

Expert voices from now and earlier:

"Chlorine is the greatestcrippler and killer of modern times. While it prevented epidemics of one disease, it was creating another. Two decades ago, after the start of chlorinating our drinking water in 1904, the epidemic of heart trouble, cancer and senility began."

SAGINAW HOSPITAL

J.M. Price, MD

"Showering is suspected as the primary cause of elevated levels of chloroform in nearly every home because of the chlorine in the water."

ENVIRONMENTAL PROTECTION AGENCY

Dr. Lance Wallace

"Taking long hot showers is a health risk, according to research presented last week in Anaheim, California, at a meeting of the American Chemical Society. Showers – and to a lesser extent baths – lead to a greater exposure to toxic chemicals contain din water supplies than does drinking the water. The chemicals evaporate out of the water and are inhaled. They can also spread through the house and be inhaled by others. House holders can receive 6 to 100 times more of the chemical by breathing the air around showers and bath than they would by drinking the water."

NEW SCIENTIST, 18 September 1996

Ian Anderson

"Studies indicate the suspect chemicals can also be inhaled and absorbed through the skin during showering and bathing."

"Ironically, even the Chlorine widely used to disinfect water produces Carcinogenic traces."

"Though 7 out of 10 American drink chlorinated water, its safety over the long term is uncertain."

"Drinking chlorinated water may as much as double the risk of the bladder cancer, which strikes 40,000 people a year."

U.S. NEWS & WORLD REPORT – July 29, 1991

Is Your Water Safe – The Dangerous State of Your Water

"A long, hot shower can be dangerous. The toxic chemicals are inhaled in high concentrations."

BOTTOM LINE – August 1987

Dr. John Andelman, Ph.D.

"Scientists found there was a higher incidence of cancer of the esophagus, rectum, breast, and larynx and of Hodgkins Disease among those drinking chlorinated surface waters."

"Volatile organics can evaporate from water in a shower or bath."

"Conservative calculations indicate that inhalation exposures can be as significant as exposure from drinking the water, that is, one can be exposed to just as much by inhalation during a shower as by drinking 2 liters of water a day."

"People who shower frequently could be exposed through ingestion, inhalation and/or dermal absorption."

IS YOUR WATER SAFE TO DRINK?

Consumer Reports Books

Chlorinated Drinking Water Linked to Cancer

November 21, 1999 The Toronto Star

Task force to conduct tests in hundreds of communities

Ottawa (CP) - A new federal analysis concludes that chlorinated drinking water may pose a cancer risk to humans, particularly the risk of bladder cancer.

The report by the Laboratory Center for Disease Control, made public yesterday, is based on an exhaustive review of dozens of studies carried out over recent years in Canada and abroad.

The review has already spurred the Federal-Provincial Drinking Water Committee to re-examine existing standards for levels of chlorine by-products (CBPs).

Despite the undisputed benefit of chlorination in controlling infectious diseases, the epidemiological studies indicate an elevated incidence of bladder cancer among those who have been exposed to chlorinated drinking water for long periods.

"If you put those two lines of evidence together I would say it comes out as a probable link (between chlorinated

water and cancer)," said health department expert Donald Wigle, who wrote the review. He said a task force would test drinking water in hundreds of communities across Canada to determine precisely the current concentrations of chlorination by-products.

The task force will also survey equipment and practices at water purification plants across the country to determine how costly it would be to lower the current limit on the chemicals.

One of the most effective ways to reduce concentrations of the chemicals is to use filtration.

But many communities, especially smaller ones, don't have up-to-date filtration systems.

Wigle said a new standard, if one is deemed necessary, probably won't be proclaimed until late next year. He said consumers could protect themselves from the risk by using household water filters or drinking bottled water.

Chlorine's Health Effects

In addition to diet and exercise, maintaining optimum health involves controlling toxic pollutants commonly found indoors. Many people who suffer from allergies find their complaints aggravated by substances that have become part of everyday life. Whether we like it or not, most of us spend 70 to 90% of our time indoors, bombarding our immune systems with chemicals and irritants from carpeting, cleaning products, tobacco smoke, pesticides, dust, plastics, fiberglass, asbestos, automobile exhaust, and even the chlorine that is routinely added to municipal water supplies.

Young children, the elderly, and the chronically ill are among the most noticeably affected. The American Medical Association reports a 75% increase in asthma cases since 1984. "Sick buildings" are routinely reported in newspapers and magazines, largely the result of poorly circulated air, toxins emitted by plastics and other synthetic materials, and out-gassing of paints and chemically treated wood. A "sick building" is defined as one where more than 20% of a building's occupants report illnesses that are building related, with symptoms such as skin rashes, nose bleeds, headaches, mental fatigue, eye, nose and throat irritation, nausea and dizziness.

Indoor pollution can frequently be the cause of feeling run down and generally out of sorts. Yet this shouldn't surprise us if our bodies, particularly our respiratory systems, are being overtaxed by contaminants, then no matter how much we control our diet and how much time we spend getting exercise, we won't be able to perform at our peak. While chlorine occurs in nature, chiefly as a component of sodium chloride in sea water and salt deposits, it irritates the eyes and throat, and it is poisonous when swallowed or inhaled. In 1992, the American Medical Association published information that stated "nearly 28% of all cancer of the intestines and 18% of all cancer of the bladder were caused by the drinking of chlorinated water." Chlorine may also be a culprit in cancer, although studies undertaken to determine if this is the case remain incomplete.

A surprising but growing concern is the effect that chlorine and other chemicals have on serotonin levels. Recent research demonstrates that recalcitrant organochlorines may play a role in the etiology of chronic fatigue syndrome. The chlorine emitted from showering and other household water use breaks down into free radicals that can lead to cancer and cardiovascular disease. Chlorinated water also contains hypochlorite, which increases levels of singlet oxygen in the body. Clearly it is vital to good health to filter as much chlorine from your home water system as possible.

Indoor air is often more contaminated than outdoor air. During the summer months especially, pollens, smog, and bacteria increase. Along with the harsh chemicals used to control germs and bacteria, our homes may also be polluted by organic gases from paint, wallpaper, insect repellent, air fresheners, and dry cleaned clothing. The levels of organic gases can be as much as five times higher inside the home than outdoors. Ordinary household dust may contain lead, asbestos, other respirable particles, and dust mites, an especially annoying problem for allergy sufferers, who may experience eye, nose, and throat irritation occluded breathing, bronchitis, and respiratory infections from inhaling dust mite feces. Biological pollutants in the home may be found in damp walls (especially in humid climates), in basements, air conditioners, carpeting, bedding and furniture.

Chlorine is one of the most reactive elements found in nature. It readily dissolves in water, where it combines with molecules of oxygen and hydrogen to form hypochlorous acid and hypochlorite ion. Chlorination of water is

achieved by adding chlorine gas directly to the water supply, or by adding the chemicals calcium hypochlorite or sodium chlorite, both of which are known as "free available chlorine".

Water utilities routinely disinfect drinking water to prevent microbial diseases, especially cholera, dysentery, and typhoid fever. Top date, the greatest contribution to the protection of public health in the United States has been the disinfection of public water supplies, yet chlorine itself has been shown to cause a number of health problems. Two decades after the start of chlorinating our drinking water, the present epidemic of heart trouble and cancer began.

Potential Contribution to Heart Disease

The patent for chlorination was granted in 1888 to Dr. Albert R. Leeds, Professor of Chemistry at Steven's Institute of Technology in Hoboken, New Jersey. The next year, the first chlorination of a public water supply was attempted in Adrian, Michigan. It wasn't until 1908, however, that chlorination was used on a large scale, at Boonton Reservoir waterworks in Jersey City, New Jersey. By the 1940s, chlorination was widespread in the United States.

Concerns about chlorine and health began in the 1960s. In one study, an association was shown to exist between chlorination and heart disease, evidence that was, interestingly, discovered in Jersey City, the site of the first large-scale chlorination project. The severity of heart disease among people over the age of 50 correlated with the amount of chlorinated tap water they consumed. A statistically significant correlation demonstrated that those persons over 50 who did not suffer from heart disease drank mostly unchlorinated fluids such as bottled water, or boiled water (chlorine is released as a gas when boiled).

Dr. Joseph Price, author of *Coronaries, Cholesterol, Chlorine*, has stated that he believes chlorine is the cause of "an unprecedented disease epidemic which includes heart attacks and strokes ... Most medical researchers were led to believe it was safe, but now we are learning the hard way that all the time we thought we were preventing epidemics of one disease, we were creating another. Two decades after the start of chlorinating our drinking water in 1940, the present epidemic of heart trouble and cancer began."

Although numerous studies have been conducted in the attempt to discover how chlorine may be a factor in cancer, no research has determined specifically that chlorine is a responsible agent. (See, for example, T. Pate, R. H. Harris, S. S. Epstein, "Drinking Water and Cancer Mortality in Louisiana," *Science* Vol. 193, 1976, 55-57). But the relationship between heart disease and chlorinated water is well established—alas, even chickens and pigeons used in tests to determine the effects of chlorine showed evidence of either atherosclerosis of the aorta or obstruction of the circulatory system.

Removal of Chlorine from Showers

In confined spaces, such as a shower or bathroom, we can sometimes smell chlorine. Frequent exposure to chlorine gas even at the low levels found during normal activities such as showering may reduce the oxygen transfer capacity of the lungs.

When we shower, we also expose our skin to a large amount of diluted chlorine. It's likely, given the strong oxidizing power of chlorine, that regular exposure to chlorinated water will hasten the skin's aging process. Fortunately, over the last ten years, water filters have become more sophisticated and it is now possible to remove chlorine from your home shower.

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