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## It's All About the Return on Investment: The Model Aquatic Health Code

**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 this column, EHSB and guest authors from across CDC will highlight a variety of concerns, opportunities, challenges, and successes that we all share in environmental public health. EHSB's objective is to strengthen the role of state, local, tribal, and national environmental health programs and professionals to anticipate, identify, and respond to adverse environmental exposures and the consequences of these exposures for human health.

The conclusions in this article are those of the author(s) and do not necessarily represent the views of CDC.

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An excellent return on investment (ROI) is something each of us personally strives for financially. But shouldn't we, as public health professionals, also strive to maximize ROI when preventing and controlling illness and injury?

In 2005, local, state, and federal public health officials and representatives from the aquatic sector met in Atlanta to discuss and develop a strategy to tackle the increasing incidence of recreational water-associated outbreaks, particularly cryptosporidiosis outbreaks associated with public pools (Hlavsa et al., 2014). Public health and the aquatics sector quickly reached consensus. They identified the lack of uniform national standards for the design, construction, operation, and maintenance

of public pools as the key barrier to preventing outbreaks and called on the Centers for Disease Control and Prevention (CDC) to lead development of national guidance.

For the next seven years, CDC and New York State Department of Health spearheaded a national, multi-partner effort to create the Model Aquatic Health Code (MAHC; [www.cdc.gov/healthywater/swimming/pools/mahc/index.html](http://www.cdc.gov/healthywater/swimming/pools/mahc/index.html)). In August 2014, the first edition of the MAHC was released. This 316-page resource is based on the latest science and best practices to maximize prevention of recreational water-associated outbreaks, pool chemical-associated health events, and drowning. The accompanying 371-page annex provides the rationale behind the guidance.

The MAHC and its annex represent the culmination of the hard work of more than 150 public health, aquatic sector, and academic volunteers and their response to 4,407 public comments, of which 72% were accepted.

So where do we go from here? Together, we need to set up systems to assess the MAHC's ROI and use system data to maximize the MAHC's ability to provide long-term public health dividends.

### Tracking MAHC Adoption

MAHC items must be voluntarily adopted before public health can assess their benefits. The latter calls for tracking MAHC adoption and is easier said than done given state and local jurisdictions' varying processes and timelines to create, adopt, and update code. But it is a challenge worth undertaking. CDC has worked carefully over the past two years to develop an algorithm designed to measure uptake of key MAHC code items. Through a critical partnership with CDC's Public Health Law Program, the groundwork for tracking MAHC adoption was laid in 2013; baseline data were collected in 2014; and prospective tracking began January 1, 2015. Data from the MAHC adoption tracking system will provide MAHC stakeholders with a snapshot of MAHC adoption. For example, the adoption tracking system will assess adoption of secondary disinfection requirements for increased risk aquatic venues (Table 1). Note that most design and construction code items apply to only newly constructed or significantly renovated pools.

### Tracking MAHC's Impact on Public Pools

In contrast to the data collection effort to assess MAHC adoption, the data collection effort to assess MAHC's impact on public pools

TABLE 1

**Tracking Model Aquatic Health Code (MAHC) Adoption: Examples**

Key MAHC Provision	What Is the Tracking System Specifically Examining?
“Increased Risk Aquatic Venue” means an aquatic venue, which due to its intrinsic characteristics and intended users has a greater likelihood of affecting the health of the bathers of that venue by being at increased risk for microbial contamination (e.g., by children less than five years old) or being used by people that may be more susceptible to infection (e.g., therapy patients with open wounds). Examples of increased risk aquatic venues include spray pads, wading pools, and other aquatic venues designed for children less than five years old as well as therapy pools.	Does the code define “increased risk aquatic venues” (e.g., pools designed for diaper-aged children and therapy pools)?
The new construction or substantial alteration of the following increased risk aquatic venues shall be required to use a secondary disinfection system after adoption of this code: 1) aquatics venues designed primarily for children under five years old, such as a. wading pools, b. interactive water play venues with no standing water, and 2) therapy pools.	Is secondary disinfection (e.g., UV, ozone) required for “increased risk aquatic venues”?

TABLE 2

**Tracking the Model Aquatic Health Code’s Impact on Public Pools: Examples**

Prevention of	What Inspection Data Is the Tracking System Specifically Examining?
Recreational water–associated outbreaks	<ul style="list-style-type: none"> <li>• Proper disinfectant level</li> <li>• pH 7.2–7.8</li> <li>• Automated chemical feeder: in good repair and operable</li> <li>• Recirculation pump and filter: approved, in good repair, and operating</li> <li>• Qualified operator or responsible supervisor on site</li> </ul>
Pool chemical–associated health events	<ul style="list-style-type: none"> <li>• Pool chemicals labeled, stored safely, and secured</li> </ul>
Drowning	<ul style="list-style-type: none"> <li>• Enclosure: fencing, walls, gates, and doors in good repair with self-closing and latching gates or doors</li> <li>• Water clear, main drain visible</li> <li>• Appropriate safety equipment present and in good repair</li> <li>• Qualified lifeguards and/or adequately staffed</li> </ul>

is more straightforward. The latter can be accomplished using data state and local environmental health specialists collect during public pool inspections. CDC is collaborating with environmental health colleagues in the top five public pool states and their respective top five public pool counties or cities. Analyses of inspection data will focus on inspection items likely to result in immediate closure, across collaborating jurisdictions, because violations of the corresponding standard could lead to an outbreak, pool chemical–associated

health event, or drowning (Table 2). Previous analyses of inspection data across jurisdictions have yielded powerful public health decision-making data (Centers for Disease Control and Prevention, 2010).

**Tracking MAHC’s Impact on Public Health and Optimizing It**

CDC will also continue to track long-term outcomes such as outbreaks, pool chemical–associated injuries, and drowning at public pools, given that decreased incidence of ill-

ness and injury is the MAHC’s ultimate ROI. In the interim, data from the MAHC adoption and pool inspection tracking systems and the latest available scientific reports will be used to optimize the MAHC. To expedite this process, the nonprofit Conference for the Model Aquatic Health Code (CMAHC; [www.cmahc.org](http://www.cmahc.org)) has been created and tasked with relaying national input on needed MAHC changes back to CDC. To accomplish this, the CMAHC will hold a biennial conference to deliberate and vote on proposed changes to the MAHC; the first CMAHC conference will be held October 6–7 in Phoenix. The CMAHC’s role in driving MAHC improvements makes it imperative that public health, the aquatics sector, and consumer groups become CMAHC members so that all stakeholder voices are at the table. Joining the CMAHC ([www.cmahc.org/getinvolved.php](http://www.cmahc.org/getinvolved.php)) and making public health’s voice heard is the next step in providing healthy and safe experiences at public pools for everyone and increasing the return on what we have all invested and will continue to invest in the MAHC. 🐬

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