



America's Drinking Problem

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Filthy water cannot be washed. ~African Proverb

My fellow Americans, we have a problem, a drinking problem, but rather than getting high, we're sometimes getting sick. Sometimes we're even getting conned. Turn on your kitchen water faucet, or purchase a leading brand of bottled water, and what do you get? It all looks and tastes like clear, clean water, but many people already know that what we see often is not what we get. Most of us won't drink tap water, having been led to understand that the current quality of much of it is questionable, at best. So we spend valuable time and money providing ourselves and loved ones with what we consider to be viable solutions—filters, bottled water, distillation. Are we succeeding in obtaining high quality, healthful water? The results may surprise you.

Our Bodies' Needs for Water

Clean water is the only liquid the body actually needs; it is vital to health and to life and nothing can replace it. Opinions vary as to how much water we need each day to remain healthy (48 – 64 ounces by most accounts), but need it we do, whether it is in our foods or in its liquid form. Our bodies contain up to 75% water by weight, our brains a little more, and water enhances many functions within:

- ❖ Digestion
- ❖ Lubrication
- ❖ Transport of nutrients
- ❖ Transport of wastes—without abundant, clean water proper detoxification becomes impossible
- ❖ Temperature control
- ❖ Appetite control—dehydration can often be mistaken for hunger
- ❖ Prevention of certain diseases

The recently deceased F. Batmanghelidj, M.D., author of *Your Body's Many Cries for Water: You Are Not Sick, You Are Thirsty*, believed dehydration to be responsible for, or a contributing factor to, the onset of many diseases and painful conditions, and that water may be our most successful pain killer. The diseases that he considered to reflect a dehydrated state, and which could be healed or ameliorated by rehydration, include most of the serious conditions that plague us today (Batmanghelidj, n.d.):

- ❖ Aids
- ❖ Angina
- ❖ Asthma and allergies
- ❖ Colitis
- ❖ Depression
- ❖ Heartburn
- ❖ High cholesterol
- ❖ Hypertension
- ❖ Insulin-dependent diabetes
- ❖ Obesity
- ❖ Pain, including of the back and neck, as well as headaches
- ❖ Rheumatoid arthritis
- ❖ Ulcers

Unfortunately there is no hard science to back up these claims, though Batmanghelidj has written that he successfully used his “water cure” for thousands of his patients. But his experiences are intriguing and serve to highlight the importance of clean water as a giver of life and health. His findings remind us that water is not a resource to be taken for granted. It is a precious fluid, the availability and purity of which we should guard as if our lives depended on it. They do.

Troubled Waters

Though the idea of drinking tap water is frightening to many people, approximately 240 million people in the United States trust public water supplies for their drinking, cooking and bathing needs (Olson, 2003). For some, this is fine; according to “What’s On Tap?”, a 2003 report by the Natural Resources Defense Council (NRDC), surprisingly, many municipal water systems deliver good, clean water. But the study also found that although the quality of tap water throughout the nation has improved somewhat over the fifteen years prior to 2003, municipal tap water quality varies widely from system to system. Some cities, including San Francisco, provide tap water contaminated enough to pose potential health hazards to immune compromised segments of the population, including the elderly, those with HIV/AIDs, organ transplant recipients and the very young. In fact, toxic exposure begins early. An Environmental Working Group (EWG) report (3/10/2008) found an average of 200 industrial chemicals, pesticides and other pollutants in the umbilical cord blood of ten babies born in the U.S. Children, whose immune and detoxifications systems are not yet matured, are far more vulnerable than most adults to water-borne pollutants.

The 2003 study found that though a vast number of contaminants affect the country’s water supplies, there are some that occur with far greater frequency than the rest:

- ❖ Lead, the source of which may be public water or the pipes and/or faucets inside the home
- ❖ Pathogens, including *coliform* bacteria and *Cryptosporidium*. (Outbreaks of *E. coli*, *Cryptosporidium*, and *Salmonella*, all from drinking tap water, have been reported in recent years, sickening hundreds and killing a few).
- ❖ Toxic chemicals, including arsenic, radioactive radon, the pesticide atrazine and perchlorate from rocket fuel, along with other suspected carcinogens, such as the gasoline additive, MTBE, and perchloroethylene (PCE), which leaches from the plastic linings of asbestos cement water distribution pipes. Research has now demonstrated that exposure to PCE slightly to moderately increases a woman’s chances of developing breast cancer (Aschengrau, 2006).

- ❖ Most recently, residues of 82 pharmaceuticals and body care products, including hormones, Prozac, and antibiotics, have been found in tap water. All are unregulated, for some we do not even test, and water treatment plants are not designed to filter these out (EWG, 2005; EWG, 3/10/2008).
- ❖ By-products of the disinfection process, such as the chlorination by-products trihalomethanes and haloacetic acids. While disinfection of water supplies with chlorine has vastly cut down on waterborne illnesses, there are natural elements in water that react with chlorine to produce a host of other chemicals, many of them harmful to humans (Ozonoff, 1998). The American Journal of Public Health published a report in 1992 that showed a 15% to 35% increase in certain types of cancer for people who consume chlorinated water (Strand, n.d.)

Acrylamide, a carcinogenic component of fried foods, also results from the water disinfection process, where it plays a part in the removal of solids from the source water (EWG, 2005).

Even when we clean up the water, it continues to pose health risks.

EWG (2005) has confirmed that more than 260 contaminants have been detected in tens of thousands of samples of tap water, many of these petrochemicals and their byproducts, and more than half of these—141—are unregulated. This means that any level of them in our water is legal; no *maximum contaminant level (MCL)* exists for them, and there is no requirement to list them on water quality reports. They have also concluded that of these unregulated toxins, 52 are linked to cancer, 41 to reproductive toxicity, 36 to developmental toxicity, and 16 to immune system damage; and for some, no health information whatsoever exists. As of February 2008, the EPA is considering another 104 contaminants for inclusion into the regulatory process, but these were chosen from a field of over 7500 chemical and microbial candidates (Ryan, 2008). The EPA approves an average of two new chemicals *every day*, with or without safety studies (EWG, 2005). That's about 1,000 each year. There are approximately 75, 000 synthetic chemicals currently in use in our society (Strand, n.d.). It is probably wise to assume that most of them will eventually end up in our water.

Source waters are contaminated in a variety of ways, from the leaching of minerals in the soil, to runoff from mines, factory farms, hazardous waste sites and dumps, and polluted storm drains. Two factors, however, stand out as the greatest threats to our tap water supply: aging infrastructure, which is in bad need of replacing and updating (pipes are on average 100 years old), and the loosening of federal regulations (much of it since 2000). If steps are not taken soon to reverse these, the nation's public water supply can only get worse. In particular, the governmental entity set up to protect our health, the Environmental Protection Agency (EPA) needs to be held more accountable. The EPA sets MCL's that often allow for significant threats to health, such as for arsenic, for which there is no safe amount. This results from the EPA's reluctance to place too great a financial burden on polluting industries for keeping our source waters clean. Consequently, this year (2008) a Congressional investigation has been launched. It is looking into the chemical industry's powerful influence over the EPA's regulation of chemical contaminants, questioning the ability of those in the industry to sit on the agency's scientific advisory panels while excluding public health scientists with opposing opinions (EWG, 3/17/2008).

Hitting the Bottle

To the tune of at least \$10 billion a year (EWG, 2005), like moths to a flame, we have turned to bottled water as our reprieve from contaminated tap water and, when away from home, as our convenient salvation from the shelves of unhealthful, commercial beverage choices. Bottled water is our second most popular drink choice after soft drinks, surpassing juice, milk and beer (Blanding, 2006). Some of us choose expensive waters from exotic foreign sources, shipped long distances to us in glass or plastic bottles. Many of these are of very high quality, pure and clean as advertised. However, most of us are drinking the best selling domestic brands of bottled water, produced by "the big three": Coca-Cola (Dasani), Pepsi (Aquafina) and Nestlé (Poland Spring, Arrowhead, Deer Park, Ozarka and Calistoga), and the quality of these, and others, is in question. Many people have favorite brands and swear they can tell their water from others. The truth, though, is that blind tastings have repeatedly shown that not only can people not differentiate between brands, they usually cannot tell the difference between bottled water and tap (Blanding, 2006).

This surge in bottled water consumption is fascinating in light of the fact that tap water is far more stringently regulated than bottled, something the bottled water companies do not advertise. As lax as the EPA has been at times about our tap water, a Natural Resources Defense Council study (1999) has found both state and federal regulations for bottled water inadequate to provide us with guarantees of purity or safety. The Federal Drug Administration's rules, regulating bottled water quality at the federal level, completely exempt waters bottled and sold within the same state. This accounts for 60 - 70 percent of all water sold in the U.S., and 20 percent of the states involved also have no regulations (NRDC, 1999). The NRDC study has also found that even when waters are subject to FDA regulation, the standards they are held to are lower than those for tap water. This translates to less frequent testing and for the allowance of small amounts of E. coli contamination and for the absence of required disinfection and testing for microbial agents, such as cryptosporidium or giardia. These regulations apply to plain bottled water only; carbonated, soda, seltzer, sparkling and tonic waters are considered soft drinks and are allowed to contain even more additives. Those with weakened immunity should take this as a warning.

Tap water may, in fact, be far safer than many bottled waters, but if the bottled water industry had anything to say about it, no one would ever know this. They spend \$70 million every year (Blanding, 2006) creating images of purity for their products, with pictures of pristine glaciers and mountain streams gracing their labels, and with clever wording conveying the idea of salvation from the evils of tap water. The truth is that most municipal water, straight from the tap, is as clean as or cleaner than much of the bottled water sold to us. According to the 1999 NRDC study, approximately one quarter of all bottled water really is just tap water, drawn from any number of unknown municipal sources. Some of it receives further filtering and treatment; some of it does not. And further treatment does not mean purer water. There have been several recalls in recent years, Dasani among them, for excessive levels of bromate in the water. Bromate is a by-product of a water cleansing treatment called ozonation; it is a suspected carcinogen and it makes people sick. The fact that this water was recalled does not mean it wasn't

consumed. In the case of one brand, the recalled water had been selling from store shelves for five weeks prior to being pulled (Blanding, 2006).

Dollars and (No)Sense

The marketing ploys of the bottled water industry have been so successful at promoting the myth of purity that people pay from 240 to 10,000 times more per gallon for bottled water than they do for tap (NRDC, 1999). An example, cited by Goodman (2007), is Aquafina, a half liter of which sells for \$1.39 at a Tucson, Arizona convenience store. The water in the bottle is purified water from the Tucson municipal water supply, which provides 6.4 gallons to consumers for a penny, making the Aquafina 7000 times more expensive than the tap water. This scenario plays out across the spectrum of cities and brands of water. To further gain some perspective on this, a reporter for the *Los Angeles Times* has found that for the price of a single bottle of Evian, one could drink 1,000 gallons of L.A. tap water which, when filtered, is some of the cleanest in the nation (Lansing, 2007).

When so many choose bottled water, public support to improve municipal infrastructure and water quality declines, in some cases paving the way for private concerns to take over. More often than not this creates vast price increases. Tony Clarke, author of "Inside the Bottle", asserts that when consumers become accustomed to paying more for their water by regularly purchasing bottled water, the higher prices charged by private water companies lose significance to them (cited in Blanding, 2006). What seems to have escaped scrutiny is the increasing transformation to a commodity of a resource, a basic human right, to which all should have access. Clean water must not become something only the rich can afford.

PET Peeves

But the high prices consumers pay to drink bottled water pale in comparison to the toll taken on the environment:

- Some of the larger bottlers are drawing so much underground water that they are depleting local aquifers, to the detriment of large segments of marshlands, streams, wildlife refuges, and lakes (Blanding, 2006).
- Bottles, primarily plastic ones, litter the landscape or go into the garbage; most are not recycled. Of the approximately 70 million bottles of water consumed each day in the United States, it is estimated that 60 million of them are thrown out (Franklin, 2006).

There is an island—a plastic soup--of garbage in the Pacific Ocean, stretching from coastal California to Hawaii, then picking up again west of Hawaii and continuing almost to the coast of Japan. It is called the Great Pacific Garbage Patch, and it is comprised primarily of plastic bags and bottles that have made their way to the ocean via beaches or inland waterways. This island circulates in a vortex of currents, its size estimated at *twice that of the continental United States*. Plastic does not biodegrade, so it floats for decades, with marine animals mistaking it for a food

source and sickening, eventually dying from the starvation that ensues from plastic clogging the digestive tract. It is estimated that more than a million seabirds, and over 100,000 marine mammals, die each year from ingesting plastic debris from all over the world (Marks and Howden, 2008).

- Plastic water bottles are constructed of a polyester material known as *polyethylene terephthalate (PET)*, known for its heat resistance and chemical stability. However, some chemicals do leach out of the bottles into water. *Acetaldehyde* (the breakdown chemical of alcohol that is responsible for hangovers) is able to migrate from bottles into liquid media (Sheftel, 2000), and *antimony* levels in PET water bottles often exceed that found in tap water. The effects of antimony on human health are not currently known, but it is a suspected carcinogen (Christen, 2007). *Bisphenol a (BPA)* also contaminates PET bottles and is known to leach into the water in plastic bottles under certain conditions. The debate rages on concerning its toxicity in humans. Whatever the health costs to consumers, because these bottles most often find their way into the waste stream and are ingested by animals, the chemicals contained within them are likely to have far reaching serious effects in many species, including our own.
- Add to this the fact that up to 20 million barrels of oil each year are estimated to go into the making of the plastic for these bottles (Goodman, 2007)--enough to fuel more than 100,000 cars for one year (Franklin, 2006)--and that it takes a lot of fuel to transport the finished product from the point of manufacture to its market destination, and to dispose of the bottles later. If petrochemicals comprise some of the top pollutants in our drinking water, does it make sense to cause, with our thirsty dollars, more and more of their manufacturing end products to be dumped into our waterways to further pollute our waters? These then quite possibly end up in our taps, in expensive bottled waters or in produce we eat—even organic--that has been grown with this toxin-infused water. We need to learn how to intelligently connect all the “dots” of this increasingly complex problem to ensure availability of affordable, clean water for generations to come.

What's a Heavy Drinker to Do?

Water contamination is easy to blame on the major industries that pollute our waterways on a grand scale. But for whom do they produce these products? Reducing our consumption of toxic products makes good sense all around. At the personal level it is important to keep in mind that whatever goes onto our lawns or down our drains affects the water supply. Watch where you dispose of garden chemicals (or better yet, cut down on their usage and use organic ones when necessary); use only natural cleaning products for the home and body; keep prescription drug use to a minimum; minimize use of plastics and recycle as much as possible what you do use.

Many of the chemicals found in our water supplies have been shown to cause cancer and, possibly, heart disease (Strand, n.d.). Do not forget that most public water systems are not designed to handle pharmaceuticals and most of the recently developed chemicals, most of which are unregulated. And just because levels of contaminants in your water do not exceed EPA MCL's on your water supplier's water quality report, you cannot assume

that the water is safe to drink. In a report from the National Cancer Institute to the Surgeon General it was stated that,

“No level of exposure to a chemical carcinogen should be considered toxicologically insignificant to humans.” (Strand, n.d.).

On the other hand, bottled water does not appear to resolve many problems. It can be just as contaminated as tap water or more so, and drinking water from plastic bottles can exact its own tolls on health and the environment. Filtering our tap water appropriately, using glass or stainless steel containers when traveling with it, and choosing bottled water in glass appear to be the best solutions at this time.

Tips for Buying Home Water Filters (Olson, 2003, unless otherwise noted)

- ❖ While the type of filter one chooses is an individual choice, the best type will remove contaminants and not dissolved minerals. This makes reverse osmosis filters and water distillation not the optimal choices for good health.

There is a right-to-know law that requires water providers supply their customers with yearly water quality reports. Be sure to get yours so you can purchase a filter that removes those contaminants specific to your tap water. The best filter is no good if it doesn't filter the right substances.

- ❖ Point-of-use (POU) filters tend to be better than point-of-entry (POE) filters—those that filter water where it enters the house—because water can pick up contaminants from the pipes as it makes its way through the system.
- ❖ To test well water, or to test your water for lead that may be leaching from your own pipes, you can find a state-certified lab through the EPA drinking water hotline at 1-800-426-4791 (or www.epa.gov/safewater/privatewells/labs.html).
- ❖ Consider filters for showers and baths, since many contaminants can be absorbed through the skin or are volatilized at low temperatures and can be inhaled in the steam.
- ❖ Filters that have been independently certified to remove particular contaminants are the best bet. NSF International (www.nsf.org) is probably the best known organization for setting standards for water filters and certifying them.
- ❖ Maintain your filter unit properly, keeping it clean and replacing filters at least as often as recommended.

Tips for Bottled Water Use

- ❖ Read labels and/or contact the companies whose water you like to find out the source of the water and what other treatments it may have undergone. Know what's in your water!
- ❖ Look for certification from the *International Bottled Water Association (IBWA)*, *NSF International*, or *Underwriters Laboratories*. These agencies all test and certify water products to FDA specifications (EPA, 2005).
- ❖ Keep consumption of water from plastic bottles to a minimum, both for health and for environmental reasons. And always, of course, recycle.

Conclusion

Our world is increasingly polluted, generating acute illnesses and chronic diseases, some leading to death, in increasing numbers. For the sake of our own health and that of those we love, it is worth the time and effort to learn as much as we can about the various ways our environment and what we put into our bodies affects us. Taking control of what we can is about all we can do, and improving the quality of the water we drink is a vital step in that process. It is not very difficult, and it may be one of the most important--and cost-effective—measures we can take.

For More Information on Water Quality and Other Environmental Issues

"National Tap Water Quality Database". *Environmental Working Group (EWG)*. Available at: <http://www.ewg.org/tapwater/contaminants/contaminant.php?contamcode=1005>

www.cdc.gov (Center for Disease Control)

www.edf.org (*Environmental Defense Fund*)

www.epa.gov. (*Environmental Protection Agency*)

www.ewg.org (*Environmental Working Group*)

www.nrdc.org (*Natural Resources Defense Council*)

www.nsf.org. *NSF International*, a not-for-profit organization that helps protect people by "certifying products and writing standards for food, water and consumer goods". Provides information on bottled water, water filters, and a guide to pharmaceuticals in drinking water.

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