

# Chlorine and Your Shower – Is it safe to be Clean?

## **Introduction:**

While many people have become enlightened to the concerns with drinking water quality in the US and abroad, most people are still unaware of the potential exposure they have to contaminants and pollutants in the privacy of their shower and/or bath. In most developed countries, chlorine is used to disinfect the domestic drinking water. This is usually mandated by law. Chlorine is a powerful oxidizer and not only kills microorganisms it also oxidizes and attacks the DNA in all living matter. This can cause damage that will eventually result in permanent cellular alteration (e.g., premature aging and cancer). In addition, chlorine reacts with organic material in our water to produce a family of compounds known as chlorination byproducts and trihalomethanes. These compounds have been directly linked to the long-term development of cancer in very low concentrations. Provided below are a number of quotes taken from a variety of reports and articles, which bring particular focus to this issue and the need to filter the water we use for showering and bathing. At the end of the quotes is provided a bibliography if the reader wishes to read the complete references.

**“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 contained in 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 1986**  
**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 Americans 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 87**  
**Dr. John Andelman, Ph.D.**

“On one hand, chlorination has freed civilization from the constant dangers of waterborne epidemics. On the other hand in the mid – 70s scientists discovered that chlorination could create carcinogens in water.”

“80% of the population drinks chlorinated water.”

“There was a higher incidence of cancer of the esophagus, rectum, breast, and larynx and of Hodgkin’s 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 a 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**

“Skin absorption of contaminant has been underestimated and ingestion may not constitute the sole or even primary route of exposure.”

**AMERICAN JOURNAL OF PUBLIC HEALTH**  
**Dr. Halina Brown**

“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 present epidemic of heart trouble, cancer and senility began.”

**SAGINAW HOSPITAL**  
**Dr. J.M. Price, MD.**

“Cancer risk among people drinking chlorinated water is 93% higher than among those whose water does not contain chlorine.”

**U.S. COUNCIL OF ENVIRONMENTAL QUALITY**

“Drinking tap water that is chlorinated is hazardous, if not deadly to your health.”

**HEALTHY WATER FOR A LONGER LIFE**  
**Dr. Martin Fox**

“Known carcinogens are found in drinking water as a direct consequence of the practice of chlorination. A long established public health practice for the disinfection of drinking water.”

**MUNICIPAL ENVIRONMENTAL RESEARCH LABORATORY**  
**Francis T. Mayo, Director**

“Chlorine is used almost universally in the treatment of public drinking water because of its toxic effect on harmful bacteria and other waterborne, disease-causing organisms. But there is a growing body of scientific evidence that shows that chlorine in drinking water may actually pose greater long-term dangers than those for which it was used to eliminate. **These effects of chlorine may result from either ingestion or absorption through the skin.** Scientific studies have linked chlorine and chlorination by-products to cancer of the bladder, liver, stomach, rectum, and colon, as well as heart disease, arteriosclerosis (hardening of the arteries), anemia, high blood pressure, and allergic reactions. **There is also evidence that shows that chlorine can destroy protein in our body and cause adverse effects on skin and hair.**

The presence of chlorine in water may also contribute to the formation of chloramines in the water, which can cause taste and odor problems.”

“Since chlorine is required by public health regulation to be present in all public drinking water supplies, it is up to the individual to remove it at the point-of-use in the home.”

**KEMYSTS LABORATORY**

**Dr. Riddle, Ph.D.**

**“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**

**“A professor of Water Chemistry at the University of Pittsburgh claims that exposure to vaporized chemicals in the water supplies through showering, bathing, and inhalation is 100 times greater than through drinking the water.”**

“As chlorine is added to kill pathogenic microorganisms, the highly reactive chlorine combines with fatty acids and carbon fragments to form a variety of toxic compounds, which comprise about 30% of the chlorination by-products.”

“During the mid-1970s monitoring efforts began to identify widespread toxic contamination of the nation’s drinking water supplies, epidemiological studies began to suggest a link between ingestion of toxic chemicals in the water and elevated cancer mortality risks. Since those studies were completed a variety of additional studies have strengthened the statistical connection between consumption of toxins in water and elevated cancer risks. Moreover, this basic concern has been heightened by other research discoveries.”

**THE NADER REPORT – TROUBLED WATERS ON TAP**

**Center For Study of Responsive Law**

“The National Academy of Sciences estimate that 200 – 1000 people die in the United States each year from cancers caused by ingesting the contaminants in water. **The major health threat posed by these pollutants is far more likely to be from their inhalation as air pollutants. The reason that emissions are high is that because water droplets dispersed by the shower head have a larger surface-to-volume ratio than water streaming into the bath.**”

**SCIENCE NEWS, VOL. 130**

**Janet Raloff**

**“The cause of arteriosclerosis and resulting heart attacks and strokes is none other than the ubiquitous chlorine in our drinking water.”**

**CORONARIES/CHOLESTEROL/CHLORINE**

**Dr. J.M. Price, MD.**

**“In the vast majority of cases where germ-free water is required for public supply, or in the swimming pool, the process of disinfection will involve the use of chlorine in one form or another.”**

**CHEMISTRY AND CONTROL OF MODERN CHLORINATION**

**Dr. A.T. Palin, Ph.D. (O.B.E.)**

**“Chlorine gas was despicable used during WWI. When the war was over, the use of chlorine was diverted to poisoning germs in our drinking water. All water supplies throughout the country were chlorinated. The combination of chlorine (when in drinking water) and animal fats results in arteriosclerosis, heart attacks, and death.”**

**WATER CAN UNDERMINE YOUR HEALTH**

**Dr. N.W. Walker, D.S.**

# BIBLIOGRAPHY

1. **"SHOWERS POSE A RISK TO HEALTH"**, Ian Anderson, New Scientist, 09/18/86.
2. **"NON-INGESTION EXPOSURE TO CHEMICALS IN POTABLE WATER"** Julian Andelman. Working Paper 84-03, University of Pittsburgh, 1984.
3. **"THE ROLE OF SKIN ABSORPTION AS A ROUTE OF EXPOSURE FOR VOLATILE ORGANIC COMPOUNDS (VOCS) IN DRINKING WATER"**, Halina Brown. American Journal of Public Health, Vol 74, 5/84.
4. **"TOXIC SHOWERS AND BATHS"**, Janet Raloff. Science News, Vol 130, Page 190.
5. **"Water"**, John F. Ashton and Ronald S. Laura. Nature & Health, 1988.
6. **"HUMAN EXPOSURE TO VOLATILE ORGANIC COMPOUNDS IN HOUSEHOLD TAP WATER: THE INHALATION PATHWAY"**, T.E. McKone Environ. Sci, Technology, Vol. 21, No 12, 1987, PP. 1194-1201.
7. **"THE NADER REPORT – TROUBLED WATERS ON TAP"**, Duff Conacher and Assc. Center for Study of Responsive Law, January 1988.
8. **"DID YOU KNOW THAT...A LONG HOT SHOWER"**, Bottom Line/Personal, Aug. 15, 1987.
9. **"MADEMOISELLE"**, Prior to August 15, 1987.
10. **"CORANARIES/CHOLESTEROL/CHLORINE"**, Joseph M. Price, Jove Book, Alta Enterprises, 1969.
11. **"WATER CAN UNDERMINE YOUR HEALTH"**, N.W. Walker D.S., Norwalk Press, 1974.
12. **"WATER-SAFE TO DRINK? Safe To Bathe In?"**, Kurt W. Donsbach D.C., PH., 1974.
13. **"PROTEINS IN NATURAL WATERS AND THER RELATION TO THE FORMATION OF CHLORINATED ORGANICS DURING WATER DISINFECTION"**, Scully. Environ, Sci. Technol., Vol. 22, No. 5, 1988.537-542.
14. **"ORGANIC CHEMICAL CONTAMINANTS IN DRINKING WATER AND CANCER"**, AM. J. Epidemiology, Vol. 110, 1979, P. 420.
15. **"CANCER INCIDENCE AND TRIHALOMETHANE CONCENTRATIONS IN A PUBLIC DRINKING WATER SYSTEM"**, George L. Carlo. American Journal of Public Health, Vol. 74, No. 5, 1984, PP. 479-484.
16. **"STUDIES OF DIFFUSION OF WATER THROUGH DEAD HUMAN SKIN: THE EFFECT OF DIFFERENT ENVIRONMENTAL STATES AND OF CHEMICAL ALTERATION OF THE EPIDERMIS"**, G.S. Berenson and G.E. Burch. AM. Of Tropical Medicine, 1951, No. 31 PP. 842-853.
17. **"REGIONAL VARIATION IN PERCUTANEOUS PENETRATION IN MAN: PESTICIDES"**, H.J. Maiback. Arch. Environ. Health, Vol. 23, Sep. 1971, p. 209.
18. **"STUDIES OF EPIDERMAL WATER BARRIER, PART 2: INVESTIGATION OF THE CHEMICAL NATURE OF THE WATER BARRIER"**, A. Mololtsy. J. of Invest. Derm, 1968, No. 50. PP. 19-20.

19. "TEMPORAL VARIATIONS IN TRIHALOMETHANE CONTENT OF DRINKING WATER", V.L. Smith. Environ. SCI. & Technol., Vol. 14 No 2, 1987, PP. 190-196.
20. "THMS IN DRINKING WATER", J.A. Cotruvo. Environ. SCI & Technol., Vol. 15, No. 3, 1981, PP. 268-274.
21. "VOLATILE SYNTHETIC ORGANIC CHEMICALS (VOCS)", K.V. Dyke. Water Technol. Vol. 13, No. 4, Apr. 1990, P. 38.
22. "IS YOUR WATER SAFE?" Carpenter, Hedges, Crabbe, Reilly and Bounds. U.S. News & World Report, July 29, 1991, PP. 48-55.
23. "IS YOUR WATER SAFE TO DRINK?", Raymond Gabler. Consumer Reports Book, 1987.