

## **FECAL/VOMITUS INCIDENT RESPONSE IN RECREATIONAL WATER FACILITIES**

***Closures for fecal/vomitus incidents are a health concern and inconvenience to both aquatic staff and patrons. It is important that aquatic staff carefully explain to the patrons why the aquatic venue needs to be closed.***

### **Fecal Incidents**

Explaining the reasons for closing the venue (for proper disinfection and protection of swimmer health) is likely to promote patron understanding and minimize their frustration. Closures allow chlorine to do its job—kill germs and help prevent recreational water illnesses (RWIs).<sup>1</sup>

### **Vomitus Incidents**

Vomiting while swimming is a common event as a result of swallowing too much water. In these cases, the vomit is probably not infectious, but if the full contents of the stomach are vomited, respond to the vomit incident as you would respond to a formed fecal accident. Norovirus are the most likely pathogens to be spread by vomit. Since the time and chlorine level combinations needed to kill noroviruses and Giardia are similar, using the recommendations outlined in **Procedure A** of this document will protect the public and facility staff from infection or illness.

### **Whirlpools and Other Water Playgrounds**

Whirlpools and some water playgrounds can have much smaller amounts of water. In response to formed or diarrheal fecal incidents in small-volume venues, it might be more efficient to completely drain as much water as possible from the venue and associated plumbing; scrub and clean all accessible surfaces in contact with contaminated water; replace or clean filter media when appropriate, and refill with uncontaminated water from an approved source (for example, municipal water system).

### **Fecal/Vomitus Response Procedures**

There are three different procedures recommended for disinfecting water in recreational water facilities that has been contaminated by fecal/vomitus accidents. Depending on the type of contamination, one of these procedures should be followed to protect the public and facility staff from infection or illness.

---

<sup>1</sup> Centre for Disease Control (CDC) *Fecal Incident Response Recommendations for Aquatic Staff*

## Procedures Developed for Differing Types of Incidents

**Procedure A (Appendix A)** - To be followed when the pool water is contaminated with **normally formed stools and/or vomitus**. This procedure was developed to inactivate and destroy *Giardia* and Norovirus.

Organisms such as *Giardia* are moderately chlorine tolerant, and can be inactivated or destroyed with quick action on the part of the pool operator.

**Procedure B (Appendix B)** - To be followed for facilities where the pool water is not stabilized with cyanuric acid, and becomes contaminated with **watery stool**.

Organisms such as *Cryptosporidium*, that are extremely chlorine tolerant, can be introduced to pool water by liquid diarrheal stools, and special care must be taken to prevent illness associated with organisms.

**Procedure C (Appendix C)** - To be followed for facilities where the pool water is using stabilized chlorine (i.e. cyanuric acid as a chlorine stabilizer), and becomes contaminated with **watery stool**.

Chlorine stabilizer (Cyanuric Acid) slows the rate at which free chlorine inactivates or kills *Cryptosporidium* (Crypto). Higher concentrations of cyanuric acid will result in longer contact times required to inactivate or kill *Cryptosporidium*.

## Fecal Accidents or Vomiting on the Pool Deck, Washrooms or Other Common Areas

From time to time vomiting and fecal accidents occur in areas of the facility outside of the pool basin, including on decks, in change rooms, etc. Appropriate steps must be taken to clean and disinfect the contaminated area to protect employees and patrons.

These steps include:

1. Remove and dispose of all fecal material/vomitus into a toilet.
2. Wash the contaminated area with soap and water, **flushing all waste away from the pool**.
3. Sanitize the contaminated area with 100 ppm chlorine (bleach).

**NOTE:** When cleaning and disinfecting areas contaminated with fecal material or vomitus, staff should wear the appropriate protective equipment for the job (e.g. gloves, rubber boots, aprons, face mask, etc. may be required if large amounts of chlorine are to be used).

## REFERENCE

*CDC (2016) Fecal Incident Response Recommendations for Aquatic Staff*, U.S. Department of Health and Human Services Centers for Disease Control and Prevention

## Appendix A

### Procedure A –Water Contaminated with Normally Formed Stools or with Vomitus

**Step 1:** Close the aquatic venue to swimmers. If you have multiple venues that use the same filtration system—all of the venues will have to be closed to swimmers. Do not allow anyone to enter the venue(s) until the disinfection process is completed.

**Step 2:** Remove as much of the fecal matter as possible (for example, using a net or bucket) and dispose of the fecal matter in a sanitary manner. Clean and disinfect the item used to remove the fecal matter (for example, after cleaning, leave the net or bucket immersed in the water during disinfection).

#### **VACUUMING FECAL MATTER FROM THE WATER IS NOT RECOMMENDED.**

**Step 3:** While maintaining the water temperature at 25°C or higher, manually hyperchlorinate the contaminated area of the pool to at least 10 ppm free available chlorine and allow pool water to recirculate for 1 hour. Maintain the water at pH 7.5 or less.

**Step 4:** Confirm that the filtration system is operating while the water reaches and is maintained at the proper free chlorine concentration and pH for disinfection.

**Contact your District Public Health Inspector to clarify if the actions taken were appropriate.** The severity and circumstances of the incident should be discussed with the Public Health Inspector to determine the specific course of action following treatment of the water, and what sampling is required for bacterial analysis.

**Step 5:** Allow swimmers back into the water only after the disinfection process has been completed and the free chlorine concentration and pH are within the operating range required by Regulation.

Before reopening the aquatic venue, record the procedures followed in response to the fecal incident (including the process used to adjust chlorine concentration and pH [if necessary], the free chlorine concentration and pH, and the hyperchlorination time).

Document each fecal incident by recording:

- Date and time of the event,
- Whether it involved formed fecal matter or diarrhea and
- Free chlorine concentration and pH at the time of observation of the event.

**NOTE: Submit a fecal incident log to your area Public Health Inspector. (Example seen in Appendix D)**

## Appendix B

### Procedure B –Water Contaminated with Diarrhea and Disinfected with Unstabilized Chlorine

**Step 1:** Close the aquatic venue to swimmers. If you have multiple venues that use the same filtration system—all of the venues will have to be closed to swimmers. Do not allow anyone to enter the venue(s) until the hyperchlorination process is completed.

**Step 2:** Remove as much of the fecal matter as possible (for example, using a net or bucket) and dispose of the fecal matter in a sanitary manner. Clean and disinfect the item used to remove the fecal matter (for example, after cleaning, leave the net or bucket immersed in the water during hyperchlorination).

**VACUUMING FECAL MATTER FROM THE WATER IS NOT RECOMMENDED.**

**Step 3:** Turn off the heater.

**Step 4:** Raise the water's free chlorine concentration (see **Table 3** below) and maintain water at pH 7.5 or less.

**Step 5:** Achieve a concentration × time (CT) inactivation value of 15,300 to inactivate or kill *Cryptosporidium*.

The CT Inactivation Value refers to the **concentration of free available chlorine (C) in parts per million (ppm)** multiplied by **time in minutes (T)** at a pH = 7.5 or lower; and temperature = 25°C or higher.

**Table 3: *Cryptosporidium* Kill/Inactivation Time for a Diarrheal Accident**

Use the Formula Below to Calculate the Time Required to Inactivate or Kill <i>Cryptosporidium</i>			
Concentration × time (CT) inactivation value	÷	Free chlorine concentration (parts per million [ppm])	Time (in minutes)
15,300	÷	20*	= 765 minutes (or 12.75 hours)
15,300	÷	10	= 1,530 minutes (or 25.5 hours)

\* Many conventional test kits cannot measure free chlorine concentrations this high. Use chlorine test strips that can measure free chlorine in a range that includes 20–40 ppm (such as those used in the food industry) or make dilutions for use in a standard DPD test kit using chlorine-free water.

**Step 6:** Confirm that the filtration system is operating while the water reaches **and is maintained** at the proper free chlorine concentration and pH for hyperchlorination.

**Step 7:** Thoroughly backwash the filter to waste after reaching the CT inactivation value. Where appropriate, replace the filter media.

**Contact your District Public Health Inspector to clarify if the actions taken were appropriate.** The severity and circumstances of the incident should be discussed with the Public Health Inspector to determine the specific course of action following treatment of the water, and what sampling is required for bacterial analysis.

**Step 8:** Allow swimmers back into the water only after the required CT inactivation value has been achieved and the free chlorine concentration and pH meet regulatory requirements.

**NOTE:** CDC does not recommend testing the water for Crypto after hyperchlorination is completed. Although hyperchlorination destroys Crypto's infectivity, it does not necessarily destroy the structure of the parasite.

Before reopening the aquatic venue, record the procedures followed in response to the fecal incident (including the process used to adjust chlorine concentration and pH [if necessary], the free chlorine concentration and pH, and the hyperchlorination time).

Document each fecal incident by recording:

- Date and time of the event,
- Whether it involved formed fecal matter or diarrhea and
- Free chlorine concentration and pH at the time of observation of the event.

**Submit a fecal incident log to your area Public Health Inspector. (Example seen in Appendix D).**

## Appendix C

### Procedure C –Water Contaminated with Diarrhea and Disinfected with Stabilized Chlorine (i.e. Outdoor Recreational Water Facilities)

**Step 1:** Close the aquatic venue to swimmers. If you have multiple venues that use the same filtration system—all of the venues will have to be closed to swimmers. Do not allow anyone to enter the venue(s) until the hyperchlorination process is completed.

**Step 2:** Remove as much of the fecal matter as possible (for example, using a net or bucket) and dispose of the fecal matter in a sanitary manner. Clean and disinfect the item used to remove the fecal matter (for example, after cleaning, leave the net or bucket immersed in the water during hyperchlorination).

**VACUUMING FECAL MATTER FROM THE WATER IS NOT RECOMMENDED.**

**Step 3:** Turn off the heater.

**Step 4:** Raise the water's free chlorine concentration (see **Step 5** below) and maintain water at pH 7.5 or less.

#### **Step 5: Hyperchlorinate**

Chlorine stabilizer (Cyanuric Acid) slows the rate at which free chlorine inactivates or kills *Cryptosporidium* (Crypto). Higher concentrations of cyanuric acid will result in longer contact times required to inactivate or kill Crypto.

#### **If the cyanuric acid concentration is 1–15 parts per million (ppm)**

- Raise the free chlorine concentration to 20 ppm and maintain it for 28 hours or
- Raise the free chlorine concentration to 30 ppm and maintain it for 18 hours or
- Raise the free chlorine concentration to 40 ppm and maintain it for 8.5 hours.

**NOTE:** Many conventional test kits cannot measure free chlorine concentrations this high. Use chlorine test strips that can measure free chlorine in a range that includes 20–40 ppm (such as those used in the food industry) or make dilutions for use in a standard DPD test kit using chlorine-free water.

**If the cyanuric acid concentration is more than 15 ppm,** lower the concentration to 1–15 ppm by draining partially and adding fresh water without chlorine stabilizer before attempting to hyperchlorinate.

**Step 6:** Confirm that the filtration system is operating while the water reaches **and is maintained** at the proper free chlorine concentration and pH for hyperchlorination.

**Step 7:** Thoroughly backwash the filter to waste after hyperchlorination has been completed. Where appropriate, replace the filter media.

**Contact your District Public Health Inspector to clarify if the actions taken were appropriate.** The severity and circumstances of the incident should be discussed with the Public Health Inspector to determine the specific course of action following treatment of the water, and what sampling is required for bacterial analysis.

**Step 8:** Allow swimmers back into the water only after hyperchlorination has been completed and the free chlorine concentration and pH meet regulatory requirements.

**NOTE:** CDC does not recommend testing the water for Crypto after hyperchlorination is completed. Although hyperchlorination destroys Crypto's infectivity, it does not necessarily destroy the structure of the parasite.

Before reopening the aquatic venue, record the procedures followed in response to the fecal incident (including the process used to adjust chlorine concentration and pH [if necessary], the free chlorine concentration and pH, and the hyperchlorination time).

**Establish a fecal incident log. (Example seen in Appendix D)**

Document each fecal incident by recording:

- Date and time of the event,
- Whether it involved formed fecal matter or diarrhea and
- Free chlorine concentration and pH at the time of observation of the event.

**Submit a fecal incident log to your area Public Health Inspector. (Example seen in Appendix D).**

## Appendix D

### WATER CONTAMINATION RESPONSE LOG EXAMPLE<sup>2</sup>

<b>Person Conducting Contamination Response</b>						
<b>Supervisor on Duty</b>						
<b>Date (mm/dd/yyyy) of Incident</b>						
<b>Time of Incident</b>						
<b>Water Feature or Area Contaminated</b>						
<b>Number of People in Water</b>						
<b>Type/Form of Contamination in Water: Fecal Accident (Formed Stool or Diarrhea), Vomit, Blood</b>						
<b>Time that Water Feature was Closed</b>						
<b>Stabilizer Used in Water Feature (Yes/No)</b>						
	Water Quality Measurements					
	Level at Closure	1	2	3	4	Level Prior to Reopening
<b>Free Residual Chlorine (1-4 are measurements spread evenly thru the closure time)</b>						
<b>pH (1-4 are measurements spread evenly thru the closure time)</b>						
<b>Public Health Inspector (PHI) Contacted</b>	<b>Date (mm/dd/yyyy):</b> _____ <b>Time:</b> _____					
<b>Name:</b> _____ <b>Phone:</b> _____						
<b>PHI Recommendations</b>						
<b>Sampling Required</b> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <b>Total Coliforms</b>  <b>E. coli</b>  <b>Pseudomonas aeruginosa</b>  <b>Other</b> </div> <div style="width: 45%;"> <b>Yes / No</b>  <b>Yes / No</b>  <b>Yes / No</b>  <b>Yes / No</b> </div> </div> <b>Organism Sampled For:</b> _____						
<b>Date (mm/dd/yyyy) that Water Feature was Reopened</b>						
<b>Time that Water Feature was Reopened</b>						
<b>Total Contact Time (Time from when disinfectant reached desired level to when disinfectant levels were reduced prior to opening)</b>						

<sup>2</sup> Based on CDC Fecal Response Protocols



--	--