

## HEALTH EFFECTS OF HIGH CHLORINE LEVELS

Most regular swimmers know that chlorine can cause skin and eye irritation. But the health risks posed by chlorinated water are potentially more dangerous than rashes and red eyes. Chlorine is also linked to chronic breathing problems, certain cancers, birth defects and erosion of tooth enamel.

### Breathing

A study by the American College of Sports Medicine found that more than 60% of competitive swimmers experience exercise-induced bronchoconstriction after several minutes of swimming in a pool with standard levels of chlorine, even if they haven't previously had breathing problems.

Irritant gases and aerosols contaminating the air around indoor swimming pools can affect the lung epithelium and increase asthma risk in children. Chlorine gas causes acute damage in the upper and lower respiratory tract. It was first used as a chemical weapon at Ypres, France, in 1915.

### Carcinogens

Chlorine combined with swimmer perspiration, skin cells and urine creates chemical compounds called trihalomethanes (THMs), carcinogens that can cause cancer.

A 2007 study found that long-term exposure to THMs through ingestion, inhalation and dermal absorption of water during showering, bathing and swimming doubled the risk of bladder cancer. Swimming in chlorinated pools increased the risk of bladder cancer by 57%. Swimming pools pose a greater health risk than drinking chlorinated water, because uptake of THMs is higher when they are breathed in or absorbed through the skin.

In a very recent study, researchers found that the total concentration of THMs in exhaled breath increased by 7 times in adult volunteers after swimming for 40 minutes in an indoor chlorinated pool. Concentrations of genotoxicity biomarkers for permanent mutation of DNA also increased, indicating a potential genotoxic effect. The greatest increase in biomarkers for genotoxicity resulted from exposure to the THM bromoform, the predominant THM formed in salt-chlorinated swimming pools.

### Birth defects

Expectant mothers can increase the risk of birth defects in their babies by drinking or swimming in chlorinated water, taking a bath or shower, or even standing close to a boiling kettle.

A 2008 study of birth defects in 400 000 infants revealed that exposure to high levels of THMs increased the risk of ventricular septal defects (holes in the heart), cleft palate and anencephalus (absence of a major portion of the brain, skull and scalp) by 50 - 100%.

### Teeth

The Centers for Disease Control and Prevention observed as early as 1983 that competitive swimmers who swam regularly in pool water that was too highly chlorinated, and consequently acidic, showed signs of eroded tooth enamel.

### Tap water

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

Chlorine in tap water also has a negative cosmetic effect. Anyone who has ever swum in a chlorinated pool can relate to its harsh effects on the skin and hair. And our tap water commonly contains higher levels of chlorine than are recommended as safe for swimming pools!

EDITOR

**"Kiss Chlorine Goodbye"**






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