Prozac, Painkillers & Hormones Found in Tap Water

by Emma Holister
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Drinking water contains traces of nine drugs, new study finds

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Sarah Staples
CanWest News Service

The federal government's first study of pharmaceuticals in drinking water will confirm traces of common painkillers, anti-cholesterol drugs and the antidepressant Prozac are ending up in the treated water that Canadians drink, CanWest News Service has learned.

A study by researchers from the National Water Research Institute for Health and Environment Canada, designed to gauge how efficiently plants removed traces of drugs from drinking water, found nine different drugs in water samples taken near 20 drinking water treatment plants across southern Ontario.

The drugs were mainly from a class known as "acidic pharmaceuticals," and included the painkillers ibuprofen and neproxin, and gemfibrozil, a cholesterol-lowering medication. Concentrations were in the parts per trillion -- comparable to one cent in $10 billion. "Barely detectable" levels of Prozac were also found.

The worst contamination came from treatment plants located near rivers or downstream from sewage treatment plants, as opposed to those plants sourcing water from lakes or groundwater.

The study has been submitted to the British scientific journal Water Research and is expected to be published sometime in the New Year.

While the amounts are well below prescription doses, experts from the NWRI say confirmation of even scant levels of a burgeoning assortment of drugs in Canada's drinking water is a troubling find warranting further investigation.

"It's kind of a brand new ball game and we don't know enough," said Jim Maguire, director of the institute's aquatic ecosystem protection research branch.

Residues of hormones are well known to disrupt the reproductive abilities of amphibians and fish. There is also suspicion that antibiotic residues working their way up the food chain may promote resistance to the drugs, while many other medications could harm fetuses, and people who are ill or infirm.

The effects of pesticides are better understood and regulated in Canada than personal care products, such as lotions and cosmetics, or prescription pharmaceuticals, said Maguire.

"You need to know how long lasting [the contamination is], and if it's being continually reintroduced -- but there's no country in the world that has enough information," he said. *"We're kind of like where we were 25 years ago with PCBs and dioxides."*

The government study is the first official acknowledgement of long-standing suspicions voiced by Canada's water-quality experts.

Transcripts obtained by CanWest News Service of a Health Canada-sponsored international workshop in 2002 show government chemists voicing serious concern over the possible negative effects of trace pharmaceuticals, at a time when U.S. and European studies were starting to reveal antibiotics and chemotherapeutics, drugs for epilepsy and depression, anti-inflammatory drugs, veterinary drugs, fragrances such as musk, and hormones in treated sewage runoff and tap water.

Informal private testing carried out last year on behalf of media outlets revealed residues of gemfibrozil and the anticonvulsant drug carbamazepine in tap water from towns and cities across Canada.

The federal government isn't testing for the full range of drugs that could be in Canada's potable water supply, preferring initially to limit its search to "acidic" drugs because they are easiest to spot using existing pesticide analysis techniques, said Kent Burnison, an NWRI microbiologist who co-wrote the study.

Ontario's water was surveyed not because of any special concern over its safety, but because samples had to be taken near NWRI's laboratory to preserve their integrity, he said.

The United States and Europe -- which acknowledged pharmaceutical accumulation several years before Canada began studying the phenomenon -- have already begun releasing the first disturbing results of experiments to understand the impact of drugs in the water on fish and wildlife.

In October, for example, the U.S. Geological Survey and the Department of Environmental Protection, revealed 42 to 79 per cent of the male smallmouth bass from a section of the Potomac River known to harbour nicotine-related chemicals and caffeine traces have started producing eggs.

Studies in Colorado waterways recently encountered more examples of "intersex" males, as well as female fish that are having trouble reproducing.

The working hypothesis is that leftover estrogen from chicken droppings or human hormones, not traditional pollutants from agriculture or mining, are disrupting the fish's reproduction.

In Europe and Japan, scientists are turning their attention to devising ways of cleaning drinking water using new, hypersensitive nano-scale filtration materials.

Burnison's lab is in the midst of a multi-year study of the environmental impacts of the drugs found so far in Canada's drinking water.

With a growing and aging population of baby boomers who will rely increasingly on medication, water experts fear the problem may only get worse.

"You may prove that individual pharmaceuticals aren't doing that much [to the environment], but when you've got a 100 or more compounds together, what is the synergistic effect?" he said.

"Is it one plus one equals two, or does it equal three and four?"

FOUND IN THE WATER

Detectable levels of many common drugs have been found in Canadian drinking water.

- Analgesics ibuprofen and neproxin.

- Antidepressant Prozac.

- Anti-cholesterol medication gemfibrozil.

- Anticonvulsant drug carbamazepine.

- Traces of nicotine, caffeine and estrogen are detectable in some wildlife.