HHS Public Access

Author manuscript

J Public Health Manag Pract. Author manuscript; available in PMC 2022 February 24.

Published in final edited form as:

J Public Health Manag Pract. 2021 ; 27(4): 428–431. doi:10.1097/PHH.0000000000001388.

Strengthening Aquatic Health and Safety: How a Pilot Program Supported Local Health Departments in Updating Pool Codes

Emily K. D'Angelo[a], **Deise I. Galan**[a], **Joseph P. Laco**[b], **Michele C. Hlavsa**[c]

[a]National Association of County and City Health Officials (NACCHO)

[b]Centers for Disease Control and Prevention (CDC), National Center for Environmental Health

[c]CDC, National Center for Emerging and Zoonotic Infectious Diseases

Background

Aquatic activities play an important role for many when it comes to living a healthy lifestyle. Not only is swimming great exercise, it can help to maintain health among people living with chronic conditions such as arthritis, diabetes, and heart disease.[1] However, despite the health benefits, there are many risks associated with aquatic activities. The Centers for Disease Control and Prevention (CDC) estimates that approximately 3,500 unintentional drownings occur annually in the United States, with children aged one to four having the highest drowning rates.[2] Pool chemical injuries in the United States lead to over 4,500 emergency department visits annually, despite being preventable with proper education and safety equipment.[3]

These health risks underscore the importance of up-to-date pool codes. These codes provide regulations for designers, builders, and managers of aquatic venues to follow, which in turn reduce the risk of injuries and illnesses. With no federal authority to monitor or regulate pool codes, standards and processes vary greatly between jurisdictions as state and local governments are left with the responsibility of developing and maintaining these codes.

In order to provide guidance to local and state authorities and the aquatics sector on how to make swimming and other water activities healthier and safer, the CDC released the first edition of the Model Aquatic Health Code (MAHC) in 2014. CDC's MAHC is a voluntary guidance document updated every three years to include the latest science and best practices to promote safe swimming and aquatics. It provides guidance and rationale for pool recommendations, covering the design, construction, operation, maintenance, and management of aquatic facilities. In 2018, CDC published the 3rd edition of the MAHC, with the 4th edition scheduled to be released in the summer 2021. By serving as a model for best practices, the MAHC can save local and state governments valuable time and resources when creating or updating their own pool codes.[6]

The National Association of County and City Health Officials (NACCHO) serves each of the nearly 3,000 local health departments in the United States by strengthening and advocating for local public health. To better understand the adoption and enforcement of pool regulations at the local level, NACCHO conducted a qualitative study in 2016,[4] and subsequently in 2019,[5] to gain insight into the specific challenges and processes associated with pool code updates. These studies revealed that the process of updating pool codes can be a hindrance, with lack of set schedules and complex legislative processes serving as barriers. Additional barriers preventing local public health agencies from updating their pool codes included: length and time of the process, cost, staff bandwidth, and competing interests of stakeholders. Recreational water-related injuries/illnesses and drownings were reported as common drivers of pool code updates. Based on these results, NACCHO recognized the challenges and gaps local health departments face to prioritize pool code updates.

Aquatic Health and Safety Pilot Program

In 2020, during the third year of CDC's OT18–1802 Cooperative Agreement (Supporting the Practice of Environmental Health at the County and City Level), NACCHO launched the Aquatic Health and Safety Pilot Program (AHSPP). This program provided funding and subject-matter expertise to local health departments to review, revise, and strengthen aquatic facilities' codes to promote the use of the MAHC as a resource. Two pilot sites were selected to participate in the program: the Cuyahoga County Board of Health (CCBH) in Ohio, and the City of Kansas City Health Department (CKCHD) in Missouri.

Cuyahoga County is located in Northeastern Ohio and is the second largest county in the state, encompassing the city of Cleveland. The state government is responsible for developing and maintaining pool codes in Ohio, while local governments have the authority to enforce these regulations. The last revision to Ohio's pool codes became effective in 2011. Though a proposed revision was introduced in 2014, it never took effect. The Ohio Rule Advisory Committee, which consists of members from stakeholder organizations and industries, is required to review Ohio's pool codes on a five-year basis. At the onset of the Aquatic Health and Safety Pilot Program in May of 2020, the Ohio Rule Advisory Committee was scheduled to begin the next review process in late 2020 – with an expected completion date in 2021 – giving CCBH the opportunity to develop proposed updates to Ohio's pool codes through this pilot program.

The City of Kansas City is the largest city in Missouri and is uniquely located on the Kansas-Missouri state line. Unlike Cuyahoga County, the local government has complete authority over the city's pool codes and has no set schedule assigned for review. Since the lack of a statewide pool code raises the potential for inconsistencies, Kansas City works with neighboring jurisdictions to compare pool codes in order to increase uniformity throughout their region. At the time of the AHSPP in 2020, the most recent edition of Kansas City's pool code had been adopted in 2014. Through the AHSPP program, both sites aimed to develop a draft action plan to update their jurisdictions' pool codes and ensure healthy aquatic environments within their respective communities.

The two sites conducted an extensive review of the 2018 MAHC, comparing this to their current pool codes to identify needs and gaps. Cuyahoga County utilized the AHSPP funding to hire a local aquatic consultant to take on this task, while internal staff at CKCHD conducted the review and comparison. NACCHO and CDC encouraged the engagement of local stakeholders throughout this project, and both sites were successful with this. Cuyahoga County engaged with stakeholders via a virtual roundtable, consisting of pool operators, managers, suppliers, and others that provided valuable perspective. This virtual roundtable enabled CCBH and the consultant to not only educate these stakeholders on the benefits of the MAHC, but to additionally collect their feedback on potential updates. In Kansas City, the staff at CKCHD considered the stakeholders who would be responsible for implementing the potential pool codes updates and prioritized their unique local needs. While the MAHC provides rationale for each pool code item, Kansas City recognized that updates could require additional equipment, new training requirements, and additional changes that would impose costs onto these community partners.

Lessons Learned

After undergoing this review, both CCBH and CKCHD identified several items from the MAHC that were either lacking specificity in their jurisdictions' pool codes or missing completely. Major items that were identified by CCBH and recommended to be included to Ohio's pool codes (see Table 1):

Similar to CCBH, the team at CKCHD identified several opportunities to update their pool code (see Table 2). Their proposed updates can be summarized as:

This project was unexpectedly impacted by the COVID-19 pandemic, challenging both sites to continue progress on the AHSPP project while balancing additional responsibilities related to the response. Both sites benefited from the MAHC by being provided the public health rationale and scientific justification for pool code updates, which streamlined the process and saved sites valuable time and resources. Cuyahoga County and the City of Kansas City are planning to play an integral role in their pool code update process. Cuyahoga County is providing their findings to the Ohio Rule Advisory Committee for the state's current regulations review and update. The City of Kansas City will use their findings to make changes to their own codes updates, as they have direct authority over their pool rules. At the conclusion of the AHSPP, both Cuyahoga County and City of Kansas City were confident in being able to execute their plans, and intend to continue using the MAHC when updating their pool codes.

Recommendations

The Cuyahoga County Board of Health and City of Kansas City Health Department serve as model examples for how local health departments can utilize CDC's Model Aquatic Health Code as a resource to keep their pool codes up to date with the latest science and evidence-based practices. In addition to using the MAHC, NACCHO provides the following recommendations for jurisdictions looking to update their pool codes:

- Engage and inform stakeholders and decision makers;

- Join NACCHO's MAHC Network[7] for education and training opportunities;
- Utilize CDC's tools and resources[8] including Mini-MAHCs, MAHC-based model inspection forms, a free aquatic inspector app, and a code comparison tool; and
- Engage with the Council for the Model Aquatic Health Code.[9]

References

1. Centers for Disease Control and Prevention (CDC). Health Benefits of Water-based Exercise https://www.cdc.gov/healthywater/swimming/swimmers/health_benefits_water_exercise.html. Updated May 4, 2016. Accessed January 11, 2021.
2. Centers for Disease Control and Prevention (CDC). Unintentional Drowning: Get the Facts https://www.cdc.gov/homeandrecreationalsafety/water-safety/waterinjuries-factsheet.html. Updated October 7, 2020. Accessed January 11, 2021.
3. Vanden Esschert KL, Haileyesus T, Tarrier AL, et al. Pool Chemical Injuries in Public and Residential Settings – United States, 2008–2017, and New York, 2018. MMWR Morbidity and Mortality Weekly Report 2019; 68(19): 433–438. DOI: 10.15585/mmwr.mm6819a2.
4. National Association of County and City Health Officials (NACCHO). Pool Code Adoption and Enforcement in Local Jurisdictions: Model Aquatic Health Code 2016. Retrieved from www.naccho.org/uploads/downloadable-resources/research-brief-mahc-december2016.pdf
5. National Association of County and City Health Officials (NACCHO). Pool Code Updates and Use of the Model Aquatic Health Code in Local Jurisdictions 2019. Retrieved from http://bit.ly/MAHCBrief.
6. Centers for Disease Control and Prevention (CDC). Rationale Behind the MAHC https://www.cdc.gov/mahc/mahcrationale.html. Updated July 10, 2018. Accessed January 12, 2021.
7. National Association of County and City Health Officials (NACCHO). Model Aquatic Health Code Retrieved February 1, 2021 from https://www.naccho.org/mahc.
8. Centers for Disease Control and Prevention (CDC). The Model Aquatic Health Code (MAHC): An All-inclusive Model Public Swimming Pool and Spa Code Updated January 19, 2021. Retrieved February 1, 2021 from https://www.cdc.gov/mahc.
9. Council for the Model Aquatic Health Code (CMAHC). The Council for the Model Aquatic Health Code (CMAHC) Retrieved February 1, 2021 from https://cmahc.org.

Table 1.

Proposed changes to Ohio's pool codes.

Proposed Items to be Added to Ohio's Pool Codes	**Justification**	**MAHC Section**
Float and sensory deprivation tanks	Ohio's current pool codes do not offer regulation on these unique aquatic venues. The MAHC provides guidance to support CCBH in drafting regulations for floatation tanks.	Design and Construction: 4.12.10.1 – 4.12.10.11 Operations and Maintenance: 5.12.10.1 – 5.12.10.15
Underwater shelves and benches	As the design and features of aquatic venues become more complex, state, and local governments can turn to the MAHC for best practices and up-to-date science to inform pool code updates.	Design and Construction: 4.5.16, 4.5.18
Qualified operator training	Ohio's pool codes currently contain minimal content regarding training for operators. CCBH is using information from the MAHC to add more content to their draft action plan.	Policies and Management: 6.1.1. – 6.1.3.13
Maximum Capacity	This topic raised many questions in 2020, with aquatic facilities having to limit bather capacity in accordance with COVID-19 safety regulations. For venues to determine what constitutes 25%, 50%, etc., capacity, Ohio's pool codes need to be updated to include specific requirements.	Design and Construction: 4.1.2.3.5 Indoor Air Handling, Design and Construction: 4.6.2.7.3

Table 2.

Proposed pool code updates by the City of Kansas City.

Proposed Updates by Kansas City	Justification	MAHC Section
Updated pool slope requirements	This change will improve access and prevent steep drop offs and allowing water to drain to a low point will prevent standing water creating a contamination issue.	Bottom slope: 4.5.2 Zero depth sloped entries: 4.5.9
Changes to minimum enclosure height	Increasing minimum enclosure height to six feet will help to prevent use of aquatic facility outside of operational hours.	Fencing requirements: 4.8.6.2.4.2 Other barriers not servicing as part of an enclosure: 4.8.6.2.4.3
Updated maximum capacity calculations	Calculating capacity became an important topic during the COVID-19 pandemic. For venues to determine what constitutes 25%, 50%, etc., capacity, pool codes need to be updated to include specific calculation requirements.	Theoretical peak occupancy: 4.1.2.3.5 Real time occupancy: 4.6.2.7.3
Design and location specifications for stairs	Provides additional visibility to stairs.	Stairs: 4.5.4.1–4.5.4.8
Design and location specifications for handrails	Adding more specific requirements will create improve accessibility of aquatic venues.	Handrails: 4.5.5.1–4.5.5.7
Design and location specifications for depth markers	Clearly states where depth markers are required for aquatic venues and adding markers at a depth of 5-feet will help prevent injuries.	Depth markers: 4.5.19.1.1–4.5.19.3
Single outlet for main drain prohibited	Requiring at least two outlets will achieve the appropriate turnover rate and chemical balance, eliminating 'dead spots' in the pool. In the event that one drain is blocked, other outlet(s) will be able to continue recirculation.	Design and Construction: 4.7.1.6.2 through 4.7.16.4.2
Diaper changing stations required	Children less than five years of age pose an increased risk of fecal contamination of recreational waters. Requiring diaper changing stations will ensure access to hygienic conditions and limit risk of fecal contamination and transmission.	Design and Construction: 4.10.4.5.1 through 4.10.4.5.5; Operations and Maintenance: 5.10.4.5 through 5.10.4.5.3.1
Safety line required	Requiring a permanent contrasting band at or before a five-foot depth will provide a reference point for swimmers and lifeguards.	Design and Construction: 4.5.19.5.1 through 4.5.19.3
Marker tile required at deepest area of pool	Provides reference point for deepest point in pool for swimmers and lifeguards. Additionally, this requirement will provide a measure of general water clarity.	Design and Construction: 4.5.1.2 through 4.5.1.2.4; Operation and Maintenance: 5.7.6.1 through 5.7.6.2.1
New turnover requirements based on intended pool use	Additional specifications for turnover times (the period of time required to circulate a volume of water) based on intended pool use ensures that recirculation and filtration rates are satisfactory to prevent contamination.	Design and Construction: 4.7.1.10 through 4.7.1.10.5.2
Carbon monoxide detectors required	Added requirement of carbon monoxide (CO) detectors will reduce exposures to CO in enclosed facilities.	Design and Construction: 4.6.4.4 through 4.6.4.4.2
Light shields or shatter proof bulbs required for lighting	This additional specification will prevent electrical injuries.	Design and Construction: 4.6.3.2.4
Ground-fault circuit interrupter used and tested monthly	Limits use of extension cords and adds procedure for maintaining electrical systems, improving safety by preventing electrical injuries.	Design and Construction: 5.6.3.3.1 through 5.6.3.3.2
Emergency exits labeled	This update makes emergency exits more visible and ensures access to emergency exit routes.	Design and Construction: 4.6.6 Operations and Maintenance: 5.6.6.1
All pipes and plumbing labeled with flow direction and purpose	Adding these requirements will aid in increasing recirculation and filtering, ultimately reducing costs.	Design and Construction: 4.9.1.5.1 through 4.9.1.5.3.2
Preventative maintenance plan / schedule created and used	This update will encourage operators to inspect equipment and pool for damage and will serve as a resource for new/incoming operators.	Operations and Maintenance: 5.4.2.1 through 5.4.2.2.4.1

Proposed Updates by Kansas City	Justification	MAHC Section
		Policies and Management: 6.4.1.2.1