Fact Sheet

Faecal and vomit release incidents – public pool response strategies

Human faecal matter and vomit contain pathogens. This includes bacteria, viruses, and protozoa that can make people seriously ill. The release of human faecal matter or vomit into public swimming pools may pose a risk to health of swimmers, staff, and patrons of the pool. Some faecal pathogens are resistant to chlorine so special care must be taken when responding to faecal release incidents.

What risks are associated with faecal matter and vomit?

Faecal matter and vomit often contain pathogens that can cause illness such as gastroenteritis and fever. Faecal matter may also contain chlorine resistant pathogens such as *Cryptosporidium* and *Giardia* that can survive in treated pool water for long periods of time.

These organisms are highly infectious and can cause severe illness in swimmers who ingest pool water, even in small volumes. It is therefore important to minimise public exposure to *Cryptosporidium* and *Giardia*.

People diagnosed with *Cryptosporidium* or *Giardia* or people who have suffered from diarrhoea within the past 14 days should not swim in public pools.

Management of faecal release incident risks

Some simple practices can help reduce the risk of a faecal release incident when an incontinent person intends to enter the pool. Pool operators should discuss potential faecal release incidents with the appropriate person to ensure adequate management of the risk.

Risk management practices could include:

- toileting prior to entering the water.
- periodic toilet breaks whilst at the pool.
- undertaking water recreation activities before eating.
- wearing incontinence pads and waterproof undergarments under bathing costumes.

If an incontinent person intends to use a public swimming pool or spa pool and is unable to prevent contamination of the water, the pool operator has the right to prevent their entry into the pool water.

Formed stool and vomit incidents versus diarrhoeal incidents

Formed stool and vomit release incidents should not be managed in the same way as diarrhoeal release incidents, as they pose different levels of public health risk.

Diarrhoeal release incidents are considered a higher risk to public health as they generally occur in individuals who are already ill. In these cases, faecal matter released will typically contain a much higher number pathogens.

Diarrhoea has a higher likelihood of containing *Cryptosporidium*, which is much more chlorine resistant than *Giardia* and is more difficult to destroy using conventional means. On the other hand, evidence indicates that formed stools pose a very low risk of *Cryptosporidium*, though they may contain *Giardia*.

Diarrhoea will also spread more rapidly through the pool to other swimmers and may have to be removed by the pool's filtration system.

Although formed stools and vomit release incidents are more easily managed compared to diarrhoeal release incidents, they still pose a public health risk to swimmers. Pathogens within the stool and/or vomit can be protected from free chlorine in the water and remain infectious to those who contact them.

Due to the public health risks associated with faecal and vomit release incidents, all public pools should have a detailed faecal and vomit release incident response plan.

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Formed stool and vomit response

Formed stools and vomit can contain pathogens. If the faecal matter is solid, removing the faeces from the pool without breaking them apart will limit the degree of pool contamination.

In the event of a formed stool or vomit release incident, the following steps should be taken:

1. Immediately direct all patrons to exit the pool. If any other pools share the same filtration system patrons must also exit those pools.
2. Remove the stool or as much of the vomit as possible from the pool using a fine mesh scoop or bucket and dispose of faecal matter in a toilet. Do not use aquatic vacuum cleaners for removing the stool or vomit unless vacuum waste can be discharged to the sewer and the vacuum equipment can be sufficiently cleaned and disinfected.
3. Ensure the filtration and any secondary disinfection systems run until the end of the decontamination process.
4. Determine a target free chlorine concentration and time combination to achieve the CT (concentration x time) necessary to kill *Giardia* (as detailed in Appendix A). Note that the required CT value is different between a pool that uses a stabiliser (cyanuric acid) and a pool that does not use a stabiliser.
5. Test the water to confirm that the required free chlorine concentration is being achieved, and if not make corrections as necessary.
6. Allow patrons to return to the pool only after the determined time has elapsed.
7. Record the incident, action taken and test results in the pool logbooks.

Diarrhoeal stool response

1. Immediately direct all patrons to exit the pool. If any other pools share the same filtration system, patrons must also exit those pools.
2. Remove as much faecal matter from the pool as possible using a scoop or bucket and dispose of faecal matter in a toilet. Do not use aquatic vacuum cleaners for removing the stool unless vacuum waste can be discharged to the sewer and the vacuum equipment can be sufficiently cleaned and disinfected.
3. Determine a target free chlorine concentration and time combination to achieve the CT (concentration x time) necessary to kill *Cryptosporidium* (as detailed in Appendix A). Note that the required CT value is different between a pool that uses a stabiliser (cyanuric acid) and a pool that does not use a stabiliser. For pools that use chlorine stabiliser (cyanuric acid), reduce the cyanuric acid concentration to15mg/L or less. This can be achieved by partially draining the pool and adding fresh water without chlorine stabiliser.
4. Maintain the pH at 7.5 or less and continue to operate filtration and any secondary disinfection systems throughout the process to ensure disinfection of the entire system.
5. To ensure the accuracy of automatic dosing equipment, manually check the concentration of free chlorine and pH. Record levels at the beginning, during (at least hourly, but ideally every 30 minutes), and end of the process to ensure the minimum CT value is achieved (see Appendix B).
6. Backwash the filter after reaching the CT value. Ensure the effluent is discharged directly to sewer. Do not return the backwash through the filter. Where appropriate, replace the filter media.
7. Before the pool is reopened for use, test the water to ensure that the total concentration of chlorine in the pool is below 10mg/L (ideally below 5mg/L). Sodium thiosulphate may be added to neutralise excess chlorine.
8. Make sure to sufficiently clean, disinfect, or dispose of any materials, tools, equipment, or surfaces that have had contact with contaminated water, or that have been directly contaminated.
9. Record the incident, action taken and test results in the pool logbooks.
10. Allow patrons to return to the pool.

Note that no remedial action is required for blood in the water provided an appropriate primary disinfectant free residual is present.

For information on CT values and how they can be achieved please refer to Appendix A.

Decontamination of items and surfaces

It is important to properly clean and disinfect anything that has touched the stool or vomit. Scoops and buckets should have all visible matter washed off and then be disinfected by placing them in the pool during decontamination.

Any surface which has been contaminated with bodily fluids should be immediately disinfected with a mixture of household bleach and water.

A 1:9 dilution of household bleach to water should be made from liquid household bleach containing 4% sodium hypochlorite. As a bleach / water solution loses its strength quickly a fresh mixture should be made before each clean-up.

Bodily fluids on the pool deck should not be washed into the pool or the water circulation system.

Protocol for decontaminating surfaces

1. Block off the area of the spill from patrons until clean-up and disinfection is complete.
2. Put on disposable gloves to prevent contamination of hands.
3. Wipe up the spill using paper towels or absorbent material and place in plastic garbage bag.
4. Gently pour bleach solution onto all contaminated areas of the surface.
5. Let the bleach solution remain on the contaminated area for 20 minutes.
6. Wipe up the remaining bleach solution.
7. All non-disposable cleaning materials used such as mops and scrub brushes should be disinfected by saturating with the bleach solution and air dried.
8. Remove gloves and place in plastic garbage bags with all soiled cleaning materials.
9. Double-bag and securely tie-up plastic garbage bags and discard to general waste.

Further information

For more information on cryptosporidium and the risks it poses in public pools refer to: ‘Minimising the risk of Cryptosporidium in public swimming pools and spa pools’.

For more information

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APPENDIX A – Concentration x time (CT) reference tables

For disinfection to occur a specific CT value must be achieved for each organism. A CT value can be calculated by multiplying the concentration of chlorine (mg/L) with the time (minutes) that the concentration is held. The following table details different concentration and time requirements which can be used to disinfect pool water after a faecal release incident using chlorine.

Note: As there is no inactivation data for the use of bromine on *Giardia* or *Cryptosporidium*, pools using bromine as the primary disinfectant must use chlorine in response to a faecal incident.

Chlorine stabiliser (cyanuric acid) significantly slows the rate at which free chlorine inactivates or kills contaminants such as *Cryptosporidium*. It is therefore important to achieve a greater CT in water bodies that contain cyanuric acid.

Formed Stool Incident

Pools that do not use chlorine stabiliser (cyanuric acid)

A chlorine CT value of 50 or higher is required to destroy *Giardia*.

Free Chlorine Concentration (mg/L)	Time (minutes)	CT
3	16.7	50
2	25	50
1	50	50

Pools that use chlorine stabiliser (cyanuric acid)

A chlorine CT value of 100 or higher is required to destroy *Giardia*.

Free Chlorine Concentration (mg/L)	Time (minutes)	CT
3	33.3	100
2	50	100
1	100	100

Diarrhoeal incident

Pools that do not use chlorine stabiliser (cyanuric acid)

A chlorine CT value of 15,300 or higher is required to destroy *Cryptosporidium*.

Free chlorine concentration (mg/L)	Time (minutes)	CT (15,300)
40	382.5	15,300
30	510	15,300
25	612	15,300
20	765	15,300
15	1020	15,300
10	1530	15,300

Pools that use chlorine stabiliser (cyanuric acid)

A chlorine CT value of 31,500 or higher is required to destroy *Cryptosporidium*.

Free chlorine concentration (mg/L)	Time (minutes)	CT (31,500)
40	787.5	31,500
30	1050	31,500
25	1260	31,500
20	1575	31,500
15	2100	31,500
10	3150	31,500

APPENDIX B – Faecal decontamination recording template

The following template should be used to document the faecal incident response. Completed templates must be provided to the local public health authority upon request and inserted into the pool logbook.

Note: For a diarrhoeal stool response, the free chlorine concentration should be measured at least hourly, but ideally every 30 minutes.

Name of facility:			
Address of facility:			
Name of pool(s) undertaking the decontamination:			
Name of operator undertaking the decontamination:			
Date:			
Time	Free chlorine (mg/L)	pH	Notes

CT value =