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Disease Transmission and Pools

Recreational pool or spa water can be a carrier of pathogenic (i.e., disease-causing) organisms. Contaminated pool water can cause minor ailments such as inflammations, infections, respiratory and dermatological problems, and gastroenteritis (abdominal discomfort, fever, vomiting, diarrhea, and headache). It can also transmit disease that leads to life-threatening illnesses. Recent fatal outbreaks of Legionnaire's Disease and *E. coli* 0157:H7 have been spread through contaminated swimming pools and spas.

How successful you are at preventing disease transmission depends on the disinfectant efficacy of the pools you operate.

- Minimum disinfectant residual levels should be present in the water to maintain the oxidation reduction potential (ORP) at 750 mV or more. Injection of sanitizers, oxidizers and pH adjustment chemicals into all commercial swimming pools and spas should be constantly monitored and regulated by automated pH/ORP controllers.
- Rigorous daily swimming pool and deck maintenance procedures should be implemented and recorded.
- Filters should be sized properly using an appropriate media and flocculants, operating efficiently, and backwashed and/or dismantled and cleaned when necessary. Bridging of diatomaceous earth filter elements, fouling of filter cartridges from body fats and oils, formation of mudballs and the resulting channeling of sand filters should not be allowed to persist. Filter tanks should be opened on a monthly basis and inspected. Swabs should be taken for bacterial culture. Shake and settling tests of filter media should be performed according to the recommendations from the national Centers for Disease Control and Prevention (CDC).
- Settled materials should be removed by

vacuuming pools daily, or more often throughout a day if necessary to prevent accumulation of debris on pool surfaces. Pool walls should also be brushed to prevent the adherence and establishment of visible algae growth. Algae is a higher organism in which bacteria can become embedded.

- Maintain pH levels at 7.2 to 7.4, the lower end of the acceptable range, to increase the percentage of hypochlorous acid formed during the process of chlorination. You should also calculate the saturation index daily and make adjustments to keep the mineral saturation in balance.
- Use clarifiers to help remove suspended solids and colloidal particles from the water.
- Dilute to keep the total dissolved solids (TDS) under control. It is recommended that the European standard of removing and replacing at least 8 gallons of water per bather per day be adopted.
- The majority of water circulated (75 percent to 85 percent) should be drawn from the pool's perimeter overflow system, rather than through the main drains at the bottom of the pool. Organic matter and bather waste are lighter than water and are present at a much greater density in the top 2 to 3 feet of water in the pool.
- Circulation dye tests should be performed regularly, and return inlets should be adjusted accordingly to guarantee uniform circulation of filtered, heated, chemically treated water, and absence of dead spots in the pool.
- Take bather-load-to-water-volume ratios into consideration when performing hydraulic calculations and sizing filtration, water treatment and circulation system components. Circulate at least 1,400 gallons of water per day per user. Increase flowrates and decrease turnover times to accommodate realistically expected peak and maximum bather loads. ♣



Alison Osinski, Ph.D., is the principal owner of San Diego-based Aquatic Consulting Services, which specializes in aquatic risk management, and aquatic facility design, management and operation. She is actively involved with several national and regional aquatic organizations.

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