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Minimizing Risk of Illness and Injury at Public Aquatic Facilities by Maximizing the Power of Aquatic Facility Inspection Data

Editor's Note: NEHA strives to provide up-to-date and relevant information on environmental health and to build partnerships in the profession. In pursuit of these goals, we feature a column from the Environmental Health Services Branch (EHSB) of the Centers for Disease Control and Prevention (CDC) in every issue of the *Journal*.

In these columns, EHSB and guest authors share insights and information about environmental health programs, trends, issues, and resources. The conclusions in this column are those of the author(s) and do not necessarily represent the views of CDC.

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More than two thirds (68%) of local health departments regulate, license, or inspect public aquatic facilities, defined as a physical place that contains one or more aquatic venues (e.g., pools) and supports infrastructure (e.g., a chemical pump room) (National Association of County and City Health Officials, 2013). When environmental health practitioners enforce state or local codes during inspections, they prevent illness and injuries at public aquatic facilities. But how exactly can the public and public health—two key healthy and safe swimming stakeholders—maximize the power of aquatic facility inspection data to minimize the risk of illness and injury? Just follow the inspection data.

The Public

A national convenience survey found that about two thirds of adults, who regularly participate in aquatics or whose children do, don't know that they can ask for inspection scores for individual public aquatic venues (Hlavsa, McClain, Collier, & Prue, 2014). If aware of inspection scores, almost 90% are somewhat or very interested in knowing the inspection scores. Conspicuously posting inspection scores online (e.g., on public health and aquatics Web sites) and on site (e.g., at the facility's entrance or waterside) can increase public awareness. It can also encourage the public to regularly check these inspection scores and use them to decide which facilities to use, much like how the

public checks food service establishment inspection scores to decide where to eat.

Public Health

Data tell us that almost one in eight (12.3%) routine inspections conducted in 2013 in 16 local jurisdictions resulted in immediate closure because at least one violation that represented a serious threat to public health had been identified (Hlavsa et al., 2016). Violations (e.g., improper disinfectant concentration or missing safety equipment) indicate an increased risk of illness and injury associated with public aquatic facilities. Additionally, violations represent an opportunity for environmental health practitioners to be illness and injury prevention advisors, educating operators about how to properly operate and maintain public aquatic facilities and why these measures are necessary. Such interactions, at the waterside or in aquatic facility operator training, could prevent future or repeated violations, and more importantly, minimize risk of illness and injury associated with public aquatic facilities.

Environmental health aquatic inspection programs have finite resources, so they can't be everywhere all of the time. To help direct enforcement (e.g., risk-based inspections) and education efforts, programs can use data from their aquatic facility inspections to

- determine which identified violations resulted in immediate closures;
- examine quantitative water quality readings (e.g., chlorine and cyanuric acid concentrations, pH) collected by environmental health practitioners during inspections, which are particularly valuable when readings that are too low have different public

FIGURE 1

Model Aquatic Health Code Aquatic Facility Inspection Report

Aquatic Facility Permit #: _____ Aquatic Venue Identifier: _____ Date: ____/____/____

Model Aquatic Health Code Aquatic Facility Inspection Report

Name of Aquatic Facility _____ Address _____ City _____ State _____ Zip Code _____ Time: In ____ / Out ____

Venue Type: Pool Hot tub/Spa Wading Pool Interactive water play venue Other _____
 Risk Type*: 1 2 3

Item	Descriptions (Bold= critical violations)	Points	In	Out	N/A	N/O
1	Enclosure: fencing, walls, gates and doors in good repair	10				
2	Self-closing/Self-latching gates or doors operational	10				
3	Protected overhead electrical wires/GFCI electrical receptacles	10				
4	Grab rails, ladders secured; shell, deck in good repair	5				
5	Float/safety line clearly present	5				
6	"Depth" & "no diving" markers; stair stripes; in good repair and visible	5				
7	Skimmers: Weirs and baskets installed; clean and operating; covers in good repair	5				
8	Recirculation inlets functional	5				
9	Main drain grate secured in place & in good repair	10				
10	Water is clear, main drain visible	10				
11	Starting blocks removed, covered, or access blocked	5				
12	Pool deck free from obstructions; emergency exit marked	5				
13	Emergency phone or other communication device available and well-marked	5				
14	First Aid Kit available	5				
15	Appropriate safety equipment present & in good repair	10				
16	Adequate supervision of the aquatic facility	10				
17	Signs: Bathing load/rules/chemicals/spa legible and in good repair	5				
18	Spa temperature ≤ 104°F (40°C)	10				
19	Approved NSF/ANSI Standard 50 DPD test kit	5				
20	Proper disinfectant level	10				
21	pH between 7.2 and 7.8	10				
22	Combined chlorine < 0.4 ppm	5				
23	Cyanuric acid ≤ 100 ppm	5				
24	Automated feeder operable	10				
25	Automated controller operable	5				
26	Piping and valves identified and marked	5				
27	Flow meter present and operating	5				
28	Recirculation pump: approved, good repair, operating	10				
29	Filter: approved, good repair, operating	10				
30	Pump strainer: baskets in good condition, not clogged	5				
31	Filter gauges operable: filter inlet and outlet, strainer; sight glass	5				
32	Proper functioning UV system; ozone system	5				
33	Chemicals: labeled, stored safely, secured	10				
34	Appropriate Personal Protective Equipment (PPE) available	5				
35	Diaper-changing station present; sink, adjacent trash can, sanitizer	5				
36	Used equipment separated from cleaned equipment	5				
37	Toilets: clean, good repair; bathroom appropriately stocked	5				
38	Rinse showers: good repair, accessible	5				
39	Cleansing showers: Warm, non-scalding water available; good repair; soap	5				
40	Operator training certification available onsite	5				
41	Lifeguard training certification available onsite	5				
42	Inspection report conspicuously posted at each entrance	5				
43	Operator inspection daily items: checklist used daily	5				
44	Operator inspection items: evidence of appropriate steps promptly taken	5				
45	Chemical records: filled out daily	5				
46	Chemical records: evidence of appropriate steps promptly taken	5				
47	Emergency Action Plan available on site	5				
48	Substantial unauthorized alterations/equipment replacement	10				
49	Other: Imminent Health Hazards are a 10-point critical violation	5 or 10				
	Points: add points for all scored categories; for in (blue) and out of (red) compliance	TOTAL				

Grading System: A= 95-100% B= 85-94% C=75-84 % F= 74% or less or critical item

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<http://www.cdc.gov/mahc/>

SCORE: _____ %

Letter Grade: _____

Previous Score: _____ %

Purpose of Visit (Check one)

- Routine
- Complaint
- Follow-Up
- Other

Water Quality Readings

Free chlorine	ppm
Free bromine	ppm
pH	
Total alkalinity	ppm
Calcium hardness	ppm
Cyanuric acid	ppm
Water Temp	°F

Quick Links

- Centers for Disease Control and Prevention's (CDC) Model Aquatic Health Code: www.cdc.gov/mahc
- Network for Aquatic Facility Inspection Surveillance: www.cdc.gov/mahc/nafis.html
- Council for the Model Aquatic Health Code (CMAHC): www.cmahc.org
- Become a member of CMAHC: www.cmahc.org/become-a-member.php
- CDC's Environmental Health Services Branch: www.cdc.gov/nceh/ehs

public health agencies to increase efficiency in developing needed tools, and at the level of individual environmental health aquatic inspection programs. Environmental health practitioners have technical knowledge of the operation and maintenance of public aquatic facilities and inspection expertise, epidemiologists have data analysis expertise, and information technology specialists have database construction and maintenance expertise.

One key tool needed to facilitate regular analysis of aquatic facility inspection data is a model form to collect the data. As a starting point, the Centers for Disease Control and Prevention (CDC) drafted a model inspection form that state and local environmental health practitioners field tested and provided feedback on. The current form (Figure 1) includes about 50 of the top risk reduction elements in the Model Aquatic Health Code (MAHC). The MAHC is a set of CDC recommendations to prevent public aquatic facility-associated drownings, other injuries, and outbreaks (such as the 2014 Tennessee cryptosporidiosis outbreak associated with a hotel pool published in this issue; see page 16). Additionally, CDC is developing a free MAHC inspection iPad application (Figure 2). The application includes the model inspection form, a system to capture and run simple statistics on aquatic facility inspection data, and the complete 2016 MAHC (2nd Edition). A link to the app will be available on CDC's MAHC Web site.

health implications than those when readings are too high;

- characterize distribution of violations, closures, and out-of-range readings by setting (e.g. hotel/motel, waterpark), venue (i.e., pool versus hot tub/spa), and pool category (e.g., wading pool, interactive water play venue); and

- monitor trends in violations, closures, and out-of-range readings overall and by specific settings, venues, and pool categories.
- Enabling regular analysis of aquatic facility inspection data requires collecting and storing the data so that they can be easily accessed and extracted. This requirement calls for a multidisciplinary effort led by environmental health across local, state, and federal

The Council for the Model Aquatic Health Code (CMAHC) (www.cmahc.org), which supports the use of aquatic facility inspection and other data to optimize the MAHC and supports MAHC adoption, could, through its membership, facilitate the cross-agency multidisciplinary collaboration needed to develop a set of tools to maximize the power of aquatic facility inspection data. Be a part of this public health effort, become a CMAHC member. Also, help drive the use of data to shape the 2018 MAHC (3rd Edition) by participating in the second biennial CMAHC conference in Denver, Colorado, on October 17–18, 2017, and by voting on proposed MAHC change requests from October 17–November 19, 2017. 🐼

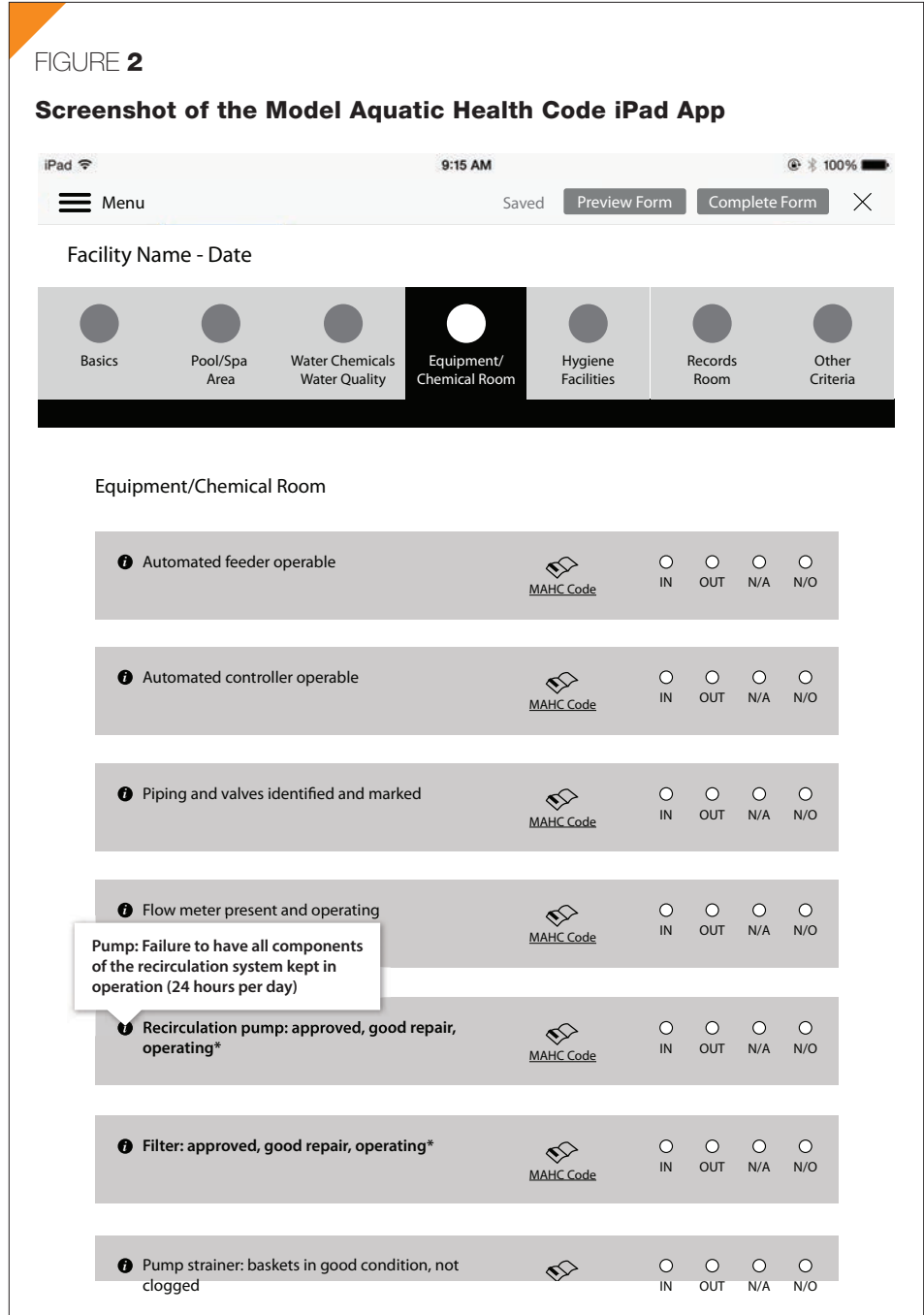
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Did You Know?

There will be 8.5 hours of recreational water education at the NEHA 2017 AEC being held July 10–13 in Grand Rapids, MI. Visit www.neha.org/aec for more information regarding the education we have planned and to register.