The Negative Health Effects of Chlorine
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Summary
Federal regulations require chlorine treatment of the water supplied to urban/suburban areas of America and much of Canada from surface sources such as lakes, reservoirs and rivers. That constitutes about 75% of water that Americans consume. Water from underground sources generally is not chlorinated unless it is supplemented by surface water. My hometown, Lacey, Washington, and some surrounding communities that are supplied water by Lacey, are fortunate to be among that group.

Chlorination is inferior water treatment on at least two counts. (1) Although it has greatly lowered infectious waterborne diseases in the US and Canada, chlorination fails against a variety of water problems including parasites, and can seriously harm people who use the water, (2) Its cost is unnecessarily high. As of 1996, Andover, Massachusetts' new ozone treatment costs $83 per million gallons of purified water, only two-thirds as much as the old treatment process. The town saves $64,000 annually in chemicals costs alone, and uses less electricity.

Possible Damage to Arteries
When chlorinated water is run through a hose or carried in a pail followed by milk as in a dairy, "very tenacious, yellowish deposits chemically similar to arterial plaque" form; with unchlorinated water this doesn't happen.

CBS' 60 Minutes show July 11, 1992, displayed two laboratory rats, both of them eating standard rat chow and drinking chlorinated water. One rat had clear arteries. The other was also on pasteurized, homogenized milk. When the animals were sacrificed and cut open, the arteries of the milk-drinking rats were clogged. A scientist in a white coat winked at the camera and said, "He [the live rat he was holding] is the only one doing research on that." The researcher didn't say why, but the powerful dairy and chemical lobbies come to mind.

Dairy buckets, hoses and rats' arteries resist the arterial-wall damage known as atherosclerosis. But what can chlorinated water and cow's milk, particularly homogenized milk, do to the far more susceptible arteries of humans? Those of young chickens are about as susceptible to such damage as people's arteries. So as a first approximation, J.M. Price, MD gave cockerels (roosters less than a year old) only chlorinated water (without milk). They developed arterial plaques; and the stronger the concentration of chlorine, the faster and worse the damage. Cockerels on unchlorinated water developed no such damage.5

The residents of the small town of Roseto, Pennsylvania, had no heart attacks despite a diet rich in saturated animal fats and milk — until they moved away from Roseto's mountain spring water and drank chlorinated water. After that, consuming the same diet, they had heart attacks.6 The Roseto example is dramatic enough, but the needed detailed comparisons and follow-up have never been done.

How well does the incidence of heart attacks match the areas where water is/was chlorinated? Chlorination spread throughout America in the second and third decades of this century, about 20 years before the mushrooming of heart attacks. Light chlorination, we will recall, yielded slow growth of plaques in Price's cockerels; and so chlorination of people's drinking water at the usual low concentration might have been expected to take at least 10-20 years to produce clinical manifestations of atherosclerosis.

A physician team led by William F. Enos autopsied 300 GIs who had died in battle in the Korean War. These men, who had passed induction examination as healthy, averaged 22.1 years of age. To their shock and amazement, in 77% of the 300 the pathologists found "gross evidence of arteriosclerosis in the coronary arteries."7 In several, one or more heart arteries were partly or completely occluded.

Although Dr. Enos didn't try to explain his discovery, he assumed arterial clogging had developed gradually. Seemingly to support that assumption, almost 20 years later pathologists discovered early arterial damage in 96% of nearly 200 consecutive babies who had died of whatever cause in their first month outside the womb. Two of those babies' coronary arteries were blocked, causing infantile heart attacks.4 Identified as crib deaths, these were related to functionally deficient vitamin E.6

But did arterial damage in fact develop slowly? The water that the American soldier had to drink in Korea was so heavily chlorinated that many could hardly tolerate it. In Vietnam too, autopsies of American soldiers found heart-artery damage.8 Again, water supplied to them had been heavily chlorinated.3 Did much of the soldiers' arterial damage develop, not gradually but quickly, as in Dr. Price's cockerels? The truth — slow or rapid development of clogging — may never be known. Interestingly, from 1950 to 1965 while heart attacks mushroomed, on a population level arterial lesions did not increase; the major growth was in clotting.

Chemical Background
Highly reactive chlorine is one of the industrial waste products profitably disposed of by using people as garbage cans, then on into the environment. Chlorine oxidizes lipid contaminants in the water. It thus creates free radicals,4 (highly reactive atomic or sub-atomic particles lacking an electron) and oxyesters (formed when lipid and oxygen molecules combine).8,9

To function we require moderate numbers of both free radicals and oxyesters. The immune system employs free radicals to kill cells that its cellular immune mechanism can't handle. A second mechanism using free radicals initiates programmed cell suicide known as apoptosis.10And moderate quantities of oxyesters, like cholesterol itself, serve a protective function.11 But excess free radicals and excess oxyesters damage arteries and initiate cancer, among many other kinds of harm.

How does chlorine in water cause these problems? It destroys protective acidophilus, which nourishes and cooperates with the 3 to 3-1/2 pounds12 of immunity-strengthening "friendly" organisms lining the colon, where about 60% of our immune cells operate.13 And
Chlorine combines with organic impurities in the water to make trihalomethanes (THMs), or chloramines. The more organic matter, the more THMs; and like excess oxysterols they are carcinogens.

Industrial chemist J.P. Berez, PhD, showed in 1992 that chlorinated water alters and destroys essential fatty acids (EFAs), the building blocks of brains and central nervous systems. The compound hypochlorite, created when chlorine mixes with water, generates excess free radicals; these oxidize EFAs, turning them rancid.

Most Western diets contain very little of critically needed omega-3 EFAs. These are found in fish oil and, better, in flaxseed oil; also in moderate quantity in first-virgin olive oil. These EFAs, except in olive oil, go rancid quickly. And so, to extend their products' shelf life, food processors remove all health-promoting EFAs, as well as destroying or discarding most needed micronutrients.

Processors substitute partially hydrogenated trans, transformed fats. Found in all boxed and packaged foods that have long lists of hard-to-pronounce chemical names on the side, trans fatty acids consumed in large quantity can cause heart attacks and many other degenerative diseases.

Among the THMs that result from chlorine combining with organic compounds in water are carcinogenic chloroform and carbon tetrachloride. It is the combination of chlorine and organic materials already in the water that produces cancer-causing byproducts. The more organic matter in the water, the greater is the accumulation of THMs.

In a study of more than 5,000 pregnant women in the Fontana, Walnut Creek and Santa Clara areas of California, researchers from the state health department found that women who drank more than five glasses a day of tap water containing over 75 parts per billion of THMs had a 9.5% risk of spontaneous abortion, i.e. miscarriage. Women less exposed to the contaminants showed 5.7% risk; no comparison was given for women who ingested no THMs.

Other Risks of Chlorinated Water
Chlorine in swimming pools reacts with organic material such as sweat, urine, blood, feces, and mucus and skin cells to form more chloramines. Chloroform risk can be 70 to 240 times higher in the air over indoor pools than over outdoor pools. And Canadian researchers found that after an hour of swimming in a chlorinated pool, chloroform concentrations in the swimmers' blood ranged from 100 to 1,093 parts per billion (ppb). If the pool smells very much of chlorine, don't go near it.

Taking a warm shower or lounging in a tub filled with hot chlorinated water, one inhales chloroform. Researchers recorded increases in chloroform concentration in bathers' lungs of about 2.7 ppb after a 10-minute shower. Worse, warm water causes the skin to act like a sponge; and so one will absorb and inhale more chloroform in a 10-minute shower than by drinking eight glasses of the same water. This irritates the eyes, the sinuses, throat, skin and lungs, dries the hair and scalp, worsening dandruff. It can weaken immunity.

A window from the shower room open to the outdoors would release chloroform from the shower room air. But to prevent its absorption through the skin requires a showerhead that removes chlorine. The ShowerWise™ filter and showerhead can be ordered for $69, plus two filters $129 — from What Doctors Don't Tell You, 1-800-851-7100 or fax 410-223-2619. Others offer comparable products.

Dishwashers pollute indoor air with chlorinated organics created from dishwasher detergents and volatilized in the air for us to breathe. They vent 5 to 7 liters (quarts) of air into the house air every minute of operation. The chlorine reacts with food scraps. Ceramic disks, used instead of detergents, totally avoid the problem and are said to be about 75% less costly than detergent.

Relation to Melanoma and Cancers
Studies in Belgium have related development of deadly malignant melanoma to consumption of chlorinated water. Drinking and swimming in chlorinated water can cause melanoma, Sodium hypochlorite, used in chlorination of water for swimming pools, is mutagenic in the Ames test and other mutagenicity tests. Redheads and blondes are disproportionately melanoma-prone; their skin contains a relative excess of pheomelanins compared to darker people.

Franz H. Rampen of the Netherlands said worldwide pollution of rivers and oceans and chlorination of swimming pool water have led to an increase in melanoma.

That disease is not associated with exposure to ultraviolet light. People who work indoors all the time, exposed to fluorescent lights, have the highest incidence of melanoma. And the disease usually appears on parts of the body that are not often exposed to sunlight.

Other Harm from Chlorination
Long-term risks of consuming chlorinated water include excessive free radical formation, which accelerates aging, increases vulnerability to genetic mutation and cancer development, hinders cholesterol metabolism, and promotes hardening of arteries.

Excess free radicals created by chlorinated water also generate dangerous toxins in the body. These have been directly linked to liver malfunction, weakening of the immune system and pre-arteriosclerotic changes in arteries (which, as we saw, struck Dr. Price's ancestors and may have happened to American soldiers in Korea and Vietnam). Excessive free radicals have been linked also to alterations of cellular DNA, the stuff of inheritance. Chlorine also destroys antioxidant vitamin E, which is needed to counteract excess oxysterols/free radicals for cardiac and anti-cancer protection.

A study in the late 1970s found that chlorinated water appears to increase the risk of gastrointestinal cancer over a person's lifetime by 50 to 100%. This study analyzed thousands of cancer deaths in North Carolina, Illinois, Wisconsin and Louisiana. Risk of such cancers results from use of water containing chlorine at or below the EPA (Environmental Protection Agency) standard and "is going to make the EPA standard look ridiculous," stated Dr. Robert Harris, lead scientist in the study.

A later meta-analysis found chlorinated water is associated each year in America with about 4,200 cases of bladder cancer and 6,500 cases of rectal cancer. Chlorine is estimated to account for 9% of bladder cancer cases and 18% of rectal cancers. Those cancers develop because the bladder and rectum store waste products for periods of time. (Keeping the bowels moving regularly lowers such risk.) Chlorinated water is associated, too, with higher total risk of combined cancers. Chlorine in treated water can also cause allergic symptoms.
American water isn't treated with safe, cheaper, more effective ozone. And why Dr. Price's revealing studies with cockerels, as well as the Roseto story, were not pursued.

Other Water Pollution Problems

EPA tests have shown that in the water we drink, over 2,100 organic and inorganic chemicals (including pesticides, heavy metals, radon, radioactive particles and) and parasitic organisms (including cryptosporidium) have been identified; 156 of them are pure carcinogens. (In 1993, cryptosporidium killed more than 100 and infected over 400,000.) Of those, 26 are tumor promoting: they can make an existing tumor grow. Exposure to cryptosporidium in people with lowered gastrointestinal immune function could lead to chronic Gi tract infection. Other examples include recurring cases of Legionnaire's disease, a pneumonia caused by Legionella pneumophila, which may lurk in hot water supplies.

A public notice recently issued in Washington, DC warned that a high level of bacteria in the chlorinated, fluoridated city system water made it unsafe for dialysis patients, AIDS patients, organ transplant patients, the elderly and infants. But water contamination is often worst in small communities that can't afford proper treatment; the EPA has not released this information.

Testimony to hearings of the House Committee on Government Reform and Oversight revealed Pfiesteria outbreaks in people drinking chlorinated water. The organism, which kills fish, sickens people; they get sick from drinking the water, not from eating infected seafood. The EPA's Robert Perciasepe said, in written testimony, "Any new public health policy on this issue needs to consider reduction of nitrogen and phosphorus pollution in our waters." A bill passed by the US House of Representatives would require managers of municipal water systems to tell customers what contaminants have been found in local drinking water. But government laboratories test only for bacterial content and a few of the major inorganic toxins such as lead and arsenic. So, for a complete water test one must consult a private laboratory.

Sherry A. Rogers, MD, authority on environmental medicine, raises the estimated number of chemicals in drinking water to 5,000. And 85% of American aquifers supplying wells below 8,000 feet altitude are contaminated with heavy metals; a recent federal report says the water you drink may have been recycled from sewage waste back to drinking water five times. The late Kevin Treacy, MD of Australia said, "If municipal water were introduced now, it would not be allowed."

The EPA called 129 contaminants found in water supplies "dangerous" singly, let alone in combination. Pesticides and other toxic wastes run off farmlands and pastures or are dumped by factories, pollute rivers and seep into underground aquifers. Aptly called "biocides" by Russell Jaffe, MD, PhD, pesticides are designed to end life; few have been shown to be safe. The EPA depends on producers of pesticides to test their safety: the wolf guards the hen house. It should be no surprise that the tests take a long time, and many have been fraudulent.

Further, one poison is tested at a time; synergistic effects of combinations, potentially far worse, are ignored. Besides, many of the so-called " inert" substances in pesticide combinations are more toxic than the "active"; one of the "inert"s is DDT, supposedly prohibited for American farm use since 1973. The American Society of Microbiology reported that water in the US is filled with microbes, such as viruses and bacteria, which pose a growing threat to public health. The document states that water pollution control efforts have focused on protecting water against chemical pollution, but they neglect serious problems from wastewater, sewer overflows, septic tanks, and the risks associated with microbial pollutants. The report recommended creation of a task force to coordinate federal agency activities on environmental and public health issues. Isn't all that bad enough without the deliberate addition of the further toxicity of chlorine?

Plants do not thrive as well on chlorinated as on unchlorinated water; wild animals do not develop atherosclerosis until they drink chlorinated water in American zoos. Although their food, selected by people, isn't the same as what they caught, plucked or dug up in the wilds, evidence induces chlorinated water, with its thousands of other chemicals, as the worst culprit in zoo animals' arterial clogging.

Scientists in Minnesota propagated embryos from healthy frogs in plain tap water. Some of the frogs had no legs or...
six legs, or an eye in the middle of the throat. Earlier, deformed frogs were found in tap water in the US, Canada and Japan and we are drinking that stuff.

Purification of Drinking Water

A reverse-osmosis water purifier that removes 87 to 93% of fluoride and comparable percentages of other toxins, is known as The Duchess. It retails for $650; or $370 from the Natural Medicine Institute, 19125 SE Stark Street, Portland, Oregon 97233; 503-491-1067. Julianna Hufnagel, MS, MD, uses and recommends the Ultra-Sun water filter, which can be installed under the sink or on the countertop. The system combines solid carbon block filters with ultraviolet (UV) light chambers. The carbon block filters remove lead, chemical and organic pollutants, chlorination byproducts, and improve taste, and the UV light kills microbes. It avoids reverse osmosis, which discards valuable minerals from the water such as calcium, magnesium and trace minerals. The filter can be purchased from Philips Products and Services at 800-705-5559, ext. K11019. The cost: $295.

The simple PUR filter easily attaches to a kitchen faucet; Consumer Reports, in July 1997, rated it very high. And it is relatively inexpensive.60

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