

Environmental Health Guideline

Response to a faecal incident in a public swimming pool in Western Australia

Risk Management Approach

All Operators of public swimming pools in Western Australia shall try to apply a risk management approach to the prevention of faecal incidents. Operators should endeavor to take such actions that will prevent incidents occurring, as far as practicable, to prevent the transmission of water borne diseases.

Operators under these Regulations should become conversant with the procedures describing how to manage a faecal incident in a swimming pool or spa pool. Operators should provide signage to educate patrons when it is not safe to use a public swimming pool to reduce the risk of contamination of a water body.

Patron Behaviour

- Patrons should not use an aquatic water body if they have had the disease cryptosporidium in the past 14 days.
- Patrons should not use swimming pools if they have experienced diarrhoea or an upset stomach in the past 48 hours.
- Babies or children who ordinarily wear nappies shall wear a tight fitting aqua- nappy or similar costume when using the water.
- Incontinent persons can lessen the risk of accidental leakage by wearing incontinence pads and water proof garments under their bathers.
- Young children should visit the toilet as a routine before entering the water body and at periodic breaks thereafter.
- Wash hands thoroughly after visiting the toilet or changing nappies.

These guidelines have been developed, by the DOH in conjunction with the LIWA (Aquatics) Western Australia the professional association of swimming pool managers, for application in all public aquatic facilities in Western Australia in accordance with the *Heath (Aquatic Facilities) Regulations 2007 [the Regulations]* and the *Code of Practice for the Design, Construction, Operation, Management and Maintenance of Aquatic Facilities [the Code]*.

A public pool under these regulations is described in Table 1 “Classification of Aquatic Facilities” in the Code.

A pool for the purposes of these guidelines can be any leisure pool, hydrotherapy pool, swimming pool, spa pool, water slide, water spray ground, etc used in connection with any aquatic facility.

These guidelines are designed to assist the Pool Operator to manage an incident where faecal matter or vomit enter the pool or spill onto the concourse surrounding the pool. Pool Operators should familiarize themselves with these arrangements and store this Guideline in a place that is readily available e.g. Operations Manual for their aquatic facility.

Operators of Group 2 – 4 pools under the Code should consult their trained Technical Operator in the first instance to ensure that the chemical parameters contained in Table 5.1.1 of the Code are maintained during and after an incident and a report of a gastro-enteritis event shall be forwarded to their local government as soon as practicable following the event.

Table 6 – Minimum Free Chlorine Levels


	Minimum Free Chlorine Levels – mg/l	Minimum Free Chlorine Levels – mg/l
	Water Temperature < 26 degrees C	Water Temperature > 26 degrees C
Unstabilised pools – cyanuric acid not used.	1.0	2.0
Stabilised pools – where cyanuric acid is used.	2.0	3.0
	Minimum Free Chlorine Levels – mg/l	Minimum Free Chlorine Levels – mg/l
Hydrotherapy Pools, Spa Pools & Wading Pools	3.0	3.0

Operators of Group One facilities shall follow the procedures and reporting requirements contained in this Guideline.

Liquid stools are generally viewed as a spray of diarrhoea or similar whereas a solid stool may be one or many pieces that can be removed intact by a tool used for that purpose.

Evidence of past incident reports have described the usual type of contamination in an aquatic water body is caused by unidentified persons in a heated pool who accidentally release human waste. However, in normal operations of a heated swimming pool, the average patron contributes 0.14 grams of faecal material in the course of using a swimming pool, thus requiring Pool Operators to maintain rigorous vigilance of the pool disinfection systems.

The treatment method for liquid stools is assessed against the risk of transmission of infectious diseases such as *Cryptosporidium* which is known to be highly resistant to chlorine.



It is desirable that modern aquatic facilities should have separate filters for each water body and may be fitted with operating ultra violet light (UV) disinfection systems. Where there are multiple pools served by one filtration system, a liquid faecal incident may require all pools to be closed simultaneously until decontamination procedures have been completed and the free chlorine residual complies with the Code.

It is essential that UV systems are maintained in operating condition to destroy cryptosporidium and Giardia organisms. UV filtration systems should be checked daily to ensure that the system is fully operational.

Pool Operators should record faecal incidents on the attached sheet and send a copy to their local government environmental health office for liquid stool events only as soon as practicable following a faecal incident. Local government may choose to undertake additional sampling of waters following an incident looking for the eradication of coliforms in the water body. Coliforms are an indicator of faecal matter being present in the water body.

DOH officers review weekly data from the notification of infectious disease that may highlight if there is a cluster of cryptosporidium cases that are within proximity to a public swimming pool. DOH will liaise directly with the Local Government & the Pool Operator if there is need for further action.

Liquid Faeces Incident

Procedure for liquid faeces in a Wading or Spa Pool

Immediate Response

1. The pool should be cleared of all people & the pool plant shut down to contain the spread in a defined area.
2. Signage should be in place to indicate that pools are closed to patrons.
3. If the pools have an independent filtration & disinfection system they should be drained immediately to sewer without passing through the filter media.
4. Scrub the pool shell and surrounds with 20:1 solution of water & 12% sodium hypochlorite solution.
5. If possible, interview the responsible person and ascertain any health related issues.

Clean up and Recommissioning of Pools

1. Disinfect filters by adding 20:1 solution to water and backwash to waste.
2. Wearing the required PPE clean up filter cartridges from pool cleaner and then soak in 20 parts water: 1 part 12% sodium hypochlorite solution for 24 hours and hose down again. Clean scoops and netting using the above methodology.

Notification

Using the Notification form, please send to your local government environmental health office within 48 hours of the incident.

Procedure for Liquid stools for Major Water Bodies

Immediate Response

1. The Technical Operator (Group 1) or Operator (Group 2 – 4) pools will immediately evacuate patrons from the effected pool and turn off circulation system. If there are multiple pools connected to the same filter as the contaminated pool, all pools will have to be cleared of people.
2. A coagulant should be added to the pool to improve the removal of pathogens by the filtration systems. (Operators of Group 2 – 4 pools should seek practical advice from their trained Technical Operator.)



3. Using a fine mesh scoop, immediately remove as much faecal material as possible from the pool. The area should also be vacuumed, with waste being directed to the sewer or other approved waste disposal system.
4. All implements used for removal of waste shall be left in a 20:1 Bleach solution for 30 minutes contact time before rinsing off with clean water and disposing of used solution.
5. Raise & keep the free chlorine level of the pool to 14mg/l for 12 hours or 20mg/l for 8 hours. This will necessitate the pool filtration system to be operational at that chlorine residual for the duration.
6. After the decontamination time period, the free chlorine level should be less than 10mg/l for persons and ideally 5mg/l before patrons may enter the pool.
7. Note the incident on your Incident Log sheet and complete the REPORTING FORM and forward it to your Local Government Principal Environmental Health Manager as soon as practicable after the incident.

Addition of Chemical Quantities – To achieve 20mg/l in a pool, add the following quantities:

Quantity of Water in pool	Sodium hypochlorite (liquid) 12.5%	Calcium hypochlorite (granular) 60 – 70%
Every 1000L	160ml	28g
30,000L	4.8L	840g
50,000L	8L	1.4KG
200,000L	32L	5.6KG

The following residual free chlorine contact periods within the water body will deactivate *Cryptosporidium* oocysts/cysts i.e. provide protection against disease transmission for liquid faecal incidents.

Residual Free Chlorine	Pool Exposure Time
5 mg/l	51 hours
10mg/l	25.5 hours
15mg/l	17 hours
20mg/l	12.75 hours

Solid Stool Incident

Procedure for dealing with solid stool fouling in the aquatic environment

Healthy persons can accidentally or purposefully release a solid stool. Any unexpected soiling of a pool will contaminate the water body.

1. Evacuate people from an area of 5 metre radius of the stool location and maintain that exclusion area with active supervision.
2. Don appropriate Personal Protective Equipment (PPE).
3. Remove stool from the pool as quickly as possible using Faecal Containment Scoop and dispose of waste in a Faecal Containment Receptacle and remove from pool deck. Group 2 – 4 pools may dispose of waste to the nearest toilet and sanitise the equipment use in a bucket of bleach in water.
4. Test chlorine levels immediately in that area of the pool to check for Code compliance levels (see Table 6 of Code).
5. If chlorine levels are within the prescribed parameters, no further action is required. Proceed to step 6. If chlorine levels are below the prescribed parameters, proceed to Step 8.
6. Discharge waste from receptacle container into the sewer by toilet or other means, clean up equipment by soaking both scoop and receptacle in chlorine based solution for 24 hours.
7. Record in Incident Report Diary.
8. Increase chlorine feed.
9. Re-open pool when levels meet the Code.
10. Clean up equipment by soaking both scoop and receptacle in chlorine based solution for 24 hours.
11. Record in Incident Report Diary.

Faecal Containment Kit – The kit would be clearly marked & could contain:

- Fine mesh pool scoop
- Containment bucket with lid
- Gloves
- Disinfectant
- A container suitable to house equipment during the disinfection process

Time Exposure for Free Chlorine Level

Inactivation times are based on cryptosporidium (Crypto) inactivation times. The (CT) value for crypto is 15,300. The CT value is the concentration (C) of free available chlorine in mg/l multiplied by time (T) in minutes ($CT = C \times T$).

For solid stool contaminated water the CT value for Giardia is used as a basis for calculations:

Giardia Inactivation Time for Solid Stools Incidents

Chlorine Levels (mg/l)	Disinfection Time*
1.0	45 minutes
2.0	25 minutes
3.0	19 minutes
These closure times are based on a 99.9% inactivation of Giardia cysts by chlorine, pH 7.5 and 25 Degree C. They do not take into account “dead spots” and other areas of poor pool water mixing.	

Vomit Incident

Procedure for dealing with vomit fouling concourse or walkways

1. Immediately exclude patrons from the area and identify an exclusion zone by setting up suitable barricades.
2. Don appropriate PPE.
3. Remove as much of the loose vomit as possible with mop, bucket & scoop.
4. If available, wet vacuum the area or hose away from the pool to concourse drainage.
Note A
5. Treat affected area with 20:1 Bleach Solution, scrub and hose solution to concourse drainage.
6. Clean up materials and return to storage.
7. Complete Incident Report Diary.

Note A – If drainage is not accessible, douse the affected area with either soda ash or bi-carb to absorb fluids and remove with broom and dust pan.

REPORTING FORM

This form is to be completed as a standard operating procedure immediately following the cleanup of an incident.

Name of Aquatic Facility _____
Name of Pool Operator _____
Name of person recording information _____
Time accident / incident was noticed _____

Indicate/ circle the type of aquatic facility where the accident / incident occurred

Toddler pool/ Hydrotherapy pool/ Leisure Pool/ Spa/ 50 m pool/
25m pool / water spray park/ Water polo pool/ Diving Pool / Other _____

Location of water body _____ Indoors / Outdoors

Indicate / circle the type of incident

Loose faecal / solid stool or multiple solid stools/ vomit
Other _____

Indicate the number of bathers in the affected water body at time of incident.

Number/s _____

Indicate /circle the appropriate response

- Was the person identified? YES / NO
- If yes, was there a recent bout of illness. YES / NO
- If yes, type of illness _____

Indicate the water body chemistry levels in the table below:

Sampling Period	Free Chlorine/ Bromine (mg/l)	Total Chlorine/ Bromine (mg/l)	pH	Water Temp
Before Event				
During the Event Location 1				
During the Event Location 2				
After the Event Location 1				
After the Event Location 2				

Circle or provide additional information regarding the type of disinfectant applied to water-body
Liquid Chlorine / granular chlorine / stabilized chlorine dioxide / Other_____

Pool Facilities:

- Size of the pool in litres _____
- Amount of disinfectant added to pool _____
- Type of filter e.g. Cartridge / sand etc _____
- Is a UV filter fitted to disinfection system? YES / NO
- UV Filter operational YES / NO

Indicate the date & time water body was re-opened (days, hours & minutes) _____

Indication duration that pool was closed for use e.g. (hours & minutes) _____

Name of Trained Technical Operator _____

A copy of this report is to be forwarded to the Principal Environmental Health Officer of your local government authority within 48 hours of the re-opening of the water body.

References

Active consultation with LIWA Aquatics (Western Australia)

"Draft Model Aquatic Health Code, Policies and Management Annex" (October 2010)

"Faecal Accident Policies" – Victorian Government Health Information

"Faecal release incidents – public pool response strategies". Health Protection Programs. SA Health.

"Protocol for Minimizing the Risk of Cryptosporidium Contamination in Public Swimming Pools and Spa Pools" NSW Health December 1999.

"Queensland Health Swimming and Spa Pool Water Quality and Operational Guidelines" (October 2004)

Code of Practice for the Design, Construction, Operation, Management and Maintenance of Aquatic Facilities (May 2011 version)

http://www.public.health.wa.gov.au/3/914/2/code_of_practice.pm

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