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Municipal Water and Your Health



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One of the best ways to improve one's health is to drink more water. We also know that we are what we drink. Bottled water helps us drink more water while avoiding chemicals like chlorine but it also increases our day to day exposure to plastics. The quality and origin of bottled water has at times been suspect and perhaps not as pure as claimed. Tap water is adequate but can be made better by removing contaminants like chlorine, lead, protozoan cysts, fine particulate and VOCs like benzene and trihalomethanes. Elva water treatment systems effectively remove over 54 contaminants to a concentration less than or equal to NSF/ANSI permissible limits.

Water Quality

- According to the U.S. Environmental Protection Agency Office of Ground Water, for fiscal year 2010 there were 29,683 community water systems (CWS) in violation across the United States (with a total of 75,857 violations) affecting a total population of 108,030,837. (1)
- In March 2008, 1,766 cities, small towns and neighbourhoods in Canada were under boil water advisories, as were 93 First Nations communities. (2)
- The estimated percentage of children served by community drinking water systems that did not meet all applicable health-based standards was 19% in 1993 and about 5% in 2001. Since 2002, this percentage has fluctuated between 7% and 13%, with the most recent estimate being 7% in 2009. (3)
- In response to the Congressional Safe Drinking Water Act Amendments of 1996, in 2005, EPA and CDC completed a series of epidemiologic studies and a national workshop designed to assess the magnitude of endemic Acute Gastro Enteritis (AGI) associated with consumption of public drinking water. The authors of two reports used current data and made various assumptions for missing data to derive two different but overlapping estimates of 4.3-11.7 million annual AGI cases and 16.4 million annual AGI cases. This data was included in a 2011 Government Accountability Office (GAO) report titled DRINKING WATER - Unreliable State Data Limit EPA's Ability to Target Enforcement Priorities and Communicate Water Systems' Performance. (4) (6)
- The Canadian government estimates that contaminated drinking water causes an estimated 90 deaths and 90,000 cases of illness per year. (5)
- Our rivers, lakes, and oceans are used for the disposal of human wastes—including human feces, which are laden with microorganisms. A small drop of fecal matter can contain millions of these microorganisms. Waste treatment systems are supposed to render these wastewaters safe for release back into the environment, but conventional wastewater treatment does not always adequately reduce the number of pathogens. Thus, the wastewaters released could still contain enough pathogenic microorganisms to threaten human health. (7)

Regulations

- In comparison to other nations and the World Health Organization's recommendation for maximum allowable concentration guidelines, Canada is often 50, 100 and in some cases 1,000 times weaker than other nations. (9)

- 3/4 of the “Guidelines for Canadian Drinking Water Quality” relating to chemical contaminants provide less protection for public health than the standards in other nations. (9)
- The Safe Drinking Water Act (SDWA) requires EPA to publish an updated Contaminant Candidate List every five years, detailing currently unregulated drinking water contaminants that may pose human health risks. From this list, EPA must determine whether to establish tap water standards for at least five contaminants. The draft CCL3, now under review by the SAB Drinking Water Committee, includes 93 chemicals or chemical groups (US EPA 2008a). (10)
- In 2008, the Environmental Working Group’s analysis of water utilities’ tap water test results shows that nationwide, drinking water contaminated with 260 chemicals is being served to 210,528,000 people in 42 states (EWG 2005b). Fifty six percent of those people drink water with one or more contaminants present at levels above non-enforceable EPA guidelines. Of especial concern is drinking water pollution with pharmaceuticals and antimicrobial chemicals. As highlighted by the recent national investigation by the Associated Press, a wide range of pharmaceuticals that include antibiotics, sex hormones, and drugs used to treat epilepsy and depression, are contaminating the drinking water supplies of at least 41 million Americans (Mendoza 2008). (10)
- In the CCL2 Final Regulatory Determination, EPA deferred on the regulation of perchlorate, toxic rocket fuel chemical that contaminates water supplies in at least 28 states nationwide (GAO 2005). EPA also avoided making any regulatory determination on fuel additive methyl tert-butyl ether (MTBE), another frequent ground water pollutant (US EPA 2008d). For perchlorate and MTBE, the Agency has simply transferred these chemicals from CCL1 (US EPA 2003) to CCL2 (US EPA 2008d) and now to draft CCL3 (US EPA 2008a, b), without establishing enforceable drinking water standards for these pollutants. And in both cases the contamination problem is enormous. Between 1998 and 2003, 32.7 million people in 632 communities drank water contaminated with MTBE. In 18 of these communities, tap water was contaminated at levels above health-based thresholds (EWG 2005). (10)

What’s Really in Your Municipal Drinking Water?

- Studies have shown trace amounts of man-made chemicals found in the public water system. Substances varying from vanilla, various spices, ibuprofen, anticonvulsants, mood stabilizers, birth control, cocaine and other illegal drugs. These types of chemicals are not tested or regulated through safe drinking water guidelines. (11, 12,13)
- Although there are currently no federal regulations limiting the levels of pharmaceuticals in wastewater or drinking water, the United States Environmental Protection Agency (U.S. EPA) has added some pharmaceuticals to the most recent contaminant candidate list (CCL 3); however, only four of the compounds on this list are exclusively used as human pharmaceuticals: three birth control substances and one antibiotic (U.S. EPA, 2009a). (11)
- Only sparse data existed on the occurrence of pharmaceuticals in U.S. drinking water until 2007 when the Water Research Foundation published a report entitled “Removal of EDCs and Pharmaceuticals in Drinking and Reuse Treatment Processes”. In this study, 20 municipal drinking water systems were screened for 17 pharmaceuticals. Five pharmaceuticals were detected in at least 50 percent of the drinking water samples evaluated: carbamazepine, ibuprofen, iopromide, meprobamate, and phenytoin. (11)

- 9 different drugs were found in samples from 20 Ontario drinking water plants in Canada. (12)
- The enigma of pharmaceutical occurrence in drinking water has especially alarmed the public and regulators despite the fact that relatively few pharmaceuticals have been detected and only at concentrations tens of thousands of times smaller than the therapeutic doses. Fortunately, pharmaceuticals have the most robust database of any environmental contaminant in terms of human health as these compounds undergo rigorous clinical trials during registration and post-registration monitoring. Although adverse human health consequences from the existing trace levels of pharmaceuticals in U.S. drinking water is highly unlikely (at least based on current knowledge), the resulting impacts to aquatic ecosystems are more nebulous. (11)
- According to a recent CBC broadcast, aging water treatment plants are defenseless against filtering complex chemicals, so they continue to build up and recycle themselves through the water supply. (14)

What about Lead in Drinking Water?

- The World Health Organization describes water systems as “the largest controllable source of lead exposure in the United States. Many household plumbing systems built before 1986 contain lead pipes, lead solder or lead fittings. PVC pipes often contain lead that can leach into your drinking water (15)
- Lead has been classified as a probable carcinogen to humans by the International Agency for Research on Cancer. (16)
- Various levels of lead exposure can negatively affect the nervous system, kidneys, bones, immune system and blood pressure. (16)
- Too much lead in the human body can cause serious damage to the brain, kidneys, nervous system, and red blood cells. You have the greatest risk, even with short term exposure, if: you are a young child, or you are pregnant. (17)
- EPA estimates that 10 to 20 percent of human exposures to lead may come from lead in drinking water. Infants who consume mostly mixed formula can receive 40 to 60 percent of their exposure to lead from drinking water. (18)
- EPA has declared the Maximum Contaminant Level Goal (which is a non-enforceable guideline) for lead is 0; they have determined that there is no safe level of exposure to lead. However, the EPA treatment technique regulation for lead (in lieu of a Maximum Contaminant Level (MCL) limit (referred to as the Lead and Copper rule) requires water systems to collect tap samples from sites served by the system that are more likely to have plumbing materials containing lead. If more than 10% of tap water samples exceed the lead action level of 15 parts per billion, then water systems are required to take additional actions. (18)
- 10 parts per billion is the maximum allowable concentration of lead in drinking water in Canada (measured from the tap) (16)

Want to Learn More?

- Look up the quality of your drinking water in the US using the EPA The Safe Drinking Water Information System (SDWIS) <http://www.epa.gov/enviro/facts/sdwis/search.html>
- Want to learn more about unregulated contaminants in your drinking water? <http://water.epa.gov/lawsregs/rulesregs/sdwa/ucmr/ucmr3/basicinformation.cfm>
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- Is Our Water Safe to Drink? First aired on The Current (19/06/13) <http://www.cbc.ca/books/2013/07/is-our-water-safe-to-drink.html>
- A Quest for Even Safer Drinking Water By Peter Andrey Smith, NY Times Science Published: August 26, 2013 <http://www.nytimes.com/2013/08/27/science/a-quest-for-even-safer-drinking-water.html?smid=tw-nytimes&r=0>
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