



To the Editor:

This is an article from a series of monthly columns by Environmental Law Specialist Dianne Saxe. This article is available for publishing at no charge, provided Dr. Saxe and Jackie Campbell are cited as the authors. Dr. Saxe can be contacted at (416) 962 5882 or admin@envirolaw.com. For more information, or to arrange and interview, visit <http://envirolaw.ca>.

Bottoms Up! What's in your glass?

Cheers! It's time to regulate the drugs in that glass (or bottle) of water

This spring, the Associated Press reported that trace amounts of drugs had been found in drinking water in American cities. (see http://www.usatoday.com/news/health/2008-03-09-water_N.htm) This set off a flurry of water testing.

However, no one knows what to do with the resulting data. We lack both the science and the baseline data to detect and set maximum acceptable levels of pharmaceuticals in drinking water.

Are tiny levels of drugs in our water a health risk? We just don't know. Drug concentrations in drinking water are low - one expert says that a person would need to drink a million glasses of water to ingest the amount of ibuprofen in a single tablet (http://www.nytimes.com/2008/04/04/nyregion/04water.html?_r=1&scp=1&sq=pharmaceuticals%20water%20%22associated%20press%22&st=cse). Drugs may be a much more serious environmental problem than they are a health problem, though: fish reproduction seems to be profoundly affected by low levels of estrogens in rivers and lakes, and veterinary diclofenac is wiping out India's vultures.

The human toxicology of active ingredients in pharmaceuticals is relatively well established. But the effects of "inactive" ingredients, called excipients, are less clear. Excipients include fillers, diluents, wetting agents, solvents, emulsifiers, coatings, dyes, sweeteners, flavours, inks, preservatives and sustained-release matrices. The US Food & Drug Administration's 2003 Guidance for Industry: Nonclinical Studies for Development of Pharmaceutical Excipients (<http://www.fda.gov/CBER/gdlns/dvpexcp.pdf>) recognizes the need to develop a database that includes safety profiles for new excipients, and to establish safe limits for each.

Our information about the toxicity of nanotechnology is also limited. Nanoparticles are extremely small (a human hair is around 100,000 nanometres in diameter) and as they readily penetrate cells, targeted drug delivery will be possible. We know that nanoparticles may differ significantly from their macroscale counterparts, but we don't yet regulate their specific qualities.

Once we understand the safety of all active ingredients and excipients, it will be far from obvious what threats they may pose when mixed together and consumed. This is a fearsomely complex question. It will be particularly hard to answer, since the soupy mixture of drugs that ends up in water varies from time to time and place to place. It depends on many factors, including the ability of water treatment plants to remove drugs, local hydrogeology, and how citizens consume and dispose of medicine. And the data keeps changing as new drugs are introduced and technologies to detect contaminants and treat water improve.

The most important thing we can do about this problem is to properly dispose of surplus or stale dated pharmaceuticals, including used patches - return them to your pharmacist, instead of flushing them down the drain!

A second option is to buy "greener" drugs. Sweden is the first country to evaluate the environmental impact of drugs, and is developing a list of "environmentally classified medications". This permits consumers and health professionals to take environmental harm into account when selecting medications. Many common medications are already listed, and all medications marketed in Sweden are expected to be classified by 2010. Visit http://www.janusinfo.se/imcms/GetDoc?meta_id=7236 and <http://www.sll.se/upload/Miljö/A4.1.klassific.pdf> to see how your medication is classified. Drugs are listed by their chemical names, which can be looked up <http://www.rxlist.com/script/main/hp.asp>.