Nothing provides relief from a hot summer day like the sparkling cool water of a swimming pool. With this enjoyment, however, comes responsibility and significant safety risks. Not to dismiss the seriousness of drowning and sunburns, but as a pool owner, water quality may be your biggest concern.

Poor pool water quality may cause many problems and health risks, and there are many things that can foul pool water. For example, the Centers for Disease Control says that between 2005 and 2006, there were 78 outbreaks of cryptosporidiosis traced to contaminated pool water, affecting thousands of people. Fortunately, if you own one of the 7.4 million pools used in the U.S., there are ways to prevent contamination, most of them simple and inexpensive.

**What are some common contaminants?**

The two most common ways that pool water becomes contaminated are (1) pharmaceuticals or personal care products (PPCPs) and (2) body fluids. Most public pool rules require patrons to shower before entering the water to get rid of PPCPs, which include lotions, soaps, cosmetics, perfumes, and prescription drugs that include pills, liquids, or topicals such as pastes or ointments.

According to the Department of Health and Human Services, more than half of all Americans take at least one prescription drug, and one in six take more than three medications. Every day, the average person uses between nine and 15 personal products, which results in the application of approximately 126 different ingredients to their bodies.

Limiting the amount of PPCPs in the water improves water quality and lessens the amount of chemicals needed to maintain healthy swimming conditions. Practicing good hygiene and rinsing away any products from the body minimizes the risk of impurities that can cause health issues.

Bodily fluids like blood, feces, and vomit are leading culprits in pool water contamination and can rapidly spread illness and disease. Other bodily fluids include sweat, saliva, and urine. Swallowing, breathing, or contact with bodily fluid contaminated water can cause gastrointestinal illnesses. Exposure to bodily fluids may also cause eye, respiratory, skin, ear, neurologic, and wound infections.

To mitigate this potential contamination, encourage your family and guests to shower before entering a pool. Make sure children are clean, and take them on frequent bathroom breaks. Do not change diapers poolside, and ensure that diapers are completely leak proof to prevent waste from combining with pool water.

**What are ways to assure quality pool water?**

The most common sanitizer used in pool water is chlorine, a rapid and persistent oxidant that kills the harmful organisms that cause illnesses such as gastroenteritis and Legionnaires’ Disease, as well as ear infections, and athlete’s foot. Chlorine treatment has provided safe drinking water for billions of people around the world and helped public health in swimming pools for decades.

Sandra Peppel, aquatic manager for West Virginia University's Student Recreational Center, recommends “spending $40 at a local pool shop on an accurate test kit and actually testing the water.” Water monitoring increases the likelihood that problems will be noticed and corrected before contamination or other dangerous contents can cause any health issues. Depending on the readings, pool owners can adjust chlorine levels appropriately.
HELP EDUCATE SWIMMERS

A recent Water Quality and Health Council survey found that almost half (47 percent) of respondents admit to one or more behaviors that contribute to an unhealthy swimming pool. One in five (17 percent) say they’ve urinated in the pool, and eight in ten (78 percent) are convinced their fellow swimmers are guilty. As far as showering goes, forget it. Roughly one third (35 percent) pass the shower without stopping, and three quarters (73 percent) say their fellow swimmers fall to shower before swimming.

The survey also found that many people weren’t clear about healthy swimming pool behavior. As a pool owner, you can help educate people—especially children—about hygienic behaviors and the reasons behind them.

“Controlling pool pH is important for optimizing the effectiveness of chlorine as a disinfectant,” says Craig Mains, an engineering scientist with the National Environmental Services Center. “Chlorine reacts with water to form a weak acid called hypochlorous acid (HOCl). HOCl further dissociates or breaks into hydrogen ions (H+) and hypochlorite ions (OCl-). The extent of this reaction is pH dependent. As the pH decreases, there is more HOCl and less OCl; as the pH increases, the reverse is true.

“Both HOCl and OCl contribute to the free chlorine residual as measured on your test kit,” Mains continues. “However, only HOCl is considered to be an effective disinfectant. At pH 7.2 about 60 percent of the free chlorine residual is in the form of HOCl. At pH 8.0 only about 15 percent is in the form of HOCl. So, even though the free chlorine may read the same on your test kit, at pH 8 the disinfection effectiveness is much less. The recommended pH range for pools is often listed as 7.0 to 8.0, with an ideal range of 7.2 to 7.6. You would, in theory, increase the disinfection effectiveness of chlorine by decreasing the pH below that level, but, because the pH of human tears is about 7.2 to 7.4, you would end up with water that was less comfortable to swim in and would cause stinging eyes.”

Pool owners should check the chemicals up to three times daily because many factors can change the chemical content of the pool water. These factors include extensive use, such as a pool party, and ultraviolet rays during peak sunlight hours that destroy chlorine. The levels must be regulated and replenished accordingly to kill harmful bacteria that may develop.

When bodily fluids occur in or near a pool, immediate disinfection procedures should be undertaken. A commonly used disinfectant for bodily fluid outbreaks is chlorine bleach mixed with water. Pools must be evacuated and closed, as it can take up to 24 hours for these situations to be corrected.

What are some signs that my pool water isn’t safe?

There are indications that pool users can look for that suggest the pool water needs attention. The Water Quality and Health Council encourages swimmers to “use your senses” before entering a pool. Specifically, they encourage:

- Sight—look for water that appears clean, clear, and blue.
- Touch—check for tiles that feel smooth and clean.
- Smell—make sure there are no strong odors.
- Sound—listen for pool cleaning equipment.

A strong scent and red, burning eyes accompanies excessive chlorine levels. When chlorine is working effectively, no strong odors should be detected.

Too little chlorine in the pool water may cause it to appear murky and cloudy. Murkiness can also be caused by poor filtration, a lack of circulation, or improper oxidation practices.

Algae can grow in pools that have poor circulation and low chlorine content. Usually green, algae can be free floating or can cling to the walls or bottom of the pool. Algae can clog filters, cause surface damage, and threaten the health of swimmers. Black algae are found in cracks or slits in lining, especially plastic linings, and are known to disrupt normal chlorine levels.

Brushing the entire pool once every two weeks during swim season helps control the growth of algae in pools. Also, maintaining pH levels between 7 and 8, as well as keeping basic chemical levels normal, minimizes algae forming conditions.

At public pools, inquire about the health inspector’s grade for how well the chemical levels are maintained. Pool managers would also be happy to show and explain the pool equipment used to monitor cleanliness. If the painted stripes along the sides and bottom of the pool are not visible through the water, it could be a problem with water cleanliness. Also, check the walls of the pool, which should be non-slippery.

With summer fast approaching, pool owners and public facilities will soon be opening and ready for thousands of swimmers around the country. Pool owners have the responsibility to maintain a healthy and safe swimming environment. As a swimmer, it is important to take as many precautions as possible while using a pool. Never swim while you are ill, and be aware of what to look for to ensure you are using a clean pool. Always avoid getting water in your mouth, and cleanse your body prior to entering the water.

More Information

To learn more about swimming pool water safety and cleanliness, visit the Centers for Disease Control website at www.cdc.gov/healthywater/swimming/index.html or the Water Quality and Health Council’s site at healthypools.org.