Mini-MAHCs – Topic-Specific Packages of MAHC Code and Resources

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What is the Model Aquatic Health Code (MAHC)?

- Based on science and best practices
  - Code / Annex
- Resource for creating or updating pool codes
- Goals
  - Reduce risk for outbreaks, drowning, and pool-chemical injuries
  - Outline uniform safety and operation standards
- Review and update cycle
  - Council for the Model Aquatic Health Code (CMAHC)
MAHC Layout and Contents

- Code Language
  - 1.0 Preface
  - 2.0 User Guide

1.0 Chapter
1.1 Part
1.1.1 Subpart
1.1.1.1 Section
1.1.1.1.1 Paragraph
1.1.1.1.1.1 Sub-Paragraph
4.9  Filter/Equipment Room

4.9.1  Equipment Room

4.9.1.1  General Requirements

4.9.1.1.1  Nonabsorbent Material

The equipment area or room floor shall be of concrete or other suitable material having a smooth slip resistant finish.

4.9.1.1.1.1  Positive Drainage

The equipment area or room floor shall have positive drainage, including a sump drain pump if necessary.
MAHC Layout and Contents

- Code Language
  - 3.0 Glossary of Acronyms, Initialisms, Abbreviations, and Terms
  - 4.0 Aquatic Facility Design Standards and Construction
  - 5.0 Facility Operation and Maintenance
  - 6.0 Policies and Management
MAHC Layout and Contents

- Annex\textsuperscript{A}
  - Scientific rationale for Code Language
  - Suggested best practices
  - Regularly updated
  - Superscript “A” – Annex available
2018 MAHC (3rd Edition): Key Changes
General Layout

- Code: 183 pages (vs. 289)
- Annex: 256 pages (vs. 371)
- All references: all cited by number in Chapter 8 vs. being in footnotes
- Section 3.3: updated to include full references, names, and years of referenced codes, standards, and laws
(New) Guidance for remediation and testing of aquatic venues suspected of and/or contaminated with *Legionella*

- Adapted from established CDC guidance at: https://www.cdc.gov/legionella/downloads/hot-tub-disinfection.pdf
Disinfection and Water Quality: Float Tanks (CMAHC Ad Hoc Committee)

- **(New)** Guidance for floatation tank regulation
  - Written as stand alone unit:
    - Plan submittal
    - Materials
    - Equipment standards
    - Electrical systems and components
    - Circulation system
    - Disinfection
    - Ventilation
Disinfection and Water Quality: Float Tanks (CMAHC Ad Hoc Committee)

- **(New)** Guidance for flotation tank regulation
  - Operating permits
  - Electrical, plumbing, disinfection, and ventilation systems
  - Cleaning
  - Fecal/vomit/blood contamination response
Performance criteria for disinfectant feeder sizing

Feeders shall be designed to maintain the minimum free chlorine concentrations specified in the MAHC at all times.

Sizing based on the following examples of chlorine-demand factors:

- Aquatic venue - surface area, volume, use/pace (e.g., agitated water), type (e.g., spa)
- Indoor vs. outdoor
- Anticipated maximum number of bathers per day
- Cyanuric acid/stabilizer used
Disinfection and Water Quality: Chemical Testing

- **(New)** Numerous pool chemicals (stabilizers, pool-grade salt, clarifiers, flocculants, defoamers, pH adjustment chemicals) must meet NSF/ANSI Standard 50 or 60 and/or EPA FIFRA registration.

- **(More flexible)** Calcium hardness levels raised to 2500ppm.

- **(More flexible)** Lowers secondary disinfection performance to a minimum 2-log reduction for all venues except interactive water play aquatic venues.
Lifeguard and Bather Supervision: Other Changes

- **(New)** Requires lifeguards if alcohol served at aquatic venue
- **(New)** Requires lifeguard personal protective equipment to be on person or rescue tube
- **(Strengthened)** Clarifies glare assessment for lifeguard positions
  - “glare conditions are assessed from each lifeguard position as identified in the Zone of Patron Surveillance to determine if the AQUATIC VENUE bottom and objects in the POOL are clearly visible to QUALIFIED LIFEGUARD staff throughout operating hours”
RISK MANAGEMENT AND SAFETY: NOISE REDUCTION (CMAHC AD HOC COMMITTEE)

- **New** Adds acoustic criteria to natatorium design to reduce noise levels
  - Uses established specific design criteria and sound absorbing materials to reduce noise in indoor aquatic facilities and to keep sound absorption coefficient to specific level (already used in other types of buildings)
  - New construction/substantial renovation
Risk Management and Safety: Chemical Release Injuries

- *(Strengthened)* Additional requirements to prevent chemical release events by improving chemical control and feed system interlocks and no/low flow deactivation
  - Requirements to ensure chemical control and feed systems shut off when recirculation systems shuts down.
  - Challenge testing of system required
  - Mandatory bather evacuation (system shutdown, backwashing) Bathers cannot re-enter until >5 minutes after system turned on
  - Visual alarm required if feeder is disabled through the electrical interlock – for new and replacement installations
Risk Management and Safety:
Other Changes

- **(New)** Adds certification for pool lifts
  - “All POOL lifts shall be CERTIFIED, LISTED, AND LABELED in accordance with UL 60335-2-1000, and be installed and used in accordance with the manufacturer’s installation instructions and ICC/ANSI A117.1”

- **(More flexible)** Clarifies handhold wording for lazy rivers
  - Example “Bathers In or On Tubes Exception: Handholds shall not be required where BATHERS are required to be in or on a tube while in the LAZY RIVER”

- **(More flexible)** More flexible requirements for closure and reopening
MAHC Adoption Map
RESOURCES AND TOOLS
Resources


Information For Specific Groups
- Potential MAHC
- Adopters
- Public

The MAHC-based model inspection form and cheat sheet are now available!

Model Aquatic Health Code
www.cdc.gov/mahc

Search the MAHC
www.cmahc.org/search-the-mahc.php
**Tools**

- MAHC-Based Aquatic Facility Inspection Form
  - Cheat-Sheet
  - Cross-Ref Guide
- Aquatic Inspector App
- Online Inspector Training (soon to launch)
- Mini-MAHCs
MINI MAHCs
MAHC Adoption Challenges

- The MAHC Is Big
  - 2016 Annex - 371 pages
  - 2016 Code Language - 289 pages
  - Can be overwhelming…

- Entire Adoption?
  - Partial adoption
  - Accept specific sections

- Time Consuming
What Is a Mini MAHC?

- **Partial Adoption**
  - Addresses one particular issue
  - Supports a list of adoption items

- **Specific and Precise Topic Areas**
  - Focuses on the matter at hand
  - Centers on how to fix or prevent

- **Code Language and Annex**
  - Reduces time spent examining the entire Code and Annex
Mini MAHC Intended Uses

- Reactive
  - Respond to an existing problem
  - Solutions to outbreak/injury/drowning investigations
  - Adjust current code

- Proactive
  - Prevent potential problems
  - Avoid future illness and/or injury
  - Address needs/gaps in current code
Mini MAHC Layout and Contents

- **Code Language**
  - Design & Construction 4.0
  - Operation & Maintenance 5.0
  - Policies & Management 6.0

- **Annex**
  - Scientific rationale
  - Separate document

- **Familiar Look**
  - Headings/format/numbering/spacing similar to the MAHC
Example: *Cryptosporidium*

- Lives in water, food, soil, on surfaces, or dirty hands spread through infected feces (humans/animals)
- Found throughout the United States
- 2001–2010 - Leading cause of waterborne disease outbreaks, linked to recreational water in the United States
- Very tolerant to chlorine - oocysts can stay alive for days
4.0A Aquatic Facility Design Standards and Construction

4.7 Recirculation and Water Treatment

4.7.3A Disinfection and pH Control

4.7.3.3 Secondary Disinfection Systems

4.7.3.3.2A Log Inactivation and Oocyst Reduction

4.7.3.3.2.1A Log Inactivation

SECONDARY DISINFECTION SYSTEMS shall be designed to achieve a minimum 3-log (99.9%) reduction in the number of infective *Cryptosporidium parvum* OOCYSTS per pass through the SECONDARY DISINFECTION SYSTEM for INTERACTIVE WATER PLAY AQUATIC VENUES and a minimum 2-log (99%) reduction per pass for all other AQUATIC VENUES requiring SECONDARY DISINFECTION.
6.5.3 Aquatic Venue Water Contamination Disinfection

6.5.3.2 Diarrheal-Stool Contamination

Diarrheal-stool contaminated water shall:

1) Check the FREE CHLORINE RESIDUAL and then raise the FREE CHLORINE RESIDUAL to 20.0 mg/L and maintain for at least 12.75 hours (or an equivalent time and concentration to reach the CT INACTIVATION VALUE) before reopening the AQUATIC VENUE, or

2) Circulate the water through a SECONDARY DISINFECTION SYSTEM to theoretically reduce the number of Cryptosporidium OOCYSTS in the AQUATIC VENUE below one OOCYST/100 mL as outlined in MAHC 4.7.3.3.2.4.
6.0 Policies and Management

6.5 Fecal/Vomit/Blood Contamination Response

6.5.3 Aquatic Venue Water Contamination Disinfection

6.5.3.2 Diarrheal-Stool Contamination

For diarrheal-stool contamination, inactivation times are based on *Cryptosporidium* inactivation times. The CT INACTIVATION VALUE for *Cryptosporidium* is 15,300. If a different CHLORINE concentration or inactivation time is used, an operator must ensure that the CT INACTIVATION VALUES remain the same.

For example, to determine the length of time needed to disinfect a POOL at 20 mg/L after a diarrheal accident, use the following formula: $C \times T = 15,300$.

Solve for time: $T = \frac{15,300}{20 \text{ mg/L}} = 12.75 \text{ hours}$.
Mini MAHCs Released

- Reducing the Spread of *Cryptosporidium*
  - Nov 2018
  - Code – 10 pages
  - Annex – 16 pages

- Improving Swimmer Hygiene and Diaper Changing
  - Jan 2019
  - Code – 12 pages
  - Annex – 12 pages
Mini MAHCs Released

- Preventing Pool Chemical Injuries
  - May 2019
  - Code – 33 pages
  - Annex – 29 pages
- Preventing In-line Production of Toxic Chlorine Gas Events
  - May 2019
  - Code – 14 pages
  - Annex – 9 pages
Next Mini MAHCs in-the-works

- Ventilation and Air Quality
- Lifeguarding/Lifeguard Supervision and Drowning Prevention
- Policies/Checklists/Reporting/Maintenance Documentation
- Operator Training
- Flotation Tanks

- Others?
What Mini MAHC topic areas would you like to see addressed next?
Questions?
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