

# **Adding to Our Healthy and Safe Swimming Arsenal: MAHC Tools For Inspectors and Operators**

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**Centers for Disease Control and Prevention**

**National Environmental Health Association Conference  
MAHC Pre-conference Workshop**

**7/7/14**



Centers for Disease Control and Prevention  
National Model Aquatic Health Code Program



# **REGULATORY PROGRAM ADMINISTRATION UPDATE**

# Regulatory Program Administration

- ❑ Regulatory guidance forms the framework around which an effective Model Aquatic Health Code (MAHC) is built
- ❑ The guidance reflected in the MAHC promotes all parties working together from the initial building permits to the code enforcement process
- ❑ Key: Can't regulate the regulator
  - Much of the regulatory provisions were moved to a new document separate from the MAHC called Operational Guidelines for Regulatory Programs

# Regulatory Program Administration

- ❑ **The MAHC still contains requirements for but not limited to:**
  - **Design and Construction Standards:**
    - Plans and permits
    - Content of design report
    - Plan approval
    - Compliance certificate
    - Construction permits
  - **Operation and Maintenance**
    - Operating permits
    - Preoperational inspections
    - Exemptions & variances

# Regulatory Program Administration

❑ **MAHC still contains requirements for but not limited to:**

- **Policies and Management**

- **Facility staffing: onsite vs. offsite operator**
- **Recordkeeping**
  - **Daily operation records**
  - **Injury & Illness reports**
  - **Swimmer empowerment: operating permit and inspection report posted/published**
- **Inspections**
  - **Establishment of imminent health hazards**
  - **Enforcement**



# **OPERATIONAL GUIDELINES FOR REGULATORY PROGRAMS**

## Purpose

- ❑ **Operational Guidelines document is intended to assist state and local public health pool programs in developing an effective pool inspection program which is data-driven, knowledge-based, and a risk reduction effort to prevent disease and injuries, and promote healthy recreational water experiences**
- ❑ **The Operational Guidelines document is intended to support the MAHC by increasing the level of public health expertise in the regulation of aquatics facilities at state and local programs**

## **Background**

- ❑ **CDC has adapted the Food and Drug Administration (FDA) Model Food Code Annexes 2009 materials as a template for the chapters in the Operational Guidelines document**
- ❑ **MAHC Operational Guidelines intended to be a “living” document that will be updated periodically as CDC learns from the collective experience of model practices from the local and state levels**

## **Public Input**

- ❑ **CDC invites suggestions for updates to be submitted to the Environmental Health Services Branch (EHSB) through their EHSB website link at <http://www.cdc.gov/nceh/ehs/Home/contact.htm> or the CDC Healthy Water link at <http://www.cdc.gov/healthywater/swimming/>**
- ❑ **Document will likely go out for a final 60 day round of public comment during Summer 2014**

## **Draft Chapter Titles**

- ❑ Purpose and scope**
- ❑ The public health reasons for a strong pool inspection program**
- ❑ Risk-based inspections**
- ❑ What is needed to conduct a risk based inspection?**
- ❑ Risk based inspection methodology**
- ❑ Achieving onsite and long-term compliance**
- ❑ Inspection form and scoring**
- ❑ Closing conference**

## **Draft Chapter Titles (Cont.)**

- ❑ Database construction, management, and data entry**
- ❑ Inspection program resources including fee categories**
- ❑ Regulatory staff training**
- ❑ Plan review and collaboration with building officials**
- ❑ Outbreak, injury, and drowning investigations**
- ❑ Variances**
- ❑ Aquatic health advisory committee**
- ❑ Conference for the Model Aquatic Health Code (CMAHC)**
- ❑ Future research and areas of improvement**

## **Implications for Regulatory Programs and Operators**

- ❑ **The MAHC seeks to increase ACTIVE OPERATOR CONTROL of aquatic facilities through training and reporting requirements, recognizing that inspectional staff may only be able to visit the facility on a periodic basis, whereas the facility manager should have a hands-on approach to her/his facility**
- ❑ **The concept of RISK BASED INSPECTIONS can be utilized by managers and inspectors to further prioritize inspection program activities based on potential and inherent recreational water injury and illness risks**

## **Active Operator Control**

- ❑ **ACTIVE OPERATOR CONTROL means the purposeful incorporation of specific actions or procedures by industry management into the operation of their businesses to attain control over recreational water injury and illness risk factors**
- ❑ **Regulatory inspections and follow-up activities must be proactive by using an inspection process designed to evaluate the implementation of MAHC interventions and the degree of ACTIVE OPERATOR CONTROL**

## **Risk Based Inspections**

- ❑ Studies have shown that the types of aquatic venues, location of aquatic venues, and patron number and populations served all have a bearing on the occurrence of recreational water injury and illness risk factors in aquatic facilities**
- ❑ Regulatory jurisdictions should develop and use a process that groups aquatic facilities or venues into categories based on potential and inherent recreational water injury and illness risks**

## **Risk Based Inspections (Cont.)**

- ❑ **In addition, regulatory jurisdictions should assign inspection frequency based on the risk categories to focus program resources on aquatic facilities with the greatest recreational injury and illness risk**
- ❑ **With limited resources, creating a variable inspection frequency for each category will allow inspection staff to effectively spend more time in increased risk venues that pose the greatest potential risk of recreational water injury and illness**

# Example Risk Categorization of Pool Establishments

RISK CATEGORY	DESCRIPTION	FREQUENCY #/YR
<b>3</b>	<p>Examples may include:</p> <ul style="list-style-type: none"><li>• Pool serving highly susceptible populations such as diaper-aged children (children &lt; 5 years old)</li><li>• Pools serving large numbers of people</li><li>• History of waterborne illness, injuries and/or complaints</li><li>• History of non-compliance with critical items</li><li>• Year round operation</li><li>• AQUATIC VENUES which have been shown in national studies to have more pool violations</li></ul>	<b>3</b>

## **Long-term Compliance (Operator)**

- ❑ Control of recreational water injury and illness risk factors may be achieved through several means, such as training programs, operator oversight, or standard operating procedures**
- ❑ If an operator is effectively monitoring all critical activities in the aquatic facility and taking corrective actions when needed, a safe recreational water experience will result**

## **Long-term compliance (Inspector)**

- ❑ **It's important for regulatory jurisdictions to establish a compliance and enforcement protocol that results in credible follow-up for each violation noted during an inspection**
  - Especially violations related to recreational water injury and illness risk factors and MAHC interventions
- ❑ **Lack of follow-up on the part of the regulatory agency signals to the operator that the priority item and priority foundation item violations noted were not important**

## **Long-term Compliance (Inspector) Cont.**

- ❑ **Successful intervention strategies for out-of-control recreational water injury and illness risk factors can be tailored to each operation's resources and needs**
  - Will require inspectors to work with the operator to identify weaknesses in the existing recreational water safety management system and consulting with the operator to strengthen any weak areas noted
- ❑ **Long-term compliance may best be achieved through voluntary actions by the operator**
  - If an operator supports the concept that a recreational water safety management system is needed, there is a better chance that long-term compliance will be achieved

# Speaker Transition



# **Surveillance Tools: Measuring the Model Aquatic Health Code's Impact**

**Michele Hlavsa, RN, MPH  
Epidemiologist, Healthy Swimming**

**Pre-Conference Workshop:  
National Environmental Health Aquatic Symposium  
Las Vegas, NV  
July 7, 2014**



Centers for Disease Control and Prevention  
National Model Aquatic Health Code Program



## Outline

- **Why is it important to assess the impact of the Model Aquatic Health Code (MAHC)?**
- **What are surveillance data?**
- **How can we measure the MAHC's impact on public aquatic venues?**
- **How can we measure the MAHC's impact on public health?**
- **How can we measure the MAHC's impact on operation and maintenance of public aquatic venues?**

## MAHC, by the Numbers

- **1 Steering and 14 Technical Committees**
  - ~140 volunteers from public health, aquatics sector, and academia
  - 7 years: 2007–2014
- **14 modules → 1 “knitted” version**
  - ~300 references
  - ~300 pages of model standards
  - >350 pages of annex (i.e., reasoning)

# Surveillance Data

- **Surveillance (CDC definition)<sup>1</sup>**
  - **“Ongoing systematic collection, analysis, and interpretation of outcome-specific data for use in the planning, implementation, and evaluation of public health practice.”**
- **Uses<sup>2</sup>**
  - **Estimate magnitude of public health problem**
  - **Document distribution of public health event**
  - **Evaluate prevention and control measures**
  - **Direct public health–decision making**

1. Thacker SB *et al.* *Epidemiol Rev* 1988;10:164–90.

2. Teutsch SM. Considerations in planning a surveillance system. In: Teutsch SM, Churchill RE (eds.). *Principles and practice of public health surveillance*. New York: Oxford University Press, 2000:17–29.

**ASSESSING THE MAHC'S IMPACT  
ON PUBLIC AQUATIC VENUES:  
ASSESSING MAHC DISSEMINATION**

## **Assessing MAHC Dissemination**

- **Challenge: Write, enact, and implement pool codes in individual state and local jurisdictions**
  - **Dissemination will vary across U.S.**
- **Strategy: Document dissemination of specific MAHC standards and language into proposed and enacted legislation**
  - **Replicate MAHC language directly in its text**
  - **Include key concepts, recommendations, or principles directly derived from MAHC**
  - **Mention MAHC directly in its text or comments**

## Legal Database Searches: Framework

- **Develop protocol to decrease variability across individual searches**
  - **Conduct searches every 3–10 months, depending on database (e.g., Westlaw, Municode, and CQ State Track)**
- **Draft list of standards and concepts of interest**
  - **Secondary disinfection: UV and ozone**
  - **Hygiene: diaper-changing station**
  - **Design & Construction: fencing**

## Tracking MAHC Adoption: Legal Surveillance Data

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### Surveillance Data Uses

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Estimate magnitude of public health problem

Document distribution of public health event

### Examples

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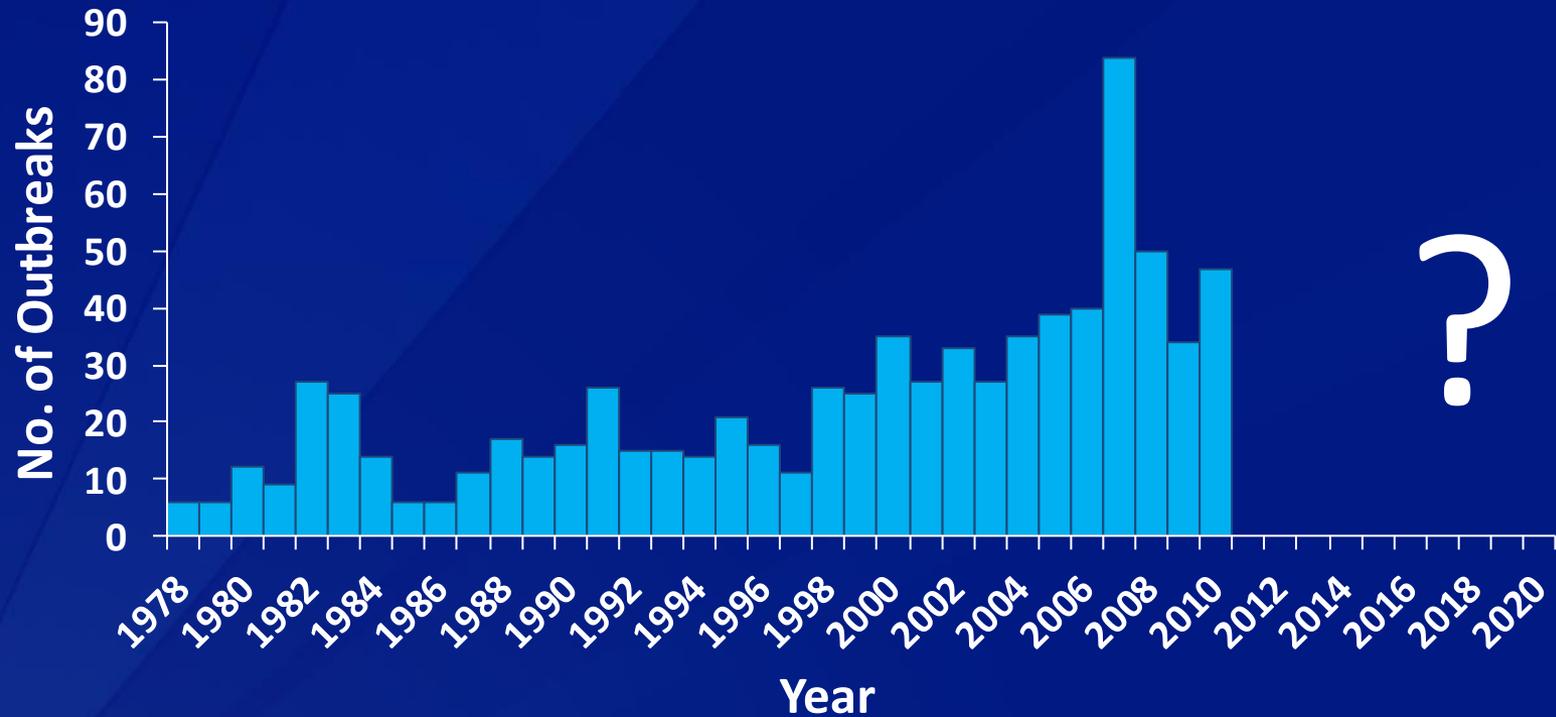
How many jurisdictions adopted a given MAHC standard?

Where are the jurisdictions that adopted a given MAHC standard?

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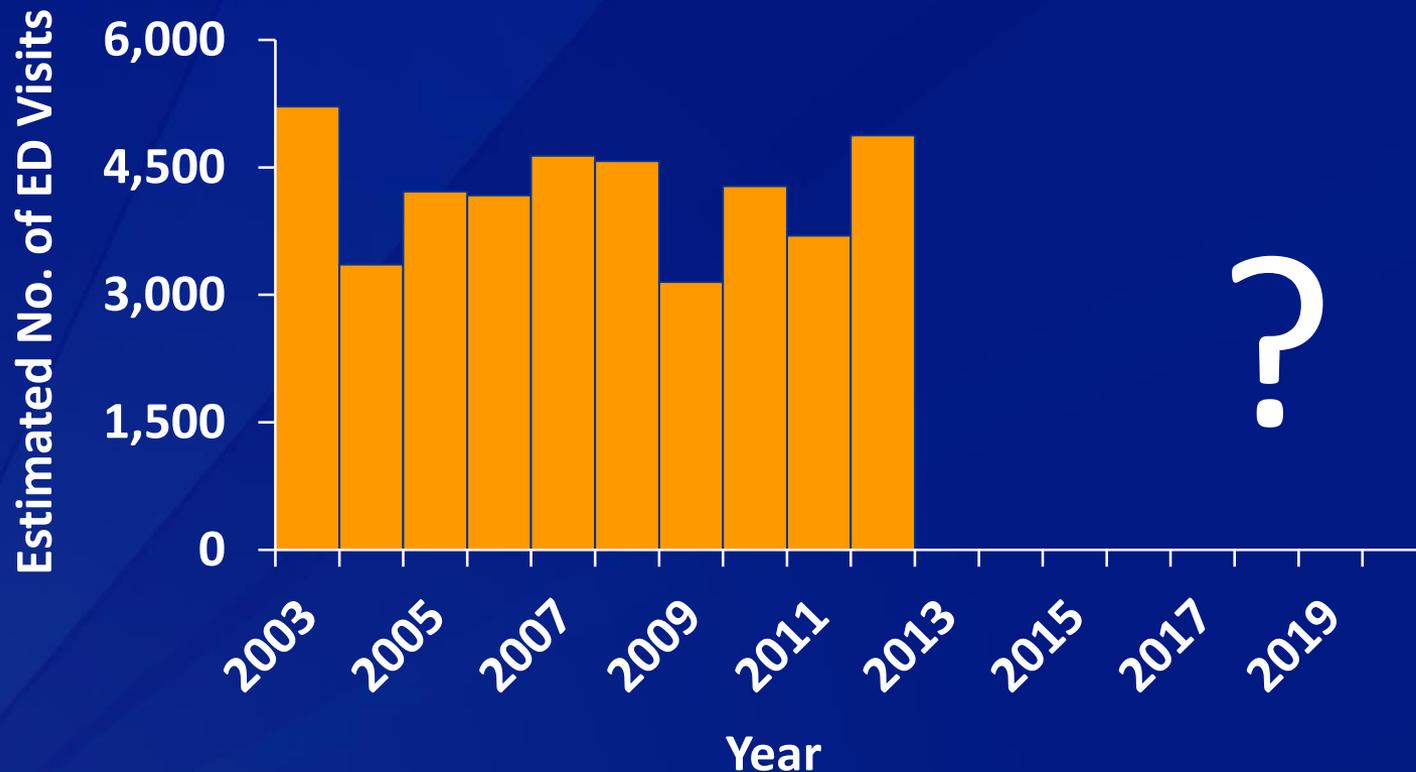
# **ASSESSING THE MAHC'S IMPACT ON PUBLIC HEALTH**

# Outbreaks associated with Recreational Water (n=789), by Year — United States, 1978 and Beyond



Source: Hlavsa MC *et al.* 2014. MMWR 63(1):6–10.

# Estimated Number of Emergency Department (ED) Visits for Injuries associated with Pool Chemicals United States, 2003 and Beyond



Source: Hlavsa MC *et al.* 2014. MMWR 63(19):427–30.

**ASSESSING THE MAHC'S IMPACT ON  
OPERATION & MAINTENANCE:  
ROUTINE INSPECTIONS OF  
PUBLIC AQUATIC VENUES**

## **Routine Inspections of Public Aquatic Venues**

- **Challenge: Write, enact, and implement pool codes in individual state and local jurisdictions**
  - **Inspections vary across U.S.**
    - **Inspect different items**
    - **Inspect same items differently**
- **Strategy**
  - **Maximize coverage of public aquatic venues across U.S.: top 5 counties in top 5 pool states**
  - **Focus on inspection with greatest public health impact (i.e., closure items)**

2.5		
elenium 34 Se	Bromine 35 Br	Kryp 3
8.96 2.4	79.90 2.8	8

3.5		
ur 6	Chlorine 17 Cl	Argon 18 A
.07 2.5	35.45 3.0	39

## Preventing Recreational Water-associated Illness

- Proper disinfectant level
- pH 7.2–7.8
- Automated chemical feeder operable
- Recirculation pump and filter: approved, in good repair, and operating
- Qualified operator or responsible supervisor on site

## **Preventing Drowning and Pool Chemical–associated Health Events**

- **Drowning**
  - **Enclosure: fencing, walls, gates, and doors in good repair AND self-closing/self-latching gates or doors**
  - **Water clear, main drain visible**
  - **Appropriate safety equipment present and in good repair**
  - **Qualified lifeguards and/or adequately staffed**
- **Pool chemical–associated health events**
  - **Pool chemicals labeled, stored safely, and secured**

## Tracking MAHC Impact: Inspection Data

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### Surveillance Data Uses

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Evaluate prevention and control measures

Direct public health—  
decision making

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### Examples

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Does frequency of violations decrease when qualified operator or responsible supervisor is on site?

Where should finite resources be targeted?

# Standardizing Inspections?

- Develop model MAHC inspection form
- THANK YOU to CA, FL, GA, and NY state and local partners

Facility Permit #: \_\_\_\_\_ Venue Identifier: \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ v.17

**Model Aquatic Health Code Draft Facility Inspection Report** Time: In \_\_\_\_ / Out \_\_\_\_

Name of Facility \_\_\_\_\_ Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Type Class Venue:  Pool  Hot tub/Spa  Wading Pool  Spray grounds  Other \_\_\_\_\_  
 Setting:  Apt/condominium  Campground/Camp  Hotel/motel  Membership club  School/University  
 Water park  Hospital  Child care  Municipal  Other \_\_\_\_\_  
 Venue Location:  Indoor  Outdoor Risk Category:  1  2  3

Descriptions (Bold= critical violations)	Item	Pts	In	Out	R	N/A	N/O
<b>Enclosure: fencing, walls, gates and doors in good repair; self-closing/self-latching gates or doors operational</b>	1	5					
<b>Protected overhead electrical wires/GFCI electrical receptacles</b>	2	5					
Grab rails, ladders secured; shelf, deck in good repair	3	5					
Floors/safety line clearly present	4	1					
"Depth" & "no diving" markers; stair stripes, in good repair and visible	5	1					
Skimmers: weirs and baskets installed, clean and operating; covers in good repair	6	1					
Recirculation inlets functional	7	1					
<b>Main drain grate secured in place &amp; in good repair</b>	8	1					
<b>Water is clear, main drain visible</b>	9	5					
Starting blocks removed, covered, or access blocked	10	5					
Pool deck free from obstructions; emergency exit marked	11	1					
Emergency phone or other communication device available and well-marked	12	1					
First Aid Kit available	13	1					
<b>Appropriate safety equipment present &amp; in good repair</b>	14	1					
<b>Qualified and/or adequately staffed lifeguards</b>	15	5					
<b>Qualified operator or responsible supervisor on-site</b>	16	5					
Signs: bathing load/rules/chemicals/spa legible and in good repair	17	1					
<b>Spa temperature ≤ 104°F</b>	18	5					
Approved NSF/ANSI Standard 50 test kit	19	1					
<b>Proper disinfectant level</b>	20	5					
<b>pH between 7.2 and 7.8</b>	21	5					
Combined chlorine <0.4 ppm	22	1					
Cyanuric acid ≤ 100 ppm	23	1					
<b>Automated feeder operable</b>	24	5					
Automated controller operable	25	1					
Piping and valves identified and marked	26	1					
Flow meter present and operating	27	1					
<b>Filter: approved, good repair, operating</b>	28	5					
<b>Recirculation pump: approved, good repair, operating</b>	29	5					
Pump strainer: baskets in good condition, not clogged	30	1					
Filter gauges operable: filter inlet and outlet, strainer; sight glass	31	1					
Proper functioning <input type="checkbox"/> UV system; <input type="checkbox"/> ozone system	32	1					
<b>Chemicals: labeled, stored safely, secured</b>	33	5					
Appropriate Personal Protective Equipment (PPE) available	34	1					
Diaper-changing station present; sink, adjacent trash can, sanitizer present	35	1					
Used equipment separated from cleaned equipment	36	1					
Toilets: clean, good repair, bathroom appropriately stocked	37	1					
Rinse showers: good repair, accessible	38	1					
Cleansing showers: warm, non-scalding water available; good repair; soap	39	1					
Inspection report conspicuously posted at each entrance	40	1					
Operator inspection items: checklist complete	41	1					
Operator inspection items: evidence of appropriate steps promptly taken	42	1					
Chemical records: daily & complete	43	1					
Chemical records: evidence of appropriate steps promptly taken	44	1					
Emergency Action Plan available on site	45	1					
Other	46	4					

**SCORE:**  
\_\_\_\_\_/100

**Letter Grade:**  
\_\_\_\_\_

Previous Score:  
\_\_\_\_\_/100

Previous Letter Grade:  
\_\_\_\_\_

**Purpose of Visit (Check one)**  
 Routine  Follow-Up  
 Complaint  Other

**Water Quality & Flow Readings**

Free Cl	ppm
Free Br	ppm
pH	
Total Alk	ppm
Calcium hardness	ppm
Cyanuric acid	ppm
Temp Air	°F
Temp Water	°F
Flow	gpm

**Substantial alterations/Equipment replacement (List since last inspection):**

## **Lessons Learned from Study of 2008 Pool Inspection Data**

- **Provide unique identifier for each inspection of each venue within each aquatic facility**
- **Specify pool setting, pool type, type of inspection, water location, disinfectant type**
- **Identify inspector**
- **Limit data field to one inspection item**
- **Record pool chemistry readings**
- **Document inspection outcome**
- **Log time required for inspection**

## **Schedule Inspections Based on Risk**

- **History of recreational water–associated illness outbreaks, injuries, or complaints**
- **History of non-compliance**
- **High-risk venues**
  - **Venue type shown to have more violations**
  - **Typical patrons (e.g., children aged <5 years)**
  - **Number of patrons**

## Scoring and Grading Highlights

- **Scoring**
  - Out of a possible 100 points
- **Grading**
  - A=95–100
  - B=85–94
  - C=75–84
  - F<75 or closure item
- **Scoring/grading to encourage code compliance**
  - Extra demerits for repeat violations

# Speaker Transition



# **Adding to Our Healthy and Safe Swimming Arsenal: MAHC Tools For Inspectors and Operators**

**CDR Jasen Kunz, MPH, REHS**

**Centers for Disease Control and Prevention**

**National Environmental Health Association Conference**

**MAHC Pre-conference Workshop**

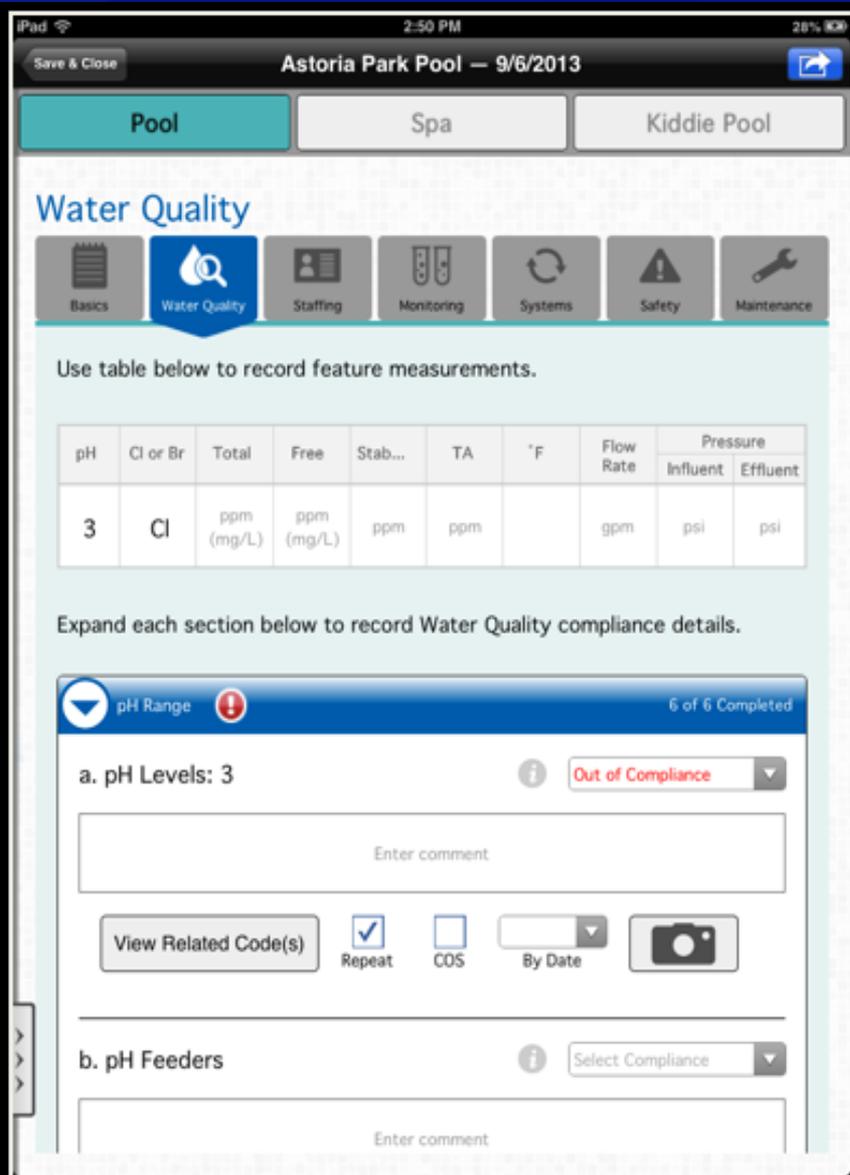
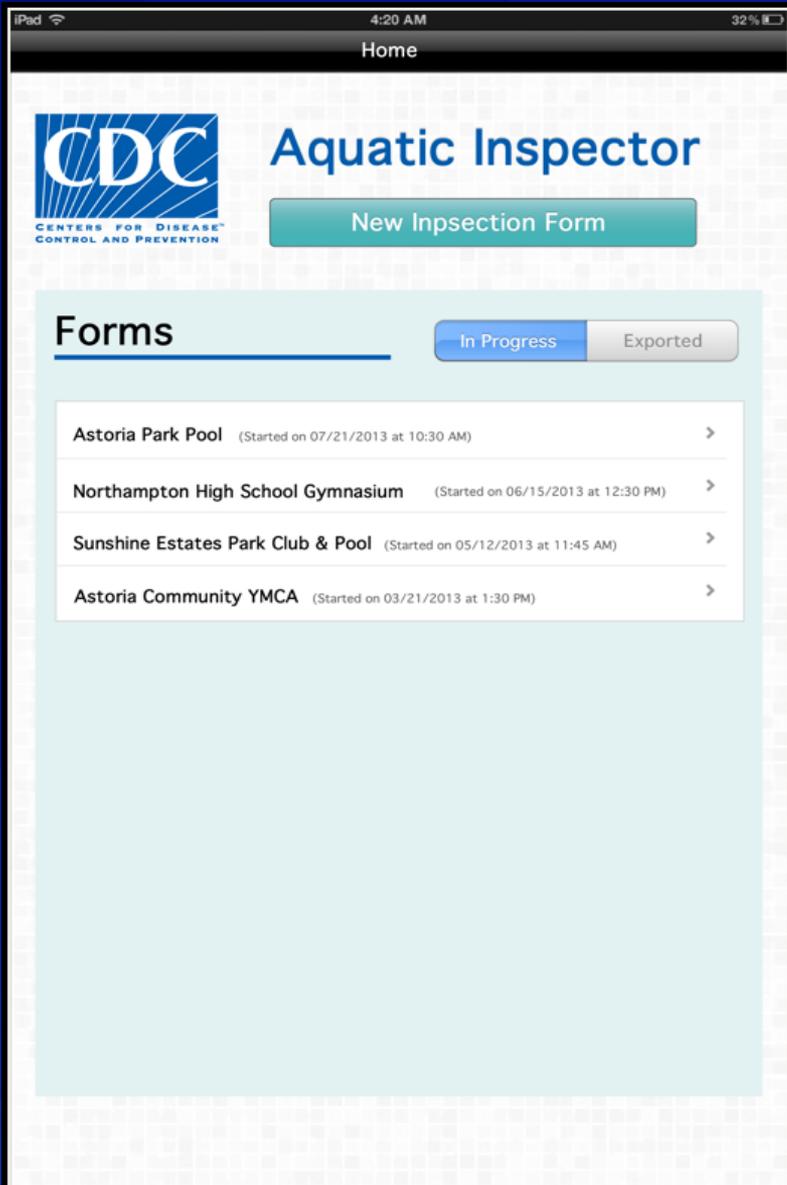
**7/7/14**



Centers for Disease Control and Prevention  
National Model Aquatic Health Code Program

## **MAHC eBook and Inspection Application**

- ❑ **MAHC is currently being converted into a free e-book version that will be viewable and searchable on tablet readers**
- ❑ **MAHC inspection form is currently being incorporated into a free electronic inspection application for tablet computers**
  - Digitizing the MAHC Inspection Form is a way to further disseminate the MAHC and facilitate standardized approach to pool inspections and data collection/analysis across jurisdictions
  - MAHC inspection app will serve as a template for existing data vendors serving state and local programs to update their electronic inspection programs





## **FUTURE RESEARCH AND AREAS OF IMPROVEMENT**

## **Operational Guidelines Looking Forward**

- ❑ It is envisioned that this document will expand over time to meet the needs of all MAHC stakeholders through a robust public engagement process**
- ❑ Items currently being considered for future updates include but not limited to:**
  - Additional MAHC specific forms for plan review, drowning investigations, daily operation checklists, variances etc.,
  - Resources for increasing collaboration with building officials,
  - Detailed scale and dimensional drawings and technical specifications for equipment in the aquatic system flow diagram,
  - Head loss calculations,
  - Pump curves.

## Contact Information

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**More Information: Search on  
 "CDC MAHC" or visit the  
 Healthy Swimming MAHC  
 Website: [www.cdc.gov/mahc](http://www.cdc.gov/mahc)  
 Email: [mahc@cdc.gov](mailto:mahc@cdc.gov)**

**More Information: Search on  
 "CMAHC" or visit the CMAHC  
 Website: [www.cmahc.org](http://www.cmahc.org)  
 Email: [info@cmahc.org](mailto:info@cmahc.org)**

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A-Z Index A B C D E F G H I J K L M N O P Q R S T U V W X Y Z #

### The Model Aquatic Health Code (MAHC): A National Model Public Swimming Pool and Spa Code

**MAHC Resources**

- Health Promotion Materials
- Newsroom
- Announcements

**Healthy Water Sites**

- Drinking Water
- Healthy Swimming/Recreational Water
- Global Water, Sanitation, & Hygiene (WASH)
- Other Uses of Water
- Water-related Emergencies & Outbreaks
- Water-related Hygiene

CDC has been working with public health, academia, and aquatics industry representatives across the United States on guidance to prevent drowning, injuries, and the spread of recreational water illnesses at public swimming pools and spas. The Model Aquatic Health Code (MAHC) is a voluntary, science- and best practices-based guidance document that can help local and state authorities make swimming and other water activities healthier and safer. The MAHC serves as a voluntary model and guide for local and state agencies needing to update or implement swimming pool and spa code, rules, regulations, guidance, law, or standards governing the design, construction, operation, and maintenance of public swimming pools, spas, hot tubs, and other disinfected aquatic facilities.

**The Model Aquatic Health Code**

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Centers for Disease Control and Prevention  
 1600 Clifton Rd  
 Atlanta, GA 30333  
 800-CDC-INFO  
 (800-232-4636)  
 TTY: (888) 232-6348  
[Contact CDC-INFO](mailto:ContactCDC-INFO)

For more information, please contact us at [MAHC@cdc.gov](mailto:MAHC@cdc.gov)

**MAHC Topics**

<b>General Information</b> Purpose, outcomes, FAQs...	<b>MAHC Status</b> First complete "knitted" version...
<b>MAHC Development</b> Development & oversight of the MAHC...	<b>Steering Committee</b> Guiding the MAHC process...
<b>Technical Committees</b> Providing specialized knowledge...	

**Now!** The public comment period for the first complete version of the MAHC closed on May 27, 2014. The first edition of the MAHC will be released in summer 2014.

**CMAHC**  
 Conference for the Model Aquatic Health Code

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- About the CMAHC
- View the MAHC
- Improving the MAHC
- Get Involved
- Public Health Materials
- Newsroom & Announcements
- Contact Us
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**Announcements**

**Workshop: National Environmental Health Association — July 7, 2014**

**Springboard to Prevention: The Model Aquatic Health Code, 1st Edition**

This workshop at the National Environmental Health Association (NEHA) Annual Educational Conference (AEC) will present the "knitted" version of the Model Aquatic Health Code (MAHC).

**Meeting: Conference for the Model Aquatic Health Code — October 8, 2014**

This FREE organizational meeting gives public health officials and members of the aquatics industry the unique opportunity to help form the Conference for the Model Aquatic Health Code (CMAHC), which will become the preeminent organization for pool and spa standard of care across the country.

Welcome to the Conference for the Model Aquatic Health Code

The Conference for the Model Aquatic Health Code (CMAHC) is a nonprofit organization created in 2014 to support and improve public health by promoting healthy and safe aquatic experiences for everyone. The CMAHC will serve as a national clearinghouse for input and advice on needed improvements to the Centers for Disease Control and Prevention's (CDC) Model Aquatic Health Code (MAHC). The MAHC is a voluntary, science- and best-practices-based guidance document that can help local and state authorities make swimming and other water activities healthier and safer. The CMAHC will collect, assess, and relay national input on needed MAHC revisions back to CDC to keep the MAHC current and up to date with the latest public health issues and aquatics sector advances. As a new organization, we encourage interested parties to join and help us build this new organization into a driving force for improved health, safety, and fun at the nation's public swimming facilities.

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Page last updated: July 3, 2014

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