

Model Aquatic Health Code Draft Module

**Preface / User Guide / Glossary Module ANNEX Sections
Modified after the First 60-day Review
Closed for Public Comment on 12/09/2008**

Informational Copy: NOT Currently Open for Public Comment

In an attempt to speed the review process along, the MAHC steering committee has decided to release MAHC draft modules prior to their being fully complete and formatted. These drafts will continue to be edited and revised while being posted for public comment. The complete versions of the drafts will also be available for public comment again when all MAHC modules are posted for final public comment. 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 Preface / User Guide / Glossary Module Abstract

The Preface/User Guide/Glossary Module outlines the rationale, history, and impetus for creation of the MAHC and its sponsorship by CDC. Infectious disease outbreak and injury data, and the lack of a national model support creation of the MAHC. The module explains the operating premises that served as the foundation for creation of the MAHC and outlines long term plans for updating it to ensure it remains current. This is followed by a User Guide that explains how the MAHC should be read, interpreted, and implemented. A partial Glossary is included that defines specific terms. When all MAHC modules are combined into a single MAHC document, the MAHC will include a complete Glossary that includes all terms defined across all modules within the MAHC. The MAHC will:

- 1) Ensure the best available standards and practices for protecting public health are available.
- 2) Incorporate data and best-practices based practices.
- 3) Updated on a regular basis with wide input.
- 4) Serve as a model that can then be used by state and local public health agencies to adopt in part or in full as regulations for their jurisdiction.

The Preface / User Guide / Glossary Code Module shows a Table of Contents giving the context of the Preface / User Guide / Glossary 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>).

Note on the MAHC Annex

Rationale

The annex is provided to:

- (a) Give explanations, data, and references to support why specific recommendations are made;
- (b) Discuss the rationale for making the code content decisions;
- (c) Provide a discussion of the scientific basis for selecting certain criteria, as well as discuss why other scientific data may not have been selected, e.g. due to data inconsistencies;
- (d) State areas where additional research may be needed;
- (e) Discuss and explain terminology used; and
- (f) Provide additional material that may not have been appropriately placed in the main body of the model code language. This could include summaries of scientific studies, charts, graphs, or other illustrative materials.

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Content

The annexes accompanying the code sections are intended to provide support and assistance to those charged with applying and using Model Aquatic Health Code provisions. No reference is made in the text of a code provision to the annexes which support its requirements. This is necessary in order to keep future laws or other requirements based on the Model Aquatic Health Code straightforward. However, the annexes are provided specifically to assist users in understanding and applying the provisions uniformly and effectively. They are not intended to be exhaustive reviews of the scientific or other literature but should contain enough information and references to guide the reader to more extensive information and review.

It is, therefore, important for reviewers and users to preview the subject and essence of each of the annexes before using the document. Some of the annexes (e.g., References, Public Health Rationale) are structured to present the information in a column format similar to the code section to which they apply. Other annexes or appendices provide information and materials intended to be helpful to the user such as model forms that can be used, recreational water illness outbreak response guidelines, and guidelines for facility inspection.

Appendices

Additional information that falls outside the flow of the annex may be included in the Model Aquatic Health Code Annex

Acronyms in this Module

See the Preface / User Guide / Glossary Module, Code Section

Glossary Terms in this Module

See the Preface / User Guide / Glossary Module, Code Section

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.*

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Model Aquatic Health Code

Preface / User Guide / Glossary Module Annex

1.0 Preface

<i>Keyword</i>	<i>Section</i>	<i>Annex</i>
	1.0	Preface
	1.1	Introduction
<i>Rationale</i>	1.1.1	<p>With hundreds of millions of visits¹ to AQUATIC FACILITIES, waterparks, and natural recreational water sites each year, bathers expose themselves to many potential dangers in and around AQUATIC FACILITIES. Thus, public health and safety is essential. Several challenges inhibit adequate cleaning and disinfecting of swimming water. Sunlight, urine, exposure to air, and inorganic and organic matter (i.e. sweat, saliva, feces) can quickly deplete FREE AVAILABLE CHLORINE, the primary disinfectant used in POOLS.</p> <p>AQUATIC FACILITIES also provide potential exposure to FECAL contamination from other swimmers. These incidents are common in AQUATIC FACILITIES, especially from diaper-aged bathers who are not toilet trained (babies and toddlers) One such pathogen is <i>CRYPTOSPORIDIUM</i> (FECAL-ORALLY transmitted) which can survive for days in chlorinated swimming POOLS because it is extremely CHLORINE resistant.^{2,3,4} <i>Cryptosporidium</i> and other waterborne pathogens have a low infectious dose and can still be excreted from the body weeks after diarrhea ends. These factors increase the potential for a WATERBORNE DISEASE outbreak. WATERBORNE DISEASES</p>

¹ US Census Bureau. Recreation and leisure activities: participation in selected sports activities 2007. Available at <http://www.census.gov/compendia/statab/2010/tables/10s1212.pdf>. Accessed May 17, 2010.

² Korich DG, et al. Effects of ozone, chlorine dioxide, chlorine, and monochloramine on *Cryptosporidium parvum* oocyst viability. *Appl Environ Microbiol* 1990;56:1423-1428.

³ Shields JM, et al.. Inactivation of *Cryptosporidium parvum* under chlorinated recreational water conditions. *J Water Health* 2008;6:513-520.

⁴ Shields JM, et al. The effect of cyanuric acid on the chlorine inactivation of *Cryptosporidium parvum*. *J Water Health* 2009;7:109-114.

Keyword

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and outbreaks can include the following:

- Gastrointestinal illness resulting from exposure to PATHOGENS such as *Escherichia coli* O157:H7 or *CRYPTOSPORIDIUM*,
- Infections of the brain, skin, ear, eye, and lungs,
- Wounds, and
- Exposure to chemicals.

1.2 Recreational Water-Associated Illness (RWI) Outbreaks and Injuries

Waterborne
Disease
Outbreaks
(WBDO)

1.2.1

Since 1978, the number of recreational water-associated WATERBORNE DISEASE outbreaks (WBDOs) reported annually has increased dramatically.⁵ This increase is probably due to a combination of factors including:

- The emergence of PATHOGENS, especially chlorine-tolerant *CRYPTOSPORIDIUM*,
- Increased participation of aquatic activities, and
- Increases in the number of AQUATIC FACILITIES,

Recognition of outbreaks that would have previously gone undetected. In addition, increased recognition, investigation, and reporting of recreational water-associated outbreaks also may be contributing factors.

Over 2007-2008, a total of 134 recreational water-associated WBDOs affecting 13,966 people were reported to the CDC. This was the largest number of outbreaks ever reported during a 2-year period. CDC documented that 116 of these outbreaks and 96.5% of the cases were associated with disinfected water venues.⁵

CRYPTOSPORIDIUM

1.2.2

There were 58 treated recreational water-associated outbreaks reported in 2007-2008 that were caused by *CRYPTOSPORIDIUM*, a substantial increase from the 8 reported for treated AQUATIC FACILITIES in 1997-1998.^{5,6} In

⁵ Hlavsa MC, et al. Surveillance for waterborne disease outbreaks and other health events associated with recreational water use — United States, 2007–2008. *MMWR Surveill Summ* 2011;60:1-37.

⁶ Barwick RS, et al.. Surveillance for waterborne-disease outbreaks, United States, 1997-1998. *MMWR Surveill Summ*, 2000;49 (4):1-35.

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<i>Drowning and Injuries</i>	1.2.3	<p>addition, during 1999-2008 <i>CRYPTOSPORIDIUM</i> was identified as the cause of 74.4% of gastroenteritis outbreaks at disinfected AQUATIC FACILITIES.⁵</p> <p>Drowning and falling, diving, chemical use, and suction injuries continue to be major public health injuries associated with aquatic venues. Drowning is a leading cause of injury death for young children ages 1 to 4, and the fifth leading cause of unintentional injury death for people of all ages.⁷ From 2008 through 2010, an average of 5,100 pool- or spa-related emergency department (ED)-treated submersion injuries occurred each year. For 2006-2008, 383 pool- or spa-related fatalities involved children younger than 15 years of age. Approximately 45% of the estimated injuries for 2008 through 2010 and 28% of the fatalities for 2006 through 2008 involving children younger than 15 occurred in a public setting.⁸</p>
<i>Pool Chemical-Related Injuries</i>	1.2.4	<p>For 2007-2008, 32 pool chemical--associated health events that occurred in a public or residential setting were reported to CDC by Maryland and Michigan. These events resulted in 48 cases of illness or injury; 26 (81.3%) events could be attributed at least partially to chemical handling errors (e.g., mixing incompatible chemicals). ATSDR's Hazardous Substance Emergency Events Surveillance System received 92 reports of hazardous substance events that occurred at aquatic facilities. More than half of these events (55 [59.8%]) involved injured persons; the most frequently reported primary contributing factor was human error. Estimates based on CPSC's National Electronic Injury Surveillance System (NEISS) data indicate that 4,574 (95% confidence interval [CI]: 2,703--6,446) emergency department (ED) visits attributable to pool chemical--associated injuries occurred in 2008; the most frequent diagnosis was poisoning (1,784 ED visits [95% CI: 585--2,984]).⁵</p>

⁷ Centers for Disease Control and Prevention. Wide-ranging OnLine Data for Epidemiologic Research (WONDER) [online]. (2010) Available from URL: <http://wonder.cdc.gov/mortsql.html>.

⁸ Gipson K. Pool or Spa Submersion: Estimated Injuries and Reported Fatalities, 2011 Report. U.S. Consumer Product Safety Commission, May 2011. Available online at <http://www.cpsc.gov/LIBRARY/FOIA/FOIA11/os/poolsub2011.pdf>.

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Keyword	Section	Annex
	1.3	Model Aquatic Health Code (MAHC)
Background	1.3.1	<p>This effort stems from a CDC-sponsored workshop titled "Recreational Water Illness Prevention at Disinfected Swimming Venues" convened on February 15-17, 2005, in Atlanta, Georgia in response to a position statement from the Council of State and Territorial Epidemiologists asking for CDC to convene such a meeting. The workshop assembled contributors from different disciplines working in state, local, and federal public health agencies and the aquatics industry to discuss ways to minimize recreational water illnesses spread through disinfected swimming venues. CDC, through an initial grant from the National Swimming Pool Foundation, has been working with public health and industry representatives across the United States to build this effort. Initial efforts have been focused on reducing the spread of recreational water illnesses at treated swimming venues.</p>
	1.4	Public Health and Consumer Expectations
	1.5	Uniform standards
Industry Agreement	1.5.1	<p>Industry and government officials have long recognized the advantages of well-written, scientifically sound, and up-to-date model CODES. Industry conformity of acceptable procedures and practices is far more likely where regulatory officials "speak with one voice" about</p> <ul style="list-style-type: none"> • what is required to protect the public health, • why it is important, and • which alternatives for compliance may be accepted. <p>Model CODES provide</p> <ul style="list-style-type: none"> • A guide for use in establishing what is required, • Businesses with accepted STANDARDS that can be applied to training and quality assurance programs, and • Local, state, and federal governmental bodies help with developing or updating their own CODES.

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<i>Provisions</i>	1.5.2	<p>The MAHC</p> <ul style="list-style-type: none"> • Provides guidance on AQUATIC FACILITY design standards & construction, operation & maintenance, and policies & management that can be uniformly adopted for the aquatics industry. • Is the collective result of the efforts and recommendations of many individuals, agencies, and organizations, and • Embraces the concept that safe and healthy recreational water experiences by the public are directly affected by how we collectively design, operate, and maintain our AQUATIC FACILITIES.
<i>Freedom to AQUATIC FACILITIES</i>	1.5.3	<p>Model performance STANDARDS essentially define public aquatic safety expectations, usually in terms of how dangerous a pathogen is to the public. By using a combination of PERFORMANCE STANDARDS and PRESCRIPTIVE MEASURES, AQUATIC FACILITIES are free to use innovative approaches to provide safe facilities whereas traditional evaluations mandate how facilities achieve acceptable results. However, to show compliance with the model performance STANDARD, the facility must demonstrate that control measures are in place to ensure that the STANDARD is being met. The underlying theme of the MAHC is that it should be science-based where possible and that change will be gradual so all parties can prepare for upcoming changes; “Evolution, not revolution”.</p>
	1.6	Modification and Improvements
	1.7	Code Adoption/Certified Copies
<i>MAHC as Law or Regulation</i>	1.7.1	<p>The MAHC is provided for use by governing bodies at all levels to regulate AQUATIC FACILITY STANDARDS. At the state and local levels the MAHC may be:</p> <ul style="list-style-type: none"> • Enacted into statute as an act of the state legislative body; • Promulgated as a regulation; or • Adopted as an ordinance.

Typically, CODE adoption bodies (federal, state, and local

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		governments) publish a notice of their intent to adopt a CODE, make copies available for public inspection, and provide an opportunity for public input prior to adoption. As is also outlined in the FDA Model Food Code, this is usually done in one of two ways.
		The recommended method is the "short form" or "adoption by reference" approach where a simple statement is published stating that certified copies of the proposed CODE are on file for public review. This approach may be used by governmental bodies located in states that have enabling laws authorizing the adoption of CODES by reference. An advantage to this approach is a substantial reduction in the cost of publishing and printing. The alternative method is the "long form" or "section-by-section" approach where the proposed CODE is published in its entirety. Both methods of adoption allow for the modification of specific provisions to accommodate existing law, administrative procedure, or regulatory policy.
	1.8	The Code Revision Process
<i>CDC Contact</i>	1.8.1	CDC continues to accept concerns and recommendations for modification of the MAHC from any individual or organization through two public comment periods via the email address MAHC@cdc.gov .
<i>Public Health Interest Group</i>	1.8.2	Given the purpose of the document as discussed in item 1.2 of this Preface, the MAHC governing body will be especially interested in addressing any problems identified. CDC will also be especially responsive to those needed policy and technical changes raised by the general public or an organization that uses a democratic process for addressing problems and concerns. Included are organizations that provide a process that encourages representative participation in deliberations by government, industry, academic, and consumer interests, followed by public health ratification such as a state-by-state vote by officially designated delegates.
		These organizations receive problems submitted by any interested individual, but specify the forms on which the issues must be detailed and provide specific time frames

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during which they may be submitted. CDC encourages interested individuals to consider raising issues and suggesting solutions involving the federal-state cooperative programs based on the MAHC through these organizations.

The MAHC will likely follow an update process similar to that of the Conference for Food Protection. This allows all interested partners to put in position papers to modify the MAHC and have a vote on modification.

1.9

Acknowledgements

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Model Aquatic Health Code
Preface / User Guide / Glossary Module Annex
2.0 User Guide

Keyword	Section	Annex
	2.0	User Guide
	2.1	Overview
<i>Structure and Format</i>	2.2	MAHC Structure and Format
		The MAHC utilizes the format also found in the FDA Model Food Code; thus, throughout the aquatic code, many references are made to the FDA Model Food Code and the Conference for Food Protection. These are purely for reference and to gain a better scope of perspective and protocol.
<i>Grading System</i>	2.3	MAHC Grading System
		The purpose of the grading system provided is show operators what recommendations are supported by scientific study and data and to prompt further study into aquatic health practices. The MAHC Steering Committee and Technical Committees ultimately intend to seek more research regarding the items graded “B” and “C” to eventually raise their grades to “A” as research and knowledge improves on these subjects.
<i>Annexes</i>	2.4	Annexes
		The annex is provided as a supplement to the code; thus, the annex is not intended to be interpreted or enforced as code. This is necessary in order to keep future laws or other requirements based on the MAHC straightforward. However, the annexes are provided specifically to assist users in understanding and applying the provisions uniformly and effectively.
		To use the code more effectively, users should preview the annex contents before using parts of the CODE. Some of the annexes (e.g., references, public health rationale) are structured to present the information by the specific CODE item number to which they apply. Other annexes

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		provide information and materials intended to be helpful to the user such as forms, recreational water illness outbreak response, and guidelines for facility inspection.

A Note About Resources

The resources used in all MAHC modules come from peer-reviewed journals and government publications. No company-endorsed publications have been permitted to be used as a basis for writing code or annex materials.

Bibliography

Complete References Cited in Module

- Barwick RS, Levy DA, Craun GF, Beach MJ, Calderon RL. Surveillance for waterborne-disease outbreaks, United States, 1997-1998. *MMWR Surveill Summ*, 2000;49 (4):1-35.
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