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## Fecal, Vomit and Blood Incidents in Swimming Pools

### I. FECAL INCIDENT PREVENTION IN SWIMMING POOLS

Although the actual health and safety risks associated with fecal accidents are considered to be minimal, provided that proper pool chemical levels are maintained, fecal incidents do pose a significant interruption in pool operations. As such, prevention of fecal incidents should be stressed. The following preventative measures shall be implemented at all pools:

- A. Patrons must be directed to take a cleansing shower before entering the pool.
- B. Do not permit diaper changing at poolside. Do not allow young children to be "dipped" or rinsed off in the pool as part of the diaper-changing process.
- C. Patrons who are ill or have suffered from diarrhea within the previous two (2) weeks should be denied admittance into the water. It has been shown that persons with cryptosporidiosis continue to shed crypto oocysts (the infectious form of the organism) in their stool for 2 weeks after their diarrhea has ended and can therefore infect others.
- D. All persons wearing diapers, or who would be of diaper-wearing age (e.g. infants and toddlers), should wear swimsuit diapers or tight-fitting rubber or plastic pants which will contain fecal matter and prevent it from entering the pool.
- E. Do not allow pets in the pool area. See 304 CMR 12.08.
- F. Maintain the chemical feed equipment and chemicals at optimal levels. This includes maintaining the disinfectant levels (residual chlorine levels between 2.0 and 3.0 ppm); optimal pH (7.4-7.6); alkalinity (80-120 ppm); and calcium hardness (200-400 ppm). Note: Lack of proper pH can greatly affect disinfection effectiveness in chlorinated pools.

### II. FECAL INCIDENT PROCEDURE IN SWIMMING POOLS

There is a concern regarding the potential transmission of *cryptosporidium parvum* (a parasite excreted in the feces of infected humans and other mammals) and *escherichia coli* O157:H7 (a harmful strain of coliform bacteria living in the digestive tracts of humans and other animals). Most organisms found in properly chlorinated pool water, including E.coli O157:H7, are killed very quickly. In fact, usually only a few seconds of disinfection are needed to kill 99.9% of these organisms. Those organisms that are more resistant to disinfection, such as cryptosporidia, are typically introduced into pool water via very watery diarrhea. This is seldom noticed or

reported. Thus, solid stool is unlikely to contain cryptosporidia. This knowledge thus requires a two-pronged approach to managing a fecal incident.

*(The following information was adapted from “Responding to Fecal Accidents in Disinfected Swimming Venues.” Morbidity and Mortality Weekly Report, May 25, 2001, Centers for Disease Control and Prevention <http://www.cdc.gov/mmwr/pdf/wk/mm5020.pdf>)*

### **A. Formed stool (solid, nonliquid)**

1. Direct everyone to leave all pools into which water containing the feces is circulated. Do not allow anyone to enter the contaminated pool(s) until all decontamination procedures are completed.

2. Remove as much of the fecal material as possible using a net or scoop and dispose of it in a sanitary manner. Clean and disinfect the net or scoop (e.g., after cleaning, leave the net or scoop immersed in the pool during disinfection). Vacuuming stool from the pool is not recommended\*.

3. Raise the free available chlorine concentration to 2 ppm (mg/L), pH 7.2–7.5, if it is <2.0 ppm (mg/L). Ensure this concentration is found throughout all co-circulating pools by sampling at least three widely spaced locations away from return water outlets. This free available chlorine concentration was selected to keep the pool closure time to approximately 30 minutes.

4. Maintain the free available chlorine concentration at 2.0 ppm (mg/L), pH 7.2–7.5, for at least 25 minutes before reopening the pool. In the presence of chlorine stabilizers such as chlorinated isocyanurates, a level of 3.0 ppm (mg/L) of free available chlorine must be achieved. Ensure that the filtration system is operating while the pool reaches and maintains the proper free available chlorine concentration during the disinfection process.

5. Establish a fecal accident log. Document each fecal accident by recording date and time of the event, formed stool or diarrhea, free available chlorine concentration at the time of observation of the event and before opening the pool, the pH, the procedures followed to respond to the fecal accident (including the process used to increase free chlorine residual if necessary), and the contact time.

### **B. Diarrhea (liquid stool)**

1. See A1.

2. See A2.

3. Raise the free available chlorine concentration to 20 ppm (mg/L)<sup>¶</sup> and maintain the pH between 7.2 and 7.5. Ensure this concentration is found throughout all co-circulating pools by sampling at least three widely spaced locations away from return water outlets. This chlorine and pH level should be sufficient to inactivate *Cryptosporidium* and should be maintained for at least 8 hours (one turnover for a standard pool). If necessary, consult an aquatics professional to determine and identify the feasibility, practical methods, and safety considerations before attempting the hyperchlorination of any pool.

4. Ensure that the filtration system is operating while the pool reaches and maintains the proper free available chlorine concentration during disinfection.

5. Backwash the filter thoroughly. Be sure the effluent is discharged directly to waste and in accordance with state or local regulations. Do not return the backwash through the filter. Where appropriate, replace the filter media.

6. Swimmers may be allowed into the pool after 8 hours **and** when the free available chlorine level has been returned to the normal operating range (1.0-3.0 ppm). Maintain the free available chlorine concentration and pH (7.2-7.8) at standard operating levels. If necessary, consult state or local regulatory authorities for recommendations on bringing the free available chlorine levels back to an acceptable operating range.

7. See A5.

### **III. Vomit and Blood Incident Procedures in Swimming Pools**

#### **A. Vomit**

Vomiting while swimming is frequently due to swallowing too much water and is probably not infectious. It is possible for Noroviruses, also known as Norwalk-like viruses, to be spread by vomit; therefore if the entire stomach contents are vomited, respond to the vomit incident as you would the “Formed Stool” procedure above. The procedure is:

1. Direct everyone to leave all pools into which water containing the vomit is circulated. Do not allow anyone to enter the contaminated pool(s) until all decontamination procedures are completed.

2. Remove as much of the vomit material as possible using a net or scoop and dispose of it in a sanitary manner. Clean and disinfect the net or scoop (e.g., after cleaning, leave the net or scoop immersed in the pool during disinfection). Vacuuming stool from the pool is not recommended\*.

3. Raise the free available chlorine concentration to 2 ppm (mg/L), pH 7.2–7.5, if it is <2.0 ppm (mg/L). Ensure this concentration is found throughout all co-circulating pools by sampling at least three widely spaced locations away from return water outlets. This free available chlorine concentration was selected to keep the pool closure time to approximately 30 minutes.

4. Maintain the free available chlorine concentration at 2.0 ppm (mg/L), pH 7.2–7.5, for at least 25 minutes before reopening the pool. In the presence of chlorine stabilizers such as chlorinated isocyanurates, a level of 3.0 ppm (mg/L) of free available chlorine must be achieved. Ensure that the filtration system is operating while the pool reaches and maintains the proper free available chlorine concentration during the disinfection process.

5. Establish a vomit accident log. Document each vomit accident by recording date and time of the event, free available chlorine concentration at the time of observation of the event and before opening the pool, the pH, the procedures followed to respond to the vomit accident (including the process used to increase free chlorine residual if necessary), and the contact time.

#### **B. Blood**

Disease-causing organisms found in blood (e.g., Hepatitis B virus or HIV) are spread only through activities that involve the exchange of infected bodily fluids, such as, in sexual contact and sharing needles with an infected individual. According to the CDC, that agency is not aware of any of these organisms being transmitted to swimmers from a blood spill in a pool; therefore, there is no recommended procedure to be followed after a blood spill in a swimming pool. As a matter of comfort, the pool operator may choose to close the pool temporarily to satisfy patrons.

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\* No uniform recommendations for disinfection of vacuum systems are available. However, if a vacuum system is accidentally used, the waste should be discharged directly to a sewer or other approved waste disposal system and not through the filtration system. The dilution effect of the pool water going through the hose may reduce the risk for high-level contamination of the vacuum system.

¶ Many conventional test kits cannot measure free available chlorine levels this high. Use chlorine test strips that can measure free available chlorine in a range that includes 20mg/L (such as those used in the food industry) or make dilutions for use in a standard DPD (N, N-diethyl- p-phenylenediamine) test kit using chlorine-free water.

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