

How Safe is Your Water?

A Holology Special Report, written by Freydis

Synopsis

Sparing the reader the obligatory didactics concerning the necessity of abundant clean water, major unresolved issues remain concerning the safety of our drinking water. The issue of fluoridation is both divisive and long-standing but it is by no means solitary. Dental associations say it prevents caries (tooth decay), while purists say it causes flourosis, a mottling of the teeth caused by too much fluoride, and even worse. Often the scare stories are in conjunction with a promotion for a water filter or some such product which makes it easier to disbelieve any validity their claims may hold. I would imagine most people don't give their local municipal water supply too much concern until they read the news and find out it's polluted or has some parasite and they need to boil everything for a month until the city fixes it. The purity of water is compounded by the fact that water itself is an excellent solvent; pure water is not found in nature. Water picks up pollutants, minerals, just about anything it comes in contact with. So potable water isn't an issue of *pure* water so much as it is about *safe* water. Safety is about minimizing pollutants in the water supply, which can range from minerals to parasites and everything in between.

Pollutants

Most city water either comes from underground sources, such as aquifers and wells, or from reservoirs. Basically this means the water comes from surface runoff, so the increasing use of fertilizers for farming and residential lawn maintenance leads to a buildup of nitrates, phosphates and other harmful compounds in the soil and in the water. Detergents, insecticides, herbicides and anything else put on the ground will eventually reach the water table, albeit in diluted form. Toxins or poisons dumped on the ground or 'stored' near water runoff also pose problems when these chemicals seep down into the soil and eventually into water reserves. Nitrates in water are especially hazardous, causing blue baby syndrome, and boiling the water doesn't fix the problem, it only increases the concentration as it's a mineral compound and not a living organism that can be killed.

Radon can not only fill up your basement with deadly radioactive gas but it can get into water supplies from underground rocks (and buried waste). Barnyard pollutants such as cattle, chicken manure (and they produce enormous quantities per animal!) as well as commercial fertilizers are a major source in rural areas. Organic contaminants are a serious concern and include E-coli, the infamous bacteria, as well as Giardia and Cryptosporidium which are protozoal intestinal parasites. For example in 1993 cryptosporidiosi affected 400,000 in Milwaukee, Wisconsin. It was the largest outbreak of waterborne disease in the United States and between 50 and 100 people directly died because of it. Although the original source of contamination is uncertain it usually comes from wildlife (like beavers) and fecal material. Cryptosporidiosi has no cure, but

unless you have a 'compromised immune system' it will only show up as a flu. Since these protozoa are widely dispersed they can potentially affect any water supply, but northern regions are more prone to outbreaks probably due to the lakes and wildlife. Chlorinating works to an extent, and as a last resort boiling works too.

A recent discovery has shown that a new hazard to water supplies comes from pharmaceutical products that aren't being removed in waste treatment, and combined with the rapid increase in medication being used by the public, may even be reaching out and medicating *you* through the tap. Estrogen has already been detected but just about any other drug (or hormone) people use may be in drinking water as well. But it's a difficult matter of detection compounded by a lack of research. The reason estrogen has popped up is due to the fact that doctors prescribe it according to the philosophy that you can't have too much, assuming you're of the proper sex anyway. Of course the body only absorbs a small fraction of it and the rest is passed on via the sewage system where in many cases it's processed and the water returns to the tap, drugs included. Medication in our water supply is definitely an important issue and of growing public concern.

Other chemicals in our water supply are turning out to be quite harmful as [endocrine disruptors](#). One notable example is the chemical bisphenol A (BPA), used to soften plastics, and linked to heart disease, diabetes and liver-enzyme abnormalities, but mainly considered a hazard because it interferes with normal hormones in the bodies of humans and animals.

Representative Edward Markey, said that chemicals showing up [sic] U.S. waterways and drinking water have been linked to deformities in fish, frogs and other wildlife. BPA leaches into the water supply when containers made with the chemical are discarded.

"There are serious concerns that the same chemicals that are responsible for these deformities in wildlife may also have similar effects in humans and may be the culprit for the widespread increase in human disorders such as infertility, obesity, diabetes and cardiovascular disease," said Markey, author of a bill to ban Bisphenol A in food and beverage containers.

The U.S. Food and Drug Administration in January [2010] raised its assessment of bisphenol A to a chemical of concern

[National Institute of Environmental Health Sciences (NIEHS) director Linda] Birnbaum said there is concern that drinking water might be a "significant route of exposure" for potential endocrine disruptors such as BPA and that even low doses can have an effect on the body. [6]

For more information on this topic read the DOR report on [Sex Hormone Pollution](#).

An older issue of concern has to do with mineralization. Water can contain many minerals most often calcium and magnesium bicarbonate and calcium sulfate. It's

possible that heavy mineral levels in drinking water are responsible for kidney stones and similar very unpleasant mineral accretions in the human body. Fluoride has been shown to cause kidney stones in rats.

But even if the minerals aren't clogging up your internal 'pipes' they most certainly will be doing double duty on your water heater and household plumbing, especially any other appliances that deal with hot water which causes the minerals to form accretions. This is why you should use distilled water in your iron or car radiator lest the percolation holes get clogged. Water mineralization is a big deal and a 'softening' is a big industry. But keep in mind most cities are cheap and usually only soften enough to keep their own pipes from clogging up.

All right, we get the point, a lot of junk gets into the water, but that's why we have water treatment facilities, right? So are they good enough to remove all that poison?

Treatment

Filters can only remove particulate material. Everything else harmful has to be killed through sterilization, which usually means chlorine. For chemicals that aren't living but are still hazardous, well, that's why we have guidelines setting maximum levels. Prior to the 1974 drinking water act U.S. states set their own safe water guidelines. Today the standards are technically defined by the Environmental Protection Agency (EPA) in America, but the water quality still varies about as much because the water sources used are so widely disparate. Realistically the states, and even more so the cities or towns, are on their own for testing, and private wells are poorly regulated, if at all. I would imagine most towns pretty much meet the absolute minimum until something goes wrong, like in Milwaukee, and then everyone better fire up the stovetop.

It's difficult to estimate the quality of water for any given region. Large cities can afford expensive water treatment systems that include chlorination, particle removal, demineralization and sediment settling ponds among other nifty stages. According to the EPA 170,000 public water systems exist in the USA. They're supposed to meet maximum contaminant levels for metals and organic materials, among other industrial byproducts. They spend about \$22 billion a year to function, and as we've seen they have a big job to do.

Many water-supply systems do not have elaborate filtration plants. But even in systems that have elaborate filtration plants, bacteria may get past the purification devices. Water is therefore usually sterilized with a chemical to ensure that it is safe to drink. Chlorine is the most common sterilizer. It takes only slight amounts of chlorine to kill bacteria. Where water is sediment-free, only one or two parts of chlorine need be added to 10 million parts of water. Sometimes water is forced under pressure into the air in a process called aeration. Oxygen in the air purifies the water somewhat. [1]

So the city cleans up the water, they pump in some chlorine to kill most of those nasty little parasites, perhaps a few water softening agents and last but not least a little

fluoride. But wait, *the EPA classifies all fluoride compounds as toxic pollutants that must be removed from water!* Oh but it's for tooth decay prevention, carry on then!

The Fluoride Factor

Studies done in the early part of the 20th century examine a strange phenomenon prevalent amongst the inhabitants of mining towns in the Rocky mountain region, like Colorado Springs in 1909. To make a long story short for lazy people like myself, bauxite processing (for aluminum production) generates fluoride waste products. These fluoride wastes were seeping into the ground and causing fluoride poisoning in the nearby towns manifest by the brown and black mottling on peoples teeth, a condition known as fluorosis. Pioneering researchers McKay and Black found that that although unaesthetic the fluorosis damaged teeth were surprisingly resistant to tooth decay. They reasoned that small amounts of fluoride could generate the benefits of decay resistance without the discoloration of full blown fluorosis. And by 1945 Grand Rapids Michigan became the first city to intentionally add fluoride to its water supply for the purposes of preventing tooth decay.

Aluminum manufacturing produced fluoride toxins that polluted the water supplies of nearby mining towns, but they weren't the only producers of fluorine waste. By the time of W.W.II the government produced fluorine waste dwarfing anything industry had ever done before, how? The Manhattan project. One of the critical stages in manufacturing fissile material uses the chemical uranium hexafluoride, which is like an inauspicious combination of highly-toxic and super-toxic. Curiously, the Aluminum companies, such as Alcoa, had a significant influence in the studies during the 1930s promoting the benefits of fluoride.

Personally when I started out with this essay I was ambivalent towards fluoridation. Probably like most people because so much of what we hear about it is the positive aspects. Dentists, whom we perceive to be tooth experts, nearly always approve of it, and why argue with that advice? Well, dentists aren't lying, fluoride does have value in tooth decay, however they aren't seeing the whole picture. It turns out that fluoridation of the water supply is at best unnecessary and at worst a health hazard. Fluorides are highly toxic compounds that are both expensive and dangerous to dispose of yet when added to a municipal water supply it somehow becomes a dental panacea, a carie cure-all. So is it a health miracle or toxic scam?

An estimated 60% of America has fluoridated water, one source claimed 200 million Americans had access to fluoridated water, clearly an issue of wide importance. There is very good reason for keeping fluoride levels in drinking water low. Canada is moving to 0.8ppm, perhaps to deflect mounting criticism of the program in toto. While the US level is around 1.0ppm. Observant Americans will notice a new warning on their tube of toothpaste stating something to the effect that ingestion of the fluoride containing substance will necessitate immediate action ala "contact a poison control center immediately". The reason is clear to those familiar with the nature of the element fluorine, the most reactive element. One compound to consider is Hydrofluoric acid the

most corrosive acid around - *it will even dissolve glass*. This acid is used extensively in electronic chip manufacturing by companies like Intel. What the hell they do with it after it's been used I have not a clue, hopefully it's not stored near my house or yours right? And what if it leaks? In certain forms it's imminently dangerous to human and animal life because, being so reactive, it replaces and dissolves calcium in the bones.

One of the most horrifying accounts of this effect comes from the Mohawk Indian reservation. Reynolds Metal Corporation Built a smelter on the St. Lawrence river. Around 1959 fluorine pollution started making cattle sick from eating poisoned grass. Their teeth began falling out, their bones warped and broke, they died slow agonizing deaths because they couldn't eat or move and no one was sure what was going on. The Mohawk's were never the same either, suffering skeletal and muscular problems.

Another story of fluorine poisoning comes from the nearby industrial fun-park of Pennsylvania (unofficial motto: The Home of Acid Rain). It started in October 1948 in the US Steel town of Donora. A temperature inversion prevented the normal circulation of pollutants from the nearby steel mill. The 'Donora Death Fog' lasted four days, people quickly developed asthma like breathing difficulties, a symptom of fluorine (gas) poisoning. 20 died. Both companies knew exactly what was going on but used legal and political muscle to cover up and deflect corporate malfeasance lest they be bankrupted by lawsuits.

The fluoride added to municipal water can come from many fluoride sources but usually is fluorosilicic acid, a byproduct of fertilizer production, because it's cheaper than sodium fluoride, the chemical that used to be added in from aluminum production waste. Old studies, such as the original in Grand Rapids Michigan, point to the benefits of adding fluoride to the water supply and the subsequent reduction of tooth decay over time. Those studies from the 1930s to the 1950s need to be critically reexamined, especially within the context of modern scientific knowledge. Fluoridated areas have higher per capita dentist ratios and also higher spending on dental care because fluoridated regions are generally urban. Other reasons for the fall in tooth decay could be substituted for the water-fluoride hypothesis. Maybe people are brushing more, maybe the toothpaste is providing all the fluoride needed. Actually with it in the water everywhere we're getting multiple doses through food products and flavored drinks made using municipal water.

The problem is that fluoride is ubiquitous now and the need for adding it to our water supply is increasingly untenable. Toothpaste is all fluoridated, so are various over the counter liquid solutions. Not only that but since the intended target is young children (up to age 13) with developing teeth, what good does it do to put it into the water supply when the vast majority of people drinking are adults, the aged, the ill, people that have no need for it at all?! Fluoride supplies accumulate and start to creep into sources we wouldn't otherwise expect.

Hydrogen fluoride is used to create unleaded gas in place of lead, and thus HF is present in auto exhaust, *even though it is far more hazardous than lead*. The soft drinks

and juice we buy in the store are usually made with municipal water, fluoridated water, so not only are we getting it from the tap but from nearly everything else we drink.

In the overview of their classic work on fluoride, Rose and Marier (1977, pp 108-110) said:

"There is no doubt that inadequate nutrition increases the severity of fluoride toxicosis" (Note 17)

"Fluoride has displayed mutagenic activity in studies of vegetation, insects, and mammalian oocytes"

"Long-term ingestion, with accumulation of fluoride in animals and man, induces metabolic and biochemical changes, the significance of which has not yet been fully assessed. ... There is evidence that neurologic complaints are related to the early histologic changes that precede overt skeletal fluorosis."

"Fluoride is a persistent bioaccumulator, and is entering into human food-and-beverage chains in increasing amounts. Careful consideration of all available data indicates that the amount of fluoride ingested daily in foods and beverages by adult humans living in fluoridated communities currently ranges between 3.5 and 5.5 mg. For a 70 kg human adult, this range is close to the 0.03 to 0.07 mg/kg/day estimated for 'an acceptable daily intake'. In addition to the food chain, dentrifices and pharmaceuticals can contribute significantly to the fluoride intake of some individuals."

"In addition to industrial workers, there are several sub-groups of the population who may be more affected by environmental fluoride than the population at large." [2]

We've seen what very high concentrations of fluorine compounds can do. Fortunately such quantities rarely affect public health. Yet long term exposure to smaller quantities can be nearly as insidious. The discolored mottling of the teeth caused by fluoritosis is one effect. It's not just un-aesthetic either as it dissolves the enamel, cracks and chips break off. Continued long term exposure to quantities around 10-20 mg of fluoride ingested daily for at least 10 years leads to skeletal fluorosis creating bone and joint damage. According to evidence I've gathered this serious condition is not common in the United States but it is a problem in the developing world, perhaps because of greater pollution.

The EPA maximum for fluoride in water is 4 ppm. Still, part per million values aren't especially meaningful because intake of any person's fluoride level is related to, at minimum, how much water they drink from the tap and the levels present in whatever other food products they consume. So honestly trying to determine that any given person consumes less than the maximum levels of fluoride on a daily, yearly, or lifetime scale is extremely difficult.

In most cases it appears this isn't a problem, or is it? Research analyzing this effect, what little exists, in relation to widespread old-age infirmities such as osteoporosis, rheumatism, arthritis is difficult to draw decisive conclusions from. Conflicting studies have shown hip fractures are higher among fluoridated populations, We know for fact that fluoride damages bones and that fluoride accumulates in the body over time. Although anyone can connect the dots, scientifically speaking that's not sufficient. Like so many similar hazards absolute proof and direct connections are difficult to demonstrate.

Mass medication via fluoridated water puts certain groups of people at risk. It is a reckless and criminal practice that most countries prohibit. Since everyone drinks different amounts of water, there is no way to control how much fluoride people consume. Laborers, athletes, diabetics, and people in hot or dry climates tend to drink more water, hence more fluoride (in fluoridated areas). It is therefore impossible to safely control what dosage of fluoride a person receives via the water supply.

What's more, in 1993 the U.S. Dept. of Health stated that "subsets of the population may be unusually susceptible to the toxic effects of fluoride and its compounds. These include the elderly, people with deficiencies of calcium, magnesium, and/or vitamin C, and people with cardiovascular and kidney problems." In other words, most of us. Poor nutrition is widespread throughout America. Furthermore, adult-onset diabetes is becoming increasingly prevalent in children. This disease adversely affects kidney function, which means more fluoride will be retained by the body — building lifetime levels that will have serious consequences later. [3]

An interesting irony that should be mentioned is the use of fluoride in experimental bone treatment techniques. Fluoride does have a superficial effect of hardening our bones and teeth, hence the concept behind the prevention of cavities: fluoride makes the teeth harder and therefore resistant to decay. However the bone treatment techniques highlight the fallacy of even this toothy benefit of fluoride, because these experiments have shown that the bones are hardened but not in a healthy way. They sort of crystallize and lose their tensile strength. This reiterates that the connection between fewer cavities and more fluoride is not as solid as dentists, lobbyists and the original 1930s studies conducted by Aluminum industry researchers would have us believe.

Here's the EPA on fluoride:

II. CARCINOGENICITY ASSESSMENT FOR LIFETIME EXPOSURE

Substance Name -- Fluorine (soluble fluoride)CASRN -- 7782-41-4

Primary Synonym -- Flouride

This substance/agent has not undergone a complete evaluation and determination under US EPA's IRIS program for evidence of human carcinogenic potential.

Is fluoride carcinogenic? The EPA doesn't know. Does your city? Do you?

While the small amount of aluminum-fluoride in the drinking water of rats required for neurotoxic effects is surprising, perhaps even more surprising are the neurological results of the sodium-fluoride at the dose given in the present study (2.1 ppm). {the amount used to achieve 1 ppm of elemental fluorine used in fluoridation}. "Fluoride has diverse actions on a variety of cellular and physiological functions, including the inhibition of a variety of enzymes, a corrosive action in acid mediums, hypocalcemia, hyperkalemia, and possibly cerebral impairment. [4]

More considerations:

- Topical application is the only means to gain any benefit; fluoride is poisonous when ingested.
- It stains everything pink
- Sodium fluoride is used as rat poison
- Sarin (the chemical weapon) has a fluoride compound in it.
- Fluoride is *not* a nutrient because the body doesn't need it for survival.

What You Can Do

Although water pollution can include any number of things, fluoride is the most important issue because it alone is intentionally added to the water supply *after it's cleaned up*. Fluoridation of the water supply has little validity supporting the primary claim of its promoters, that being that it prevents tooth decay. And if that's the only reason to keep it in the water one is forced to wonder why all the fuss? Take it out like Europe does. After all, anyone that brushes their teeth on a regular basis gets plenty of fluoride applied topically just as it should be, not ingested.

As I've already made painfully obvious, fluoride compounds are extremely hazardous substances that are produced as toxic waste from a wide array of industrial manufacturing, ranging from plutonium production to steel mills. The corporate question arises again, what to do with all that poison? One profitable answer is to *sell* it to the municipal water agency as a public health benefit, thereby absolving the company of the need for costly disposal. Corporate power has a lot of legal muscle and this would certainly not be the first case of warping studies and twisting the right arms to get the 'proper' results.

I sometimes wonder if the Aluminum Company of America, and its many subsidiary companies, might not have a deep interest in getting rid of the waste products from the manufacture of aluminum, because these products contain a large amount of fluoride. In this connection it is interesting [sic] to know that Oscar Ewing, who now heads up the Federal Security Administration (parent organization of the USPHS), *and the firm of attorneys he was with--Hubbard, Hill, and Ewing--represents the Aluminum Company of America.*" [5]

Another question has to do with the ethics involved in mass-drugging of the population using the water supply as a vector. It's an honest question: does the government have

the right to determine that every water drinker needs fluoride from their tap? Should government mass-medicate using toxic substances for an illness that is significantly less than life threatening? Since fluoride compounds accumulate in the body, what actions are being done to prepare for the health-effect time-bomb that will manifest as entire populations reach old-age having consumed a lifetime of fluorides from tap water and environmental pollution? Finally, what of the coincidence in symptomatic patterns exhibited by both Chronic Fatigue Syndrome and Hydrogen Fluoride poisoning? Given the increasingly widespread presence of HF in the air, is fluoride a culprit here too?

During the writing this article I went down to the store and bought distilled water (really!), which I will be drinking as much as possible instead of the city water. I would prefer not to drink anything else, including 'spring water' and brand name drinking water because they aren't any safer and are untreated. My recommendation would be to do the same: *minimize exposure*. I don't trust filters as much because they're limited to large particulate matter and can't get rid of dissolved chemicals, such as pharmaceutical pollution, at least the affordable technology anyway. By my estimation only distillation of the water renders purity. Another benefit of distilled water is that it won't clog up your coffee maker, or other appliances, and pipes with mineral build up or fluoride stains. If fluoridation comes up on your ballot, vote it down with a vengeance. If you don't want to buy distilled water ask your city why taxpayers have to *pay* to add industrial waste to the public's water supply.

News

- [Australian town fights back against bottled water industry](#), BBC, 08.07.09
- [Pharmaceutical pollution at record levels in India](#), AP, 25.01.09
- [Top 11 compounds in US drinking water](#), New Scientist, 12.01.09
- [Water Super Profits in a Time of Crisis: Who Controls the World's Water?](#), Japan Focus, 08.09.08
- [Health facilities flush estimated 250M pounds of drugs a year](#), AP via USA Today, 14.09.08
- [Drugs in drinking water: Do we need to care?](#), McClatchy, 11.04.08
- [Third of male fish in rivers are changing sex](#), Daily Mail (UK), 19.07.06
- [Antidepressant Prozac detected in water supply](#), BBC August 8, 2004
- See Also: DOR report - [Sex Hormone Pollution](#)

References

1. Compton's Interactive Encyclopedia, copyright 1994, 1995, 1996, SoftKey Multimedia Inc.
2. ROSE D & MARIER JR (1977) [Environmental Fluoride](#). NRCC Number 16081, Ottawa: National Research Council of Canada (100 Sussex Drive, Ottawa, K1A 0R6).
3. [Fluoridation](#)

4. JA Varner, KF Jensen, W Horvath and RL Isaacson, "Chronic Administration of Aluminum-Fluoride or Sodium-Fluoride to Rats in Drinking Water: Alterations in Neuronal and Cerebrovascular Integrity," Brain Research, 784, 284-298, 1998. Reprints: Julie A. Varner, jvarner@lineberryresearch.com
5. YIAMOUYIANNIS J (1990) Water fluoridation and tooth decay: results from the 1986-87 National Survey of US Schoolchildren. Fluoride 23 (2), 55-67. Italics added
6. *U.S. examining possible effects of bisphenol A*, by JoAnne Allen, Reuters, February 25, 2010.