Safe swimming

Talk to parents about preventing recreational water illnesses

by **Mei L. Castor, M.D., M.P.H.**

The parents of a toddler-aged patient come to your office this summer after their child has recent onset of diarrhea. After the workup, you begin to discuss your assessment and plan with the parents. They mention that they are planning to visit a water park in the next several days and want to know if it is OK for their child to swim.

Dr. Castor

Before answering this question, it may be useful to review some information on recreational water illnesses (RWIs).

What are RWIs?

RWIs refer to illnesses associated with use of recreational water venues such as swimming pools, hot tubs, water parks, beaches and the ocean. Numerous associations have been found between swimming in recreational water venues and subsequent illness.

RWIs comprise a broad spectrum of illnesses, including infections of the skin, eye, ear, respiratory, neurologic and gastrointestinal systems. Waterborne pathogens that have emerged as significant contributors to RWIs include the Norwalk-like viruses, *Escherichia coli* O157:H7 and the parasites *Cryptosporidium* and *Giardia.*

Infections with certain waterborne pathogens may have serious and life-threatening consequences, particularly in high-risk groups such as the immunosuppressed, pregnant women, the elderly and the young. Infections with *E. coli* O157:H7 may have disastrous consequences in the pediatric and elderly population when hemolytic uremic syndrome develops as a sequela. Another example is the significant morbidity associated with *Cryptosporidium* infections in the immunosuppressed population.

RWIs increasing

Outbreaks of gastrointestinal illness associated with recreational water venues are on the rise. Surveillance conducted by the Centers for Disease Control and Prevention (CDC) and the states has revealed a startling increasing trend over the past two decades (*MMWR Surveill Summ.* 2002;51:1-47). This emergence is due primarily to RWI outbreaks in the disinfected water arena as opposed to the natural water venues.

Several factors are likely contributors to the emergence of RWIs.

Many of the waterborne pathogens responsible for outbreaks are commonly found in the environment and the population. Some, such as *Cryptosporidium,* display chlorine-resistance and therefore may survive for days in swimming pools despite adequate chlorination.

Many of the pathogens have low infectious doses and can be shed for weeks even after diarrhea ends.

Diarrhea also is a common phenomenon, with surveys showing that 11% of the population has experienced diarrhea in the past month (*Emerg Inf Dis.* 1999;5:607-625).

Finally, swimming is a popular activity. It has ranked as the second most popular form of exercise in the United States, with more than 368 million person-visits annually to swimming venues, according to the U.S. Bureau of the Census.

Sources of contamination

The route of contamination for recreational water venues varies. Natural water venues may be contaminated by infected animals defecating in watershed areas or by point source contamination (e.g., sewage effluent).

In all settings, fecal accidents as well as swimmers' bodies serve as potential sources of contamination. Fecal accidents are common, particularly in venues frequented by diapered and toddler-aged children. Showering before entering pools is a good hygiene habit that may be largely ignored. Swimming venues are environments of communal bathing and shared bathing water that may facilitate the exchange of waterborne pathogens.

Disinfected recreational water venues provide some challenges for RWI prevention and control measures. Disinfected water venues have the potential to become contaminated when there is poor facility maintenance, resulting in inadequate disinfectant levels. In this setting, pathogens normally sensitive to chlorine, such as *E. coli* O157:H7, may spread to other swimmers. In addition, even with adequate disinfectant levels, chlorine-resistant pathogens such as *Cryptosporidium* and *Giardia* may survive to pose a health threat to swimmers.

False sense of security

Despite this, there is an overall perception that swimming pools are always safe and uncontaminated.

The CDC conducted focus groups with parents of young children to understand how parents perceive the potential for disease transmission in swimming pools. CDC researcher Michael Beach, Ph.D., found that "many parents believed that pool water is sterile and that chlorine kills everything instantaneously. There was no awareness of the potential for swimming pools to spread illness.

"We need to get rid of these myths that contribute to the belief that chlorinated swimming pools cannot spread disease," Beach continued. "In helping the public to understand the potential for this, we can help to change swimming behaviors that will prevent disease transmission in the future."

Prevention and control strategies address issues of inadequate maintenance at disinfected water venues. However, human behavior and habits play a pivotal role in the occurrence of RWIs. A swimmer ill with diarrhea may contaminate a pool and create a risk for other swimmers.

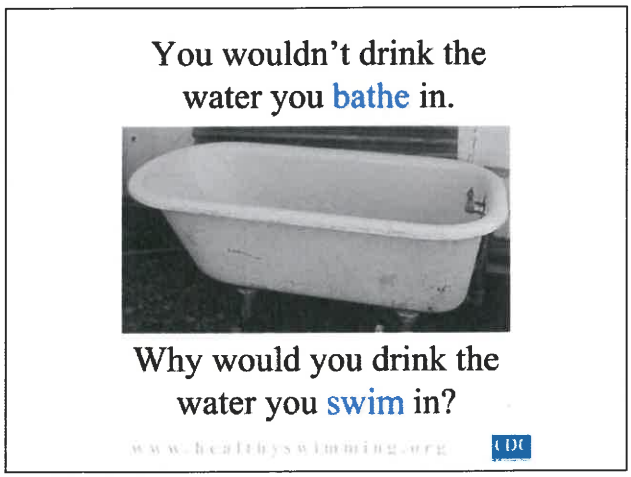
In addition, amplification of an RWI outbreak within a community may occur due to ill swimmers who continue to swim despite their symptomatology. Multiple outbreak investigations have demonstrated that transmission occurs in all age groups, allowing spread of the outbreak to child care facilities, schools, nursing homes, etc.

Getting the message out

The CDC has been promoting healthy swimming through its Web site, www.cdc.gov/healthyswimming. The Web site provides information for the general public, pool staff, public health practitioners, travelers and health care providers. To meet the needs of these varied audiences, there is a spectrum of topics from specifics on waterborne pathogens and RWIs to disinfection guidelines for pool staff. For health care providers, there are fact sheets, question-and-answer sheets, brochures and posters that may be printed out for use in clinic waiting rooms or as handouts for patients.

The message of healthy swimming for the public is not that we shouldn't participate in swimming, but rather we should practice healthy swimming habits. Healthy swimming messages that should be communicated to parents and patients include:

- Do not swim when you have diarrhea (especially important for children in diapers).



The CDC offers a variety of materials on recreational water illnesses to health care providers, including the poster above.

Reprinted from the American Academy of Pediatrics Newsletter, May 2004

- Do not swallow pool water.
- Practice good hygiene with a shower before swimming and washing hands after using the toilet or changing diapers.
- Take your kids on bathroom breaks or check diapers often.
- Change diapers in a bathroom and not at poolside.
- Wash your child thoroughly (especially on the rear end) with soap and water before swimming.

It also may be judicious to recommend that patients ill with infectious diarrhea refrain from swimming for up to two weeks after cessation of diarrhea, particularly if they are infected with *Cryptosporidium* or *Giardia*, which may be excreted for several weeks even after symptom resolution.

The clinical scenario presented at the beginning of this article raises the issue of whether a child with diarrhea should be swimming. When health care providers advise the parents of a child ill with diarrhea not to swim, they play a critical role in keeping recreational water venues clean and free from disease transmission. Routine guidance for diarrheal illness may extend beyond individually focused advice such as rehydration and bland diets to encompass preventive messages for the patient's community.

In addition, by providing anticipatory guidance about healthy swimming behaviors to parents at well-child visits, health care providers play a critical role in keeping children and their communities healthy.

Health care providers who educate parents of both ill and healthy children have the opportunity to help keep the bath water clean and the baby healthy.

Dr. Castor is a preventive medicine resident at the Centers for Disease Control and Prevention.

Reprinted from the American Academy of Pediatrics Newsletter, May 2004