

# Pool Chemicals and Work-Related Asthma Information for Employers

## Pool chemicals can cause and trigger asthma

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Pool chemicals protect swimmers from the recreational waterborne illnesses caused by germs. However, pool chemicals and the disinfection byproducts that form when pool chlorine mixes with swimmers' sweat, urine, and other waste can cause or trigger asthma in people who work around pools, hot tubs, and water parks. Pool users can also be affected.

Examples of pool chemicals that can cause asthma in someone who doesn't already have it are disinfectants, such as bleach (sodium hypochlorite) and chlorine gas, and pH adjusters, such as muriatic acid (hydrochloric acid). Another substance that causes asthma is trichloramine, a byproduct of disinfection. These byproducts are measured as combined chlorine. Pool chemicals and byproducts can also trigger asthma symptoms in people who already have the illness.

## What is work-related asthma?

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Asthma is a chronic lung disease where the flow of air is decreased, making it hard to breathe. Asthma is work-related when it is caused or made worse by something at work, such as:

- Exposure to a spill or accidental release of a chemical into or around a pool
- Exposure to gases that form when the wrong chemicals are mixed
- Poor ventilation in enclosed pool areas where pool chemical vapors and combined chlorine byproducts collect

Symptoms can start right after an employee breathes in a substance, or can start hours after leaving work. Sometimes a person can suddenly develop work-related asthma from chemicals they have worked with for years. An employee experiencing wheezing, chest tightness, cough, shortness of breath, or difficulty breathing, should be sent to see a doctor. The employee should tell the doctor if exposures at work seem to increase or cause the symptoms.

## Work-related asthma and pools

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The Work-Related Asthma Prevention Program (WRAPP) tracks information about California workers with asthma and helps workers avoid getting asthma from their jobs. WRAPP has found that workers in many different jobs have developed asthma or had their asthma worsened from exposure to pool chemicals and/or disinfection byproducts. These jobs include lifeguard, swimming instructor, maintenance employee, pool supply retail worker, janitor, and others working in pool areas.

### **Case Report – A one-time overexposure can lead to life-long asthma**

A maintenance supervisor was adding muriatic acid to a batch of water for a swimming pool when a cloud of yellow gas arose. He breathed in the gas, immediately had difficulty breathing, and began coughing and wheezing. He was hospitalized and was diagnosed with asthma. He now has constant and severe asthma attacks and has been hospitalized several times.

### **Case Report – Poor ventilation in pool area worsens a lifeguard's asthma**

A lifeguard with asthma was exposed to pool chemicals and disinfection byproducts at an indoor pool. One day when the pool area was poorly ventilated, she had an asthma attack that sent her to the emergency room. Since then, she has had to use her asthma medications daily. Before this incident, she used them only occasionally.

## **How to prevent asthma from pool chemicals**

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- Train all workers who handle chemicals on how to follow product labels, safely use chemicals and wear personal protective equipment. Ensure that workers always follow safe practices. This includes seasonal workers who work for only a few weeks or months a year.
- Institute and enforce pool rules that decrease the amount of disinfectants needed and prevent the formation of disinfection byproducts. For example, encourage bathroom use before swimming and require swimmers to shower before entering the pool.
- Ensure adequate ventilation in the pool, chemical storage, and pump room areas.
- Use the correct amount of pool chemicals. Require regular testing and keep chemicals and pH at recommended levels.
- Keep the level of combined chlorine (which includes trichloramine) controlled to below the maximum limits recommended by your local health agency.
- Keep workers away during breakpoint chlorination ("shocking" the pool). Maintain maximum fresh (outdoor) air ventilation in indoor pools during and after addition of shock chemicals. Fans at the pool surface can help clear out the gases that form.
- Use supplemental or alternative treatment methods such as ultraviolet (UV) light or salt water pools. (Note: Salt water pool systems still generate chlorine, but require less use of bulk concentrated chemicals.) UV light will help keep combined chlorine levels low.

For more information, call the Work-Related Asthma Prevention Program in California: 1-800-970-6680 (toll-free to California callers) or go to [www.cdph.ca.gov/programs/ohsep/Pages/Asthma.aspx](http://www.cdph.ca.gov/programs/ohsep/Pages/Asthma.aspx). California Relay Service: 711. To get a copy of this fact sheet in another format, please call (510) 620-5757. Allow at least 10 days.

## **Additional Resources**

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Centers for Disease Control (CDC) web page on Chloramines:  
[www.cdc.gov/healthywater/swimming/pools/irritants-indoor-pool-air-quality.html](http://www.cdc.gov/healthywater/swimming/pools/irritants-indoor-pool-air-quality.html)

CDC web page for the Model Aquatic Health Code and other healthy swimming resources:  
<http://www.cdc.gov/healthywater/swimming/pools/mahc/>