



**To the Editor:**

*This is an article from a series of monthly columns by Environmental Law Specialist Dianne Saxe, one of the top 25 environmental lawyers in the world, and Jackie Campbell. These articles are available for publishing at no charge, provided Dr. Saxe and Ms. Campbell are cited as the authors. Dr. Saxe can be contacted at (416) 962 5882 or [admin@envirolaw.com](mailto:admin@envirolaw.com). For more information, visit <http://envirolaw.com>.*

## **Keeping drugs out of our drinking water – an update**

Two years ago, we told you about the growing problem of pharmaceuticals in our drinking water. Since then, has Government done anything about it?

### ***Ontario Ministry of the Environment Survey***

In January, the Ministry of the Environment quietly posted new data.<sup>1</sup> 258 samples were collected from 17 municipal drinking water systems (half from source water, and half from treated drinking water). The samples were analysed for 46 pharmaceuticals plus BPA; 27 of them were detected. (They did not check for the presence of illegal drugs, like cocaine or marijuana.)

The most frequently detected drugs in **untreated source waters** (rivers, lakes) were:

*Anticonvulsant:* carbamazepine

*Lipid-lowering agents:* gemfibrozil, sulfamethoxazole, bezafibrate

*Analgesics:* ibuprofen, naproxen, acetaminophen

*Antimicrobials:* lincomycin, erythromycin, trimethoprim; veterinary-only anti-infectives: monensin, sulfamethazine

*Other:* bisphenol A (a plasticizer now banned in baby bottles)

In **treated drinking water**, the most frequently detected drugs were

- Carbamazepine (an anticonvulsant)
- Gemfibrozil (a lipid-lowering agent)
- Ibuprofen (a commonly used fever/pain medication)
- Bisphenol A (a notorious plasticizer)

Unfortunately, there are no regulatory standards for safe levels of drugs in drinking water, and no one knows the effects of lifelong exposure to mixtures of different drugs.

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<sup>1</sup> *The Survey of the Occurrence of Pharmaceuticals and Other Emerging Contaminants in Untreated Source and Finished Drinking Water in Ontario* (<http://www.ene.gov.on.ca/publications/7269e.pdf>).

Nor is there any evidence that bottled water is any better; bottled water is usually made from tap water, or from the same types of source water that municipalities use.

The good news?

1. Drug levels in drinking water are tiny.
2. Current water treatment plants may not be designed to treat pharmaceuticals, but they do help. Drug concentrations in finished (treated) drinking water were usually lower than those in untreated source water.
3. Regulators in both Canada and Australia conclude that one would have to drink thousands of glasses of water a day to exceed “acceptable” daily intakes of individual drugs.

Australia has been thinking about how to set safe limits for pharmaceuticals in drinking water, and has proposed public guidelines.<sup>2</sup> For example, regulators could divide the lowest daily therapeutic dose by a reasonable safety factor, which has to protect toddlers and pregnant women. After much discussion, they propose a safety factor from 1000 to 10,000.

As an example, Australian guidelines consider the antibiotic norfloxacin (lowest daily dose 800 mg/day): applying a safety factor of 1000 would mean that 0.8 mg (i.e., 800 mcg) could be ingested each day via (the average) 2 litres of water individuals consume each day. That translates to a maximum acceptable concentration of 400 mcg/L, well above concentrations that have actually been measured.

I admit, however, that this apparently scientific calculation doesn't make me feel much better:

- Drug safety tests never endure for an entire lifetime, and the “lowest daily therapeutic dose” isn't calculated with lifetime exposure in mind.
- What if the right safety factor for norfloxacin ought to be 10,000 or 100,000?
- What if I am from an ethnic group that is particularly sensitive to a particular drug or group of drugs?
- Lots of drugs have additive or synergistic effects, meaning that exposure to one can amplify the effect of another. Even grapefruit or various herbal remedies are known to have this effect.
- Many people are exposed to more than 2 L of water a day, in drinking and cooking.
- What if the drugs can be absorbed through the skin, i.e. from swimming, laundry or bathing?
- What if the drugs are also present in consumer products that are made with water, like shampoo or hand cream? Or in food that has been irrigated with water containing drugs?

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<sup>2</sup> *Australian Guidelines For Water Recycling: Managing Health And Environmental Risks (Phase 2) - Augmentation of Drinking Water Supplies* 2008.

([http://www.ephc.gov.au/sites/default/files/WQ\\_AGWR\\_GL\\_ADWS\\_Corrected\\_Final\\_%20200809.pdf](http://www.ephc.gov.au/sites/default/files/WQ_AGWR_GL_ADWS_Corrected_Final_%20200809.pdf) )

- Some drugs have hormonal effects, and can affect the human body at incredibly tiny concentrations.
- What about fish, and other plants and animals? What are the drugs doing to them?

I think we need to do something about these drugs in our water supply.

***Post-consumer pharmaceutical waste – Ontario will regulate as of July 1***

Fortunately, there is one easy thing that can help. Leftover drugs should never be flushed down toilets or discarded with regular garbage. Consumers should return unused drugs to their pharmacies for incineration.

So far, returning drugs to pharmacies is voluntary in most of the country; only B.C. requires it. Vancouver bans consumers from throwing unused medications into curbside garbage, which has prompted a huge increase in consumer awareness. As of July 1, Ontario will also regulate consumers' unused drugs, and hopes to collect about 659 tonnes a year, all at the expense of the drug manufacturers.<sup>3</sup> .

Believe it or not, 90% of Ontario pharmacies already accept unused drugs, and the rest will have to this summer. Every pill bottle returned to a pharmacy may help to keep something important out of our drinking water. It is an easy thing to do right.

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<sup>3</sup> Stewardship Ontario. Final consolidated municipal hazardous or special waste program plan – Volume II: material-specific plans. July 30 2009 at page 120.

[http://www.stewardshipontario.ca/mhsw/pdf/plan/mhsw\\_plan\\_jul30\\_09\\_vol2.pdf](http://www.stewardshipontario.ca/mhsw/pdf/plan/mhsw_plan_jul30_09_vol2.pdf) .

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