused drugs into sewage systems or landfills, runoff from animal manure applied to fields, and from facilities that manufacture and package pharmaceuticals. As analytical methods improve, many drugs and their metabolites are now detectable, at very low concentrations, in wastewater and drinking water.

These drugs do have environmental effects. A study conducted in



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the Experimental Lakes Area of Northwestern Ontario found that adding minute concentrations of an estrogen used in many birth control pills to the lake's water led to feminization of male fathead minnows, followed by near extinction of the species from the lake. More recently, significant concentrations of antidepressant drugs were found in the tissue of brook trout exposed to wastewater that had gone through primary treatment; lower levels were noted in fish exposed to ozone-treated

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effluent. The same researchers conducted an in vitro study that suggests that antidepressants (or other contaminants) in effluent may affect certain brain pathways in brook trout.

So far, limited evidence has not proven adverse human health effects. Ontario's Ministry of the Environment is gathering information on pharmaceuticals that will be used to create a database that includes the concentration of these agents showing up in water and other media. The ministry just published results of a 2006 survey, which found pharmaceuticals and other contaminants in both source water and finished drinking water, but at levels it did not consider to be of concern. One small study screened 19 drugs and their metabolites in drinking water, without finding adverse health effects, but recommended more research on other mixtures and sensitive populations. As usual, absence of evidence is not evidence of absence.

### No standards yet

Responsibility for safe drinking water is shared among the three levels of government. The federal government is responsible for drinking water in certain areas, like First Nations communities and armed forces bases, as well as for regulating food safety, such as bottled water. Health Canada recently revised its (voluntary) Guidelines for Canadian

Drinking Water Quality, developed by the Federal-Provincial-Territorial Committee on Drinking Water. These incorporate health and aesthetic considerations such as odour and taste and recommend standards for many chemicals including pesticides and fertilizers, but not pharmaceuticals.

Provinces and territories enact laws and regulations for safe drinking water, including setting standards for chemicals, which must be followed by water providers, including municipalities.

Provincial and territorial governments also make laws and policies concerning protection of the environment, natural resources and our watersheds. Provinces typically use the federal

guidelines in their own drinking water standards. So far, we don't know of any that set standards for pharmaceuticals in drinking water.

Municipalities usually provide drinking water and wastewater services (at least in urban areas), and typically implement these provincial/territorial policies. They enact bylaws that prohibit or limit discharges of many chemicals into sanitary and storm sewers. As yet, pharmaceuticals are not regulated through sewer bylaws. Nor is it obvious how such a bylaw could be enforced, especially for those drugs that pass through the human body.

### Are municipalities at risk of liability?

If drugs in drinking water turn out to harm human health, municipalities can expect to be sued. Whether a successful defence can be mounted will depend on good monitoring of the issue, taking appropriate actions when they can, and sticking together to set reasonable standards. An insurance pool wouldn't hurt either.

Municipalities have some protections against civil lawsuit for nuisance, relating to leaks and discharges from their waterworks, based on statutory immunities adopted by each province in the late 1980s, after four Supreme Court of Canada decisions imposed huge liabilities on municipalities. However,

claims for unsafe water are unlikely to be barred by these statutory immunities, which were not directed at the quality of water. When it comes to water safety, municipalities are much like anyone else who sells products intended to be consumed, and must provide water that is reasonably safe for consumption.

At a minimum, municipalities have to do everything they reasonably can to provide safe drinking water to their residents. Statutory duties of care, such as the extremely demanding section 19 of Ontario's *Safe Drinking Water Act*, 2002, will make this even harder, but here are a few hints.

**Prevent pollution:** Like the City of Vancouver, mandate responsible drug disposal. Help educate consumers and health professionals not to pour surplus drugs down the drain, or put them in the garbage. Encourage product stewardship schemes by pharmacists and drug companies.

**Stay transparent:** Monitor and report levels of potential contaminants that could have adverse health effects, including pharmaceuticals where appropriate.

**Keep current:** Be aware when other levels of government proposal benchmarks for pharmaceuticals in water and when treatment options become available to remove them from drinking water and/or effluent. Keep bylaws up to date.

**Ask senior levels of government for action:** The U.S. Association of Metropolitan Water Agencies is asking senior governments to set up a list of target drugs and focus research on their effects on human health and aquatic life. It also suggests that the Food and Drug Administration mandate environmental assessments as part of the drug approval process; that guidance be developed concerning antibiotics in animal feed and production; and that a national program be developed to make it easy for consumers to dispose of unused medications. wc

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