

Chlorinated Pools May Contribute to Asthma and Respiratory Allergies

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Published: Tuesday, 15 September 2012



Chlorine is one of the leading cause of chronic illness in children, affecting as many as 9 million children in the United States; a number that has dramatically increased over the past two decades. And though no one really knows why more and more children are developing the disease, there are a number of theories. Some experts suggest the increase may be due to limited access to care, especially those living in inner-city neighborhoods, and to poor asthma management and education. Others say children aren't exposed to enough childhood illnesses to build up their immune system. Still others suggest that, because today's kids spend more time indoors than before, they are increasingly exposed to asthma-triggering allergens, such as dust mites and polluted air. But researchers in Belgium propose another explanation for the 86.8 percent spike in asthma among children since 1982—chlorinated swimming pools.

For their study, Alfred Bernard, a toxicology professor at Catholic University of Louvain in Brussels, and colleagues compared the health of 733 adolescents, aged 13 to 18, who swam for various amounts of time in outdoor and indoor pools treated with chlorine with 114 adolescents who swam primarily in pools sanitized with a concentration of copper and silver (the "control" group). The researchers discovered that teens spending more than 1,000 hours swimming in chlorinated pools were eight times more likely than the controls to develop asthma. And their susceptibility to asthma rose proportionately with the time exposed; 22 out of 369, or 6 percent, for teens who swam 100-500 lifetime hours, 14 out of 221, or 6.4 percent, who swam for 500-1,000 hours, and 17 out of 143, or 11.9 percent, for those with more than 1,000 lifetime hours of exposure.

Furthermore, the risk of developing other allergies such as hay fever also rose in teens exposed to the disinfectant for more than 100 hours. For example, the odds for hay fever were between 3.3 and 6.6 times greater for those who swam in chlorinated

pools longer than 100 hours and the risk of allergic rhinitis increased 2.2 to 3.5 times for those logging more than 1,000 hours in chlorinated pools.

However, teens without allergic tendencies that swam in copper-silver sanitized pools showed no increased risk of developing asthma and allergy. The researchers say “the only plausible explanation” for these observations is that the toxic, chlorine-based chemicals in the water or hovering in the air at the pool surface irritate the airways of swimmers, causing changes in the airway and promoting the development of asthma and respiratory allergies. “The impact of these chemicals on the respiratory health of children and adolescents appears to be much more important—at least by a factor of five—than that associated with secondhand smoke,” said Bernard.

The current results, together with the team’s prior studies, leaves “little doubt that pool chlorine is an important factor implicated in the epidemic of allergic diseases affecting the westernized world,” Bernard says. He and his colleagues conclude that these findings “reinforce” the need for further study and the importance of enforcing regulations concerning levels of these chemicals in the water and air of swimming pools. The National Institute for Occupational Safety and Health had previously recommended limiting ones exposure to chlorine to prevent negative consequences over the long-term.

The researchers say parents should be on alert to the signs of too much chlorine, such as a strong smell of chlorine or children complaining of sore eyes or throats, which may pose too great a risk, particularly for very young children
The study is published in the September 14 edition of *Pediatrics*.