

Faecal release incidents

-public pool response strategies

Human faecal matter may contain bacteria, viruses and other infectious micro-organisms which can make people seriously ill. As such, the release of human faecal matter into public swimming pools poses a risk to the health of swimmers, staff and patrons of the pool. Some faecal micro-organisms are resistant to chlorine so special care must be taken when responding to a faecal release incident.

What risks are associated with faecal matter?

Faecal matter often contains viruses and bacteria, such as *E. coli* which can cause gastroenteritis and fever. It may also contain chlorine resistant micro-organisms such as *Cryptosporidium* and *Giardia* which can survive in 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 the smallest of volumes. It is therefore important to minimise public exposure to *Cryptosporidium* and *Giardia*. Not only should those diagnosed with *Cryptosporidium* and *Giardia* avoid swimming in public pools, all individuals who have suffered from diarrhoea within the past 14 days should avoid swimming in public pools.

Due to the risks associated with faecal releases, all pools should have a detailed faecal release response plan.

Management of faecal incident risks

Some simple practices can help reduce the risk of a faecal release incident. It is important for pool operators to discuss the management of faecal incidents with parents and caretakers of incontinent persons to ensure correct risk management steps are being undertaken.

Some management practices for consideration include:

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

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

Formed stool incidents versus diarrhoeal incidents

Formed stool incidents and diarrhoeal incidents should not be managed in the same way as they pose different levels of risk to those using the pool. Diarrhoeal incidents are considered more dangerous as they generally occur in individuals who are already ill and the faecal matter released will typically contain a much higher number of infectious organisms. Diarrhoea will also spread more rapidly through the pool to other swimmers and may have to be removed by the pool's filtration system. Whilst being more manageable than diarrhoeal incidents, formed stools still pose a risk to swimmers and need to be addressed immediately. Micro-organisms within the stool can be protected from free chlorine in the water and remain infectious to those who contact them.

Studies of faecal release incidents have determined that formed stools pose a very low risk of *Cryptosporidium*, though they may contain *Giardia*. In comparison diarrhoea has a high likelihood of containing *Cryptosporidium*, which is much more chlorine resistant than *Giardia* and is more difficult to destroy using conventional means.

For more information on *Cryptosporidium* and the risks it poses to public pools refer to: 'Minimising the risk of *Cryptosporidium* in public swimming pools and spa pools' located at <http://www.dh.sa.gov.au/pehs/topics/water-swimming.htm>

Formed stool response

Formed stools can act as a container for disease causing micro-organisms. 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 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 from the pool using a fine mesh scoop or bucket and dispose of faecal matter in a toilet.
3. Based on the free chlorine level of the pool, determine the time necessary to kill *Giardia* (refer Appendix A).
4. Test the water to confirm that the free chlorine level is being achieved, and if not make corrections as necessary.
5. Allow patrons to return to the pool only after the determined time period has elapsed.
6. Record the incident, action taken and test results in the pool log books.

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.
3. Determine a target free chlorine level and time combination to achieve the CT (concentration x time) necessary to kill *Cryptosporidium* (refer Appendix A).
4. Raise the free chlorine concentration to achieve the CT value (see above) and maintain the pH at 7.5 or less.
5. Continue to operate the pumps and filtration systems throughout the process to ensure disinfection of the entire system.
6. The concentration of free chlorine and pH will need to be checked manually and recorded at the beginning, during (at least hourly, but ideally every 30 minutes), and at completion of the process to ensure the minimum CT value is achieved, and to ensure the accuracy of automatic dosing equipment (refer Appendix B).
7. Backwash the filter after reaching the CT inactivation value. Be sure the effluent is discharged directly to sewage. Do not return the backwash through the filter. Where appropriate, replace the filter media.
8. 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.
9. Record the incident, action taken and test results in the pool log books.
10. Allow patrons to return to the pool.

It is important to properly clean and disinfect anything that has touched the stool. Scoops and buckets should have all visible faecal matter washed off then disinfected by placing them in the pool during decontamination. Vacuum systems are not recommended for removing faecal matter from the pool as they may become contaminated and/or clogged with faecal matter.

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

Decontamination of surfaces

Bodily fluids including blood, vomit, urine and faecal matter may contain infectious micro-organisms which pose a risk to the health of individuals exposed to them. 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.

For more information on cryptosporidium and the risks it poses to public pools refer to: 'Minimising the risk of *Cryptosporidium* in public swimming pools and spa pools' located at <http://www.dh.sa.gov.au/pehs/topics/water-swimming.htm>

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.

Formed Stool Incident

A chlorine CT value of 45 or higher is required to destroy *Giardia*.

Free Chlorine Concentration (mg/L)	Time (minutes)	CT
3	15	45
2	22.5	45
1	45	45

Diarrhoeal incident

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

Free chlorine concentration (mg/L)	Time (minutes/hours)	CT (15,300)
40	382.5/6.375	15,300
30	510/8.5	15,300
25	612/10.2	15,300
20	765/12.75	15,300
15	1020/17	15,300
10	1530/25.5	15,300
5	3060/51	15,300

