

## Model Aquatic Health Code

### Fecal/Blood/Vomit Contamination Response Module CODE Sections Modified after the First 60-day Review that Closed on 11/03/2008

#### Informational Copy: NOT Currently Open for Public Comment

***This version of the MAHC Fecal/Blood/Vomit Contamination Response Module has been modified based on the first round of public comments received. It is being re-posted so users can view how it was modified but is not currently open to public comment. The complete draft MAHC, with all of the individual module review comments addressed will be posted again for a final review and comment before MAHC publication. This will enable reviewers to review modules in the context of other modules and sections that may not have been possible during the initial individual module review. The public comments and MAHC responses can be viewed on the web at***

***<http://www.cdc.gov/healthywater/swimming/pools/mahc/structure-content/index.html>***

***The MAHC committees appreciate your patience with the review process and commitment to this endeavor as we all seek to produce the best aquatic health code possible.***

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## MAHC Fecal/Blood/Vomit Contamination Response Module Abstract

Health issues related to fecal contamination of aquatic facilities are well documented. The Fecal/Vomit./Blood Contamination Module contains requirements for planning, training, and response to contamination of aquatic facility water and surfaces by these biological fluids that include:

- 1) Response plans for vomit and formed or diarrheal stool contamination events.
- 2) Response plans for contamination of surfaces with blood.
- 3) Requirements for training in the fecal/vomit/blood contamination response plans.

### Table of Contents

The Fecal/Blood/Vomit Contamination Response CODE Module shows a Table of Contents giving the context of the Fecal/Blood/Vomit Contamination Design, Construction, Operation and Maintenance in the overall Model Aquatic Health Code's Strawman Outline (<http://www.cdc.gov/healthywater/pdf/swimming/pools/mahc/structure-content/mahc-strawman.pdf>).

#### MAHC "Strawman"

Table of Contents (4.0 – 6.0 show proposed structure)

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#### **6.5 Fecal/Blood/Vomit Contamination Response**

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- 6.5.1 Contamination Response Plan
- 6.5.2 Water Contamination Response
- 6.5.3 Pool Water Contamination Disinfection
- 6.5.4 Surface Contamination Cleaning and Disinfection

## 6.6 Inspections

### Acronyms in this Module:

AHJ	Authority having jurisdiction
ATSDR	Agency for Toxic Substances and Disease Registry
CDC	Centers for Disease Control and Prevention
CYA	Cyanuric Acid
DBP	Disinfection by-product
EAP	Emergency Action Plan
MAHC	Model Aquatic Health Code
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
RWI	Recreational Water Illness
UV	Ultraviolet

### Glossary Terms in this Module:

“**Aquatic Facility**” means a physical place that contains one or more aquatic venues and support infrastructure under a single management structure.

“**Aquatic Feature**” means an individual component within an aquatic venue. Examples include mushrooms, slides, buckets, spray guns/nozzles, and other play features.

“**Aquatic Venue**” means an artificially constructed or modified natural structure where the general public is exposed to water intended for recreational or therapeutic purpose. Such structures do not necessarily contain standing water so water exposure may occur via contact, ingestion, or aerosolization. Examples include swimming pools, wave pool, river, spas (including spa pools and hot tubs), therapeutic pools, spray pads. Aquatic venue requirements do not apply if the venue uses potable water that discharges to waste without impoundment or recirculation of the water.

“**Authority Having Jurisdiction**” (AHJ) means an agency, organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

“**Bather Load**” means the maximum number of persons allowed in the water of an AQUATIC VENUE. Bather load is used to determine the number of RINSE and CLEANSING SHOWERS. Bather Load is not the same as OCCUPANT LOAD which refers to maximum aquatic facility loads.

“**Chlorine**” means an element that at room temperature and pressure is a heavy green gas with characteristic odor and is extremely toxic. It can be compressed in liquid form  
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and stored in heavy steel tanks, but most pools now add other chlorine compounds (e.g. hypochlorite) that similar to the liquid form release hypochlorous acid when dissolved in water. Chlorinating agents are the most commonly used disinfectants for pools.

**“Contamination Response Plan”** means a plan for handling contamination from formed-stool, diarrheal-stool, vomit, and contamination involving blood.

**“Contaminant”** means a substance that soils, stains, corrupts, or infects another substance by contact or association.

**“CT Value”** means a representation of the concentration of the disinfectant (C) multiplied by time in minutes (T) needed for inactivation of a particular contaminant. The concentration and time are inversely proportional; therefore, the higher the concentration of the disinfectant, the shorter the contact time required for inactivation.

**“Disinfection”** means a treatment that kills microorganisms (e.g., bacteria, viruses, and parasites); in water treatment, a chemical (commonly CHLORINE, chloramine, or ozone) or physical process (e.g., ultraviolet radiation) can be used.

**“Disinfection By-Product”** means a chemical compound formed by the reaction of a disinfectant (e.g. CHLORINE) with a precursor (e.g. natural organic matter, nitrogenous waste from bathers) in a water system (pool, water supply).

**“EPA Registered”** means all pesticide products regulated and registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) by the U.S. Environmental Protection Agency (EPA; <http://www.epa.gov/agriculture/lfra.html>). EPA registered products will have a registration number on the label (usually it will state “EPA Reg No.” followed by a series of numbers). This registration number can be verified by using the EPA National Pesticide Information Retrieval System (<http://ppis.ceris.purdue.edu/#>).

**“Free Chlorine Residual”** means the available disinfectant in the water. It is the portion of total chlorine that is not combined chlorine and is available as disinfectant. When chlorine is added to water, hypochlorous acid is produced in either the molecular state (HOCl) or the ionized state (hypochlorite ion (OCl<sup>-</sup>) plus hydrogen ion (H<sup>+</sup>)), and a by-product specific to the type of chlorine is produced. The pH of the water determines the amount of hypochlorous acid in each state. HOCl is a very effective bactericide and is the active available chlorine disinfectant in the water. OCl<sup>-</sup> is also a bactericide, but acts more slowly than HOCl. Thus chlorine is a much less effective bactericide at high pH. The sum of HOCl and OCl<sup>-</sup> is referred to as “free chlorine” in pool water. The hypochlorous acid that remains in pool water uncombined with ammonia is called “free chlorine residual.” A free chlorine residual must be maintained for adequate disinfection.

**“pH”** means a symbol that expresses the negative log of the concentration of hydrogen ions. When water ionizes, it produces hydrogen ions (H<sup>+</sup>) and hydroxide ions (OH<sup>-</sup>). If there is an excess of hydrogen ions the water is acidic. If there is an excess of hydroxide ions the water is basic. pH ranges from 0 to 14. Pure water has a pH of 7.0. If pH is higher than 7.0, the water is said to be basic, or alkaline. If the water’s pH is lower

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than 7.0, the water is acidic. As pH is raised, more ionization occurs and CHLORINE disinfectants decrease in effectiveness.

“**Pool**” means a subset of aquatic venue designed to have impounded/standing water for total or partial bather immersion.

***Preface:** This document does not address all health and safety concerns, if any, associated with its use. It is the responsibility of the user of this document to establish appropriate health and safety practices and determine the applicability of regulatory limitations prior to each use.*

DRAFT

**Model Aquatic Health Code  
Fecal/Blood/Vomit Contamination Response Module Code**

**6.0 Policies and Management**

<i>Keyword</i>	<i>Section</i>	<i>Code</i>	<i>Grade</i>
	<b>6.0</b>	<b>Policies and Management</b>	
	<b>6.1</b>	<b>Operator Training <i>(reserved)</i></b>	
	<b>6.2</b>	<b>Lifeguard Training <i>(reserved)</i></b>	
	<b>6.3</b>	<b>Facility Staffing</b>	
	<b>6.3.1</b>	<b>Operators: Staff Requirements and Availability <i>(reserved)</i></b>	
	<b>6.3.2</b>	<b>Lifeguards: Staff Requirements and Availability <i>(reserved)</i></b>	
	<b>6.3.3</b>	<b>Staff Management</b>	
	<b>6.3.3.1</b>	<b>Chain of Command <i>(reserved)</i></b>	
	<b>6.3.3.2</b>	<b>Emergency Response/Communication Plan <i>(reserved)</i></b>	
	<b>6.3.3.3</b>	<b>Lifeguard Rotation Plan and Procedures <i>(reserved)</i></b>	
<i>Contamination Training</i>	<b>6.3.3.4</b>	<b>Contamination Incident Training</b>	<b>A</b>
<i>Minimum</i>	<b>6.3.3.4.1</b>	A minimum of one person on-site while the AQUATIC FACILITY is open for use shall be: <ol style="list-style-type: none"> <li>1) Trained in the procedures for response to formed-stool contamination, diarrheal contamination, vomit contamination, and blood contamination; and</li> <li>2) Trained in Personal Protective Equipment and other OSHA measures including the Bloodborne Pathogens Standard 29 CFR 1910.1030 to minimize exposure to bodily fluids that may be encountered as employees in an aquatic environment.</li> </ol>	
<i>Informed</i>	<b>6.3.3.4.2</b>	Staff shall be informed of any updates to the response plan.	
	<b>6.3.3.5</b>	<b>Remote Monitoring Systems <i>(reserved)</i></b>	
	<b>6.3.3.6</b>	<b>Employee Illness Policy <i>(reserved)</i></b>	
	<b>6.4</b>	<b>Facility Management</b>	
	<b>6.4.1</b>	<b>Operations</b>	
	<b>6.4.1.1</b>	<b>Operations Manual <i>(reserved)</i></b>	
	<b>6.4.1.2</b>	<b>System Check Program <i>(reserved)</i></b>	

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<i>Keyword</i>	<i>Section</i>	<i>Code</i>	<i>Grade</i>
<i>Recordkeeping</i>	<b>6.4.1.3</b>	<b><i>Recordkeeping</i></b>	
	6.4.1.3.1	<i>Daily Operation Records (reserved)</i>	
	6.4.1.3.2	<i>Monitoring and Testing Records (reserved)</i>	
	6.4.1.3.3	<i>Illness and Injury Reports (reserved)</i>	
<i>Remediation log</i>	6.4.1.3.4	<i>Bodily Fluids Remediation Log</i>	<b>A</b>
<i>Contamination incidents</i>	6.4.1.3.4.1	A Body Fluid Contamination Response Log shall be maintained to document each occurrence of contamination of the water or its immediately adjacent areas by formed or diarrheal fecal material, whole stomach discharge of vomit, and blood.	
<i>SOPs</i>	6.4.1.3.4.2	The log shall include a copy of the AQUATIC FACILITY'S standard operating procedures for responding to these contamination incidents.	
<i>Required Information at Incident</i>	6.4.1.3.4.3	The log shall include the following information recorded at the time of the incident: <ol style="list-style-type: none"> <li>1) Person conducting response;</li> <li>2) Supervisor on duty;</li> <li>3) Date and time of incident response;</li> <li>4) Specific area contaminated by incident;</li> <li>5) BATHER LOAD in that body of water at the time of incident (if applicable);</li> <li>6) Incident specifics, including type and form of body fluid observed (for example, diarrheal or formed stool, vomitus, or blood);</li> <li>7) Date and time when the area was closed to swimming;</li> <li>8) Whether the POOL uses CHLORINE stabilizer and concentration at time of incident ;</li> <li>9) Free residual of disinfectant and PH at the time of incident; and</li> <li>10) Remediation procedures used after the incident.</li> </ol>	
<i>Required After Incident</i>	6.4.1.3.4.4	The log shall also have the following information recorded when remediation is complete: <ol style="list-style-type: none"> <li>1) Date and time of the reopening;</li> <li>2) Free residual level of disinfectant ,PH, and stabilizer concentration at the time of the reopening (if applicable); and</li> </ol>	

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		3) Total contact time (if applicable).	
<i>Certifications</i>	6.4.1.3.5	Staff Certifications on File ( <i>reserved</i> )	
	<b>6.4.2</b>	<b>Patron-Related Management Aspects (<i>reserved</i>)</b>	
<i>Contamination Response</i>	<b>6.5</b>	<b>Fecal/Vomit/Blood Contamination Response</b>	
<i>Plan</i>	<b>6.5.1</b>	<b>Contamination Response Plan</b>	<b>A</b>
<i>Contamination response plan</i>	6.5.1.1	All recreational water facilities shall have a response plan for responding to formed-stool contamination, diarrheal-stool contamination, vomit contamination, and contamination involving blood.	
<i>Contamination training</i>	6.5.1.2	The CONTAMINATION RESPONSE PLAN shall include procedures for response and cleanup, provisions for training staff in these procedures, and a list of equipment and supplies for clean-up.	
<i>Equipment and supply verification</i>	6.5.1.3	The availability of equipment and supplies for remediation procedures shall be verified by the operator at least weekly.	
<i>Plan review</i>	6.5.1.4	The response plan shall be reviewed at least annually and updated as necessary.	
<i>Plan availability</i>	6.5.1.5	The response plan shall be kept on site and available for viewing by the AHJ.	
<i>Contamination Response</i>	<b>6.5.2*</b>	<b>Water Contamination Response</b>	<b>A</b>
<i>Closure</i>	6.5.2.1	In the event of a fecal or vomit contamination in a disinfected water venue, the operator shall immediately close the POOL to swimmers until remediation procedures are complete. This includes the affected AQUATIC FEATURE and other features that share the same recirculation system.	
<i>Physical removal</i>	6.5.2.2	Contaminating material shall be removed (e.g., <i>using a net, scoop, or bucket</i> ) and disposed of in	

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		a sanitary manner.	
Clean / disinfect net or scoop	6.5.2.2.1	Fecal or vomit contamination of the item used to remove the contamination ( <i>e.g., the net or bucket</i> ) shall be removed by thorough cleaning followed by DISINFECTION ( <i>e.g., after cleaning, leave the net, scoop, or bucket immersed in the POOL during the DISINFECTION procedure prescribed for formed-stool, diarrheal-stool, or vomit contamination, as appropriate</i> ).	
No vacuum cleaners	6.5.2.2.2	Aquatic vacuum cleaners shall not be used for removal of contamination from the water or adjacent surfaces unless vacuum waste is discharged to a sanitary sewer and the vacuum equipment can be adequately disinfected.	
Treated	6.5.2.3	POOL water that has been contaminated by feces, vomit, or blood shall be treated as follows: <ol style="list-style-type: none"> <li>1) Check to ensure that the water's pH is 7.5 or lower and adjust if necessary;</li> <li>2) Verify and maintain water temperature at 77°F (25°C) or higher;</li> <li>3) Operate the filtration/recirculation system while the POOL reaches and maintains the proper free CHLORINE concentration during the remediation process; and</li> <li>4) Test the CHLORINE residual at multiple sampling points to ensure the proper free CHLORINE concentration is achieved throughout the POOL for the entire DISINFECTION time.</li> </ol>	
Contamination Disinfection	<b>6.5.3*</b>	<b>Pool Water Contamination Disinfection</b>	
Formed-stool	6.5.3.1	Formed-stool contaminated water shall have the FREE CHLORINE RESIDUAL checked and the FREE CHLORINE RESIDUAL raised to 2.0 mg/L (if less than 2.0 mg/L) and maintained for at least 25 minutes ( <i>or an equivalent CT VALUE</i> ) before reopening the POOL.	A
Diarrheal-stool	6.5.3.2	Diarrheal-stool contaminated water shall have the FREE CHLORINE RESIDUAL checked and the FREE CHLORINE RESIDUAL raised to 20.0 mg/L and	A

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		maintained for at least 12.75 hours or an equivalent CT VALUE.	
<i>Pools containing chlorine stabilizers</i>	6.5.3.2.1	The remediation procedure outlined in 6.5.3.2 shall not apply to POOLS using CHLORINE stabilizer, such as cyanuric acid.	B
<i>Vomit</i>	6.5.3.3	Vomit-contaminated water shall have the FREE CHLORINE RESIDUAL checked and the FREE CHLORINE RESIDUAL raised to 2.0 mg/L (if less than 2.0 mg/L) and maintained for at least 25 minutes (or an equivalent CT VALUE as shown) before reopening the POOL.	A
<i>Blood</i>	6.5.3.4	Blood contamination of a well-maintained AQUATIC VENUE does not pose a public health risk to swimmers. Operators may choose whether or not they want to close the POOL and treat as a formed stool contamination as in 6.5.3.1 to satisfy patron concerns.	A
<i>Procedures for brominated pools</i>	6.5.3.5	Formed-stool, diarrheal-stool, vomit, or blood-contaminated water in a brominated POOL shall have CHLORINE added to the POOL in an amount that will increase the FREE CHLORINE RESIDUAL to the level specified for the specific type of contamination for the specified time. The bromine residual shall be adjusted if necessary before reopening the POOL.	C
<i>Supplemental Disinfection</i>	6.5.3.6	POOLS with Supplemental Disinfection Systems (e.g., UV, ozone) (reserved)	
<i>Surface Cleaning and Disinfection</i>	<b>6.5.4</b>	<b>Surface Contamination Cleaning and Disinfection</b>	<b>B</b>
<i>Limit access</i>	6.5.4.1	If a bodily fluid such as feces, vomit, or blood, has contaminated a surface in an AQUATIC FACILITY, facility staff shall limit access to the affected area until remediation procedures have been completed.	
<i>Clean surface</i>	6.5.4.2	Before DISINFECTION, all visible CONTAMINANT shall be cleaned and removed with disposable	

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		cleaning products effective with regard to type of CONTAMINANT present, type of surface to be cleaned, and the location within the facility.	
<i>Disposal</i>	6.5.4.3	CONTAMINANT removed by cleaning shall be disposed of in a sanitary manner or as required by law.	
<i>Disinfect surface</i>	6.5.4.4	Contaminated surfaces shall be disinfected with a DISINFECTION solution outlined in MAHC Section 6.5.4.4.1 or 6.5.4.4.2.	
<i>Bleach Solution</i>	6.5.4.4.1	A 5,000 mg/L bleach DISINFECTION solution, such as a 1:10 dilution of fresh household bleach with water.	
<i>EPA-Registered</i>	6.5.4.4.2	An equivalent EPA REGISTERED disinfectant that has been approved for body fluids DISINFECTION.	
<i>Soak</i>	6.5.4.5	The disinfectant shall be left to soak on the affected area for a minimum of 20 minutes or as otherwise indicated on the disinfectant label directions.	

## 6.6 *Inspections (reserved)*