

# Pharma in the Plumbing Flushed Away

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The planet may still be paying for the cold you had last winter. If it was a bad one, you probably took medicine. Maybe you rinsed the little dosing cup in the sink every time you used it. Maybe you finished the bottle and threw it in the trash. What you surely did several times a day was go to the bathroom — perhaps more than usual if you were taking care to drink plenty of liquids — and some of that medicine passed straight through you. What all this means is that while you were taking your cold medicine, so was your local water supply.

The planet is also paying for your dad's hypertension, your aunt's high cholesterol and your colleague's throat infection, all of which were treated with drugs whose chemical residue then leaked into sewers or was leached into landfills and water tables. All told, there are about 3,000 prescription pharmaceuticals in use in the U.S. and thousands more over-the-counter drugs, not to mention creams and ointments we smear on and then shower off. "Between cosmetics, pharmaceuticals and other sources," says John Spatz, commissioner of Chicago's department of water management, "there are 80,000 potential combinations of chemicals." It's impossible to keep our drinking supply safe from a gusher like that. Wastewater from homes gets treated at sewage plants, but it's never possible to remove every trace of drugs. What's more, sewage pipes break, septic tanks overflow, and in some parts of the U.S. "straight-piping" — which sends untreated sewage flowing directly into surface water — is still practiced. One way or another, the drugs find their way back to us. ([See TIME's special report "How to Live 100 Years."](#))

Pharmaceutical pollutants are worrisome for reasons beyond their mere numbers. They're also specifically designed to be reactive with human tissue. If they weren't, they'd be useless. In March, Lisa Jackson, administrator of the Environmental Protection Agency (EPA), announced that Washington is formulating new rules to regulate all contaminants in water, including drugs. The measures will include better enforcement of existing regulations, closer coordination with states and development of new water-treatment techniques. "We are identifying contaminants at a much faster pace than we are addressing them," she warned in an address to the Association of Metropolitan Water Agencies (AMWA) in which she announced the new policies. ([See the top 10 medical breakthroughs of 2009.](#))

In the 1970s, scientists began detecting pharmaceutical residue in waterways, but in an era when rivers were

choking on industrial sludge, traces of drugs seemed a small matter. It would take until the 1990s for that view to change. That was when pharmaceutical estrogens, principally from birth control pills, began showing up in the water too, leading to male fish with androgynous sex organs. Scarily, it did not take much estrogen to affect the fish — just 5 or 6 nanograms, or billionths of a gram, per liter of lake water.



That woke regulators up fast, and numerous groups, including the EPA and the World Health Organization, began looking closely at just how thick a pharmaceutical soup our drinking water had become. Even a partial list of the drugs they found is alarming: it included antidepressants, anticonvulsants, tranquilizers, antibacterials, antipsychotics, ACE inhibitors, nitroglycerin, steroids, ibuprofen and caffeine.

But the mere fact that so many drugs have been found in the water does not mean they pose a danger. Testing techniques

have become so refined that even the most inconsequential levels of contaminants cannot elude detection. "Some of these concentrations are thousands of parts smaller than what could be of pharmaceutical concern," says Robert Renner, director of the Water Research Foundation, a nonprofit group that evaluates water safety. "We're aware that they're there only because we're measuring at parts per billion." ([See "The Year in Health 2009: From A to Z."](#))

So just how worrisome are pharmaceuticals when they're so thoroughly diluted? A study described in a recent AMWA report estimated that at the highest levels ever detected for the antianxiety medication meprobamate, a person would have to drink 1.24 million gal. (4.7 million L) in a day to ingest even a safe therapeutic dose. Not all drugs are present at such vanishingly small levels. Some are much higher, though for now they too are far below the danger threshold. More troubling, nearly all research conducted so far looks only at short-term exposure — one day's consumption of one chemical. What it doesn't take into consideration is what happens over the course of years or decades, particularly when multiple drugs interact.

The EPA acknowledges that studies on that topic must still be done but stresses that there is no reason to panic. "We are concerned but not alarmed by the very low levels of pharmaceuticals that have been detected in water," says Peter S. Silva, assistant administrator of the EPA's Office of Water. Adds another agency official: "We need more

science behind this." ([See the top 10 scientific discoveries of 2009.](#))

Whatever danger does exist, it's hard to know what to do about it. Bottled water may help a little, but it's no guarantee of safety, the EPA warns, since merely labeling a product "ultra-filtered" or "spring-water" is no proof of its cleanliness. Some risk is mitigated naturally, depending on where you live. Despite serving about 3 million people, the Chicago water system is comparatively clean. "We take our water from Lake Michigan, which is pretty pristine," says Spatz. "And our wastewater flows away." Colorado and other points west are a different matter, since many towns dot the Colorado River, and waste can flow from one to another.

Proper disposal of pharmaceuticals helps, and some communities have set up take-back centers for leftover meds in police stations and other public facilities. All those drugs are disposed of in nonpolluting ways and thus are kept out of landfills. But this addresses only about 10% of the problem. The rest comes from pharmaceuticals passing through the body and into the sewage system — a nonnegotiable pollution source if ever there was one.

For now the answer might hinge on better technology, with the EPA and other groups working to develop new cleaning techniques, improve others and lower the cost of ones that work well but are still too expensive. It's well and good if our drugs keep us healthy — but not if they make the water supply sick in the process.