

Implementing the Model Aquatic Health Code at the Local Level

The Pueblo County
Experience

NACCHOSM

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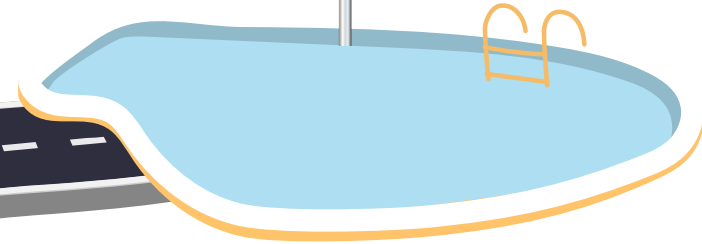


Implementation and Enforcement



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Pueblo County's MAHC Implementation Roadmap



Background

Pueblo County is located in southeast Colorado and is home to the city of Pueblo, the 9th largest city in Colorado. The [Pueblo Department of Public Health and Environment](#) (PDPHE) Recreational Water program oversees 48 total facilities and 75 total water bodies, including 56 pools, 14 spas, and five fountains. Prior to implementing the Model Aquatic Health Code, the swimming pool and mineral bath regulations in Pueblo County were last updated in 1994.

First published by the Centers for Disease Control and Prevention (CDC) in 2014, the [Model Aquatic Health Code](#) (MAHC) is a set of guidelines intended to prevent injury and illness at public aquatic venues, such as pools, hot tubs, and splash pads. It was created in a collaborative effort between public health officials and aquatic sectors and seeks to reduce the health risks of aquatic venues, such as drowning, swimming-related disease outbreaks, and pool chemical injuries. These guidelines are voluntary – jurisdictions can choose to adopt all or parts of the MAHC. However, there are often barriers that exist that prevent the adoption from happening. The most significant barriers include costs (hiring and training staff, acquiring tools and technology to fulfill new code standards), complications or pushback from stakeholders and partners, and the time and effort required to complete adoption and implementation.

The MAHC is updated every three years through a process managed by the Council for the Model Aquatic Health Code (CMAHC), a voluntary organization established to keep up with the latest advancements in the aquatics sector. The update process involves a change request submission period from the public and a vote on the change request by members of the CMAHC.

PDPHE is one of very few local jurisdictions in the country that has adopted the MAHC in its entirety, with implementation of the new code beginning on January 1, 2022. Having gone through the adoption and implementation process, the team at the PDPHE Recreational Water Program has amassed a wealth of knowledge and lessons learned from the process.

This report seeks to share PDPHE's MAHC adoption and implementation experience, from the early catalyst event to present day progress, so that other local health departments can learn and consider undergoing a similar process.



Key Takeaways

- Adopting the Model Aquatic Health Code (MAHC) led to higher safety standards and fewer closures.
 - The Pueblo County Department of Public Health and Environment found that facilities without surveyed MAHC equipment were **three times more likely** to have a closure.
 - Fewer closures benefit the community, the health department, and pool operators who depend on revenue generated from their facilities.
- State-level backing, policies, and support were instrumental in the adoption process.
- Stakeholders played a valuable role in implementation, and the use of presentations to educate and ask for feedback, creating inspection guides and other resources to operators to lessen their burden, and flexibility when enforcing violations contributed to a successful collaboration.
- It would be beneficial if future adopters of the MAHC could receive access to resources to support their transition (trainings for staff/inspectors, inspection guides, violation libraries, and communications for stakeholders).



Catalyst

In 2011, there was a *Cryptosporidiosis* outbreak in Huerfano County, CO. As a neighboring county and regional partner, PDPHE helped to control the spread of disease to prevent illness from reaching Pueblo County. A few years later in 2013, there was a *Legionella* outbreak in Pueblo County at a hotel pool. Although there were no fatalities, three people became very ill.

In 2016, Pueblo County experienced its worst aquatic health scenario, with multiple drowning incidents. Three individuals drowned in a mobile home park pool. All three of these individuals were minors - one individual was a babysitter and two were children.

To mitigate these incidents, PDPHE looked into the MAHC for guidance on improved aquatic health practices. Since this guidance is broken down into sections, with clear justification for those regulations and rules, the MAHC code provides an avenue to educate not only the health department, but also partners involved in the adoption process.

Additionally, the push for updated regulations grew out of a need to revamp the Recreational Water Program in Pueblo County in general. Local regulations had not been updated since 1994, so PDPHE determined there was a need for an updated version that would be based off current data technology and science. Some of the parameters in the old regulations were outdated or based solely on water chemistry, rather than a more a holistic view of aquatic health.

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Timeline

- ★ *Cryptosporidium* response in 2011.
- ★ *Legionella* outbreak in 2013.
- ★ Accidental drowning leading to the deaths of three individuals in 2016.
- ★ Local regulations hadn't been updated since 1994.
- ★ Work groups in Colorado highlighted need for regulation changes.



Adoption

Regulation

PDPHE was awarded the CDC Environmental Health Capacity Grant (EHC) for September 2020 to 2025, which prioritized developing a comprehensive, effective, and safe recreational water program. This grant allowed Pueblo County to assess its aquatic safety program as a whole, develop performance measures for the adoption process, and allocate a designated staff member to carry out this work.

The MAHC guidelines are structured, detailed, and divided into clear sections. Since Pueblo County's regulation framework was outdated and written in paragraph format, they decided to use the MAHC as their foundation, and add in any important features from their local regulations.

Plan Development

Though interest in revising aquatic health regulations began in 2018 after reviewing the third edition MAHC, the official adoption process started in 2020 when PDPHE received the CDC EHC grant. The process took two years from start of the work to implementation. In February of 2021, the Pueblo County Board of Health requested a cost-benefit analysis to see what the proposed MAHC equipment and changes would cost the operators. It took PDPHE a few months to develop the survey and field it to pool operators. The inspector from the local health department reminded operators to fill out the survey during inspections and through email reminders.

★ Public hearing on adoption; determining which codes should be adopted.

★ State Board of Health allow local governments to adopt MAHC by reference (December 2020).*

★ Presentation to Board of Health for feedback and asked for a cost-benefit analysis (February 2021).

★ Newsletters, emails, and physical mail notifying operators and surveys to understand operators' perspectives.

Once the surveys were collected, the results were presented to the Board of Health in June of 2021. The results found that the majority of pool facilities in Pueblo County would be able to cover the cost of MAHC-related equipment upgrades within a year of MAHC adoption. For the facilities that would not be able to cover the costs within that timeframe, plans were made to provide them with either 1) more time to complete equipment upgrades, or 2) a variance to continue use of current equipment with added requirements to ensure swimming safety. After presentation of these results, PDPHE was approved to move forward with this process.

Some aspects of the MAHC were not adopted into the new guidance report. These areas included sections that were redundant, in which case they were consolidated. Other areas the health department did not include were regulations and enforcement action that were not allowed due to state statute limitations or regulations that they were not yet equipped to take on at the time. For example, there may have been equipment or training that would be difficult to implement at the time but could be adopted at some point in the future.

The PDPHE environmental health team developed a plan review decision tree, which prioritized the need for a plan review based on substantial alterations, non-substantial alterations, and emergency replacements, as well as their respective timeframes. Additionally, PDPHE created checklists and templates for various scenarios including safety equipment for lifeguard facilities versus non-lifeguard facilities, inclement weather protocol, and transition guides for pool operators.

After multiple reiterations of the report, the final pool code draft adopting the MAHC was created in November 2021 and would be implemented starting January 2022.

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★ Results from analysis and drafts (June 2021-November 2021).

★ Identifying parts that would be adopted.



Implementation

The MAHC implementation started on January 1, 2022. The health department gave a few months for facilities to transition to the new regulations while PDPHE fine-tuned the new violation library and inspection report with inspections starting in April 2022. Since lifeguards and safety equipment had not been regulated in Pueblo County since 1994, there was extra leniency on some of these imminent health hazards, and operators were given a few extra days to correct those violations in instances when public safety would not be compromised by an extension for correcting that imminent health hazard.

PDPHE held several stakeholder meetings with the pool operators to assess challenges and barriers that could arise with the new code implementation. After initial meetings with stakeholders, management, and legal teams, the new codebook was shown to the Board of Health to inform them of the new regulations, the rationale behind those changes, and potential barriers to implementation.

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- ★ Utilizing established resources/documents as guidelines to create new and internal resources/templates to aid with inspections and implementation.
- ★ Update the community of changes through presentations.
- ★ Train additional staff to support implementation.
- ★ Meeting with other counties.
- ★ Newsletters, emails, and physical mail notifying operators and establishing a violation library to house new and expanded list of violations and a new inspection report form.

Stakeholders

PDPHE developed resources and guidance for the transition, but they were also open to feedback and potential edits for implementation from stakeholders. They found that most of the time, stakeholders were flexible to make the proposed changes and adhere to PDPHE's recommendations; however, some facilities with above average closures were not participating in feedback or implementing these changes. Participation from those stakeholders would have been ideal as they were the facilities that required the most updates and education regarding the MAHC.

To make this transition as seamless as possible for pool facilities, PDPHE became a helpful partner and resource. If facilities were not able to implement a change due to undue financial hardship, the health department created a compliance agreement for their facility to adhere to the code by a designated timeframe. While the MAHC had an allowance for specific equipment to be implemented "within one year of adoption," some facilities needed additional time to make upgrades or purchase new equipment, such as automated controllers or chemical feeders.

PDPHE also allowed the use of a variance when a facility provided evidence of undue financial hardship due to implementing regulation requirements, if the facility could still meet the intent of the regulation to ensure public safety. For example, if a facility did not have a separate room for recirculation equipment and a room for chemicals, the facility was allowed to store those items in one room as long as they agreed to additional safety requirements listed in the MAHC for that scenario.

- ★ Educating operators on codes when clarification was needed.
- ★ Connecting operators with needed resources and lessening the financial burden when possible (i.e., providing safety tools/products).
- ★ Collaboration with operators via compliance agreements and variances, where applicable, to ensure necessary changes are made without penalizing the operators unnecessarily.

Additionally, the health department was able to use grant funds to provide temporary resources to facilities for two of the most prominent health hazards, as this process was brand new to pool operators. This aid was not only a helpful gesture to stakeholders, but it also promoted safety for heavily cited hazards before the facilities could sustain these resources on their own. This flexibility and support from PDPHE allowed for open communication and solution-oriented processes between the health department and stakeholders.

PDPHE also created presentations for pool operators that discussed the biggest changes in the regulations that they would see. This included violation data, compliance agreements, variances, and open dialogue for questions so operators felt prepared and ready for the MAHC adoption. Additionally, PDPHE conducted pre- and post-stakeholder meetings and surveys were conducted before and after these meetings to get feedback and ensure that operator needs were identified, and that they felt confident to implement changes at their facility.

Pueblo County's MAHC Implementation Toolkit

The toolkit contains downloadable resources used by PDPHE following their adoption and implementation of the CDC's Model Aquatic Health Code. This may be useful for local health departments looking to undergo a similar process. Resources include:

- Board of Health presentations,
- Stakeholder presentations and newsletters,
- Inspection forms,
- Checklists, and more.

https://bit.ly/PDPHE_Toolkit



Enforcement

Though there was some leniency with MAHC implementation, regulations still needed to be implemented. If there was not a compliance agreement or safe option for a variance, the facility needed to adhere to codes during the time of inspection. If codes regarding imminent health hazards were not met, the venue was closed. Since PDPHE did not have a state statute or regulation on civil penalties that they could use for continued non-compliance, they decided to charge a facility a follow-up inspection fee each time an inspector conducted non-routine inspections, which replicated the effect and cost of a civil penalty. Overall, there was an incentive to fix any issues and adhere to codes so that the venue could remain open, and the facility would not be charged for multiple inspector visits.

This method of enforcement was shown to have positive results, with facilities working through their challenges with the health department and trying to be proactive against future hazards.

To date, PDPHE has seen a 50% decrease in the list of highly cited violations, with the list decreasing from 14 hazards of concern to seven since inspection data was initially analyzed in September 2022.

★ Inspections begin April 2022. Initial increase in number of citations/violations.

★ Positive changes in the percentage of violations/hazards of concern leading to safer facilities.

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Engagement

At stakeholder meetings, PDPHE presented the data they were seeing, collected feedback from pool operators, and identified potential interventions as a team. Most stakeholders were willing to follow the interventions PDPHE proposed and PDPHE welcomed any feedback given. Though there was not much participation in these meetings, stakeholders were willing to enact those changes and followed PDPHE guidance.

Additionally, they had several stakeholder meetings to assess the challenges and barriers these new regulations would put on pool operators if the code was implemented. By keeping an open dialogue, they were able to identify issues during the adoption process and work closely with their stakeholders to form agreements, partnerships, and clarifications to the code as needed.

Contextual Factors and Resources

External

The Colorado State Board of Health incorporated the MAHC by reference* into the state regulations on December 15, 2020, which allowed local jurisdictions to adopt the MAHC locally, if they chose. Since PDPHE was starting the MAHC adoption process from scratch, there were certain resources that were helpful templates and guides. This included the original regulations from 1994, CDC resources, such as the 3rd edition MAHC inspection form, and templates from state health departments that previously implemented the MAHC, like New Mexico and Rhode Island. They looked at the Rhode Island Department of Health's 2016 MAHC plan review application, which they used as a template for their own. To further edit and improve their MAHC draft, inspectors reviewed the codebook and added in observations and comments for areas of concern or clarification. These areas of concern were discussed as a team and with the PDPHE legal team.

The [2018 version](#) of the MAHC Cross-reference Guide for Aquatic Facility Inspections was also used to inform PDPHE's violation library in *HS GovTech*, where the department's inspection data is stored. PDPHE combined aspects of the 3rd edition MAHC inspection form and their Retail Food inspection form to create their MAHC inspection report form.

**Incorporation by reference* means that the MAHC was incorporated into the Colorado Swimming Pools and Mineral Baths Regulation without explicitly including the entire text of the MAHC within the document. Adopted in 2020, the current Colorado state regulations incorporate the 2018 3rd edition of the MAHC.

In addition to documenting resources, partners were also helpful sources of information. PDPHE's partnered work with other Colorado local health departments (LHDs) and representatives from the Pool Training Academy informed which pieces would be added to their MAHC draft as well as changes in inspection procedures that needed to occur internally. The group of Colorado LHDs, along with the Colorado Directors of Environmental Health, and the Colorado Department of Public Health and Environment, were instrumental in getting the MAHC incorporated by reference into the state regulations which allowed PDPHE to adopt the MAHC locally. The work completed by these partner agencies was extremely beneficial and increased support from PDPHE's Board of Health since there was work occurring statewide to make the MAHC an option for local jurisdictions.

Internal

As mentioned, PDPHE leveraged available resources and knowledgeable partners to inform their work and necessary documents; however, they had to create many new internal templates, guides, and other resources. Some of these documents include a MAHC equipment and chemical inventory log, MAHC inspection guides for inspectors, and an inspection report form. These resources encouraged a more seamless transition for both operators and inspectors who were both unfamiliar with the new and longer list of potential codes/violations. For example, the equipment and inventory logs were created internally and were provided to operators to lessen the burden of creating their own form. Providing a standard form to operators also ensured they documented the correct equipment and chemical criteria so PDPHE inspectors would have more efficient inspections when those documents were reviewed.

Aside from the internal creation of documents, PDPHE shared several contextual factors impacting their experience in the MAHC adoption process.

One of the most significant factors is the size of their team and jurisdiction. The jurisdiction is on the smaller side compared to other counties and PDPHE also operate with a smaller-sized team. PDPHE noted that this made their process more manageable even though they didn't have many staff members to work on the MAHC adoption. Additionally, the availability of dedicated CDC funding expedited the adoption. Without these funds, their timeline would have extended due to their program being funded mainly through inspection fees, which decreased greatly during the COVID-19 pandemic.

Challenges

There were two main challenges during the MAHC adoption and implementation process. The first challenge was working around the COVID-19 pandemic and having the capacity to move this process along. Most of the staff were working remotely during the pandemic or were being pulled into COVID-19-related responsibilities. With initial stakeholder meetings being in-person, attendance dropped and did not pick back up when meetings went virtual since shareholders' priority during that time was keeping their business afloat and running.

The second challenge was developing tools and guidance from scratch. Though there were various resources to look at, there was not a concise template that made adoption and implementation a seamless process. Additionally, during the enforcement process, there weren't any state statutes or regulations that detailed civil penalties for operators who did not comply with the codebook, which was an issue with the old regulations they followed prior to the MAHC adoption.



Measuring Impact

Chemical Violations

PDPHE has seen a positive impact after implementing the MAHC guidelines. Pool and spa closures resulting from the lack of required safety equipment and depth markers and “No Diving” markers have decreased with PDPHE providing some resources to facilities to assist in correction of these violations. Violations due to pH imbalances have also gone down, with a 30% decrease in pH violations since 2021. These violations have decreased largely due to the new guidelines requiring automatic feeders and the widening of an acceptable pH range. These guidelines around chemical equipment have not only lowered the number of pH-related violations, but they have also lowered the burden for pool operators to maintain and correct chemical issues. This is especially helpful for maintenance workers at hotels or facilities where pool safety may not be their number one priority. There is still room for improvement, with the pool closure rate at 25% and the spa closure rate at 39%; PDPHE hopes to reach the national closure averages of 13-14%. Using positive data surrounding chemical equipment that was collected during a cost-benefit analysis survey, PDPHE was able to present their findings to their Board of Health and stakeholders to emphasize the importance and benefit of these new guidelines.

- ★ Additional data analyses reveal decline in closures and prevalence of violations.
- ★ Continuous program improvement through additional data analyses, subsequent interventions, and an overall program evaluation.

MAHC Equipment

A significant piece of data that PDPHE found was the relationship between facilities that had implemented MAHC equipment and the rate of facility closures. When operators were asked if they had implemented MAHC equipment, they found that facilities without the surveyed MAHC equipment were three times more likely to have a closure. This data was then used at future meetings with the Board of Health to promote adoption of the MAHC and the specific equipment requirements in the code.

Inspections/Codes

Adopting the MAHC expanded their violation categories, which increased the number of codes and potential violations during inspections. These robust codes doubled the data points collected on their inspection report form, which resulted in higher quality data and higher safety standards. Some of these codes included making sure emergency phones are well marked, the presence of safety equipment near the venue, and more parameters surrounding lifeguards. PDPHE noted that precautions like these can have a large-scale impact, especially during emergencies and chaotic situations.

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Future Plans

Looking forward, PDPHE hopes to be a helpful resource for other jurisdictions looking to adopt the MAHC. Over the last three months, the Colorado Department of Public Health and Environment has met with PDPHE to gain advice and recommendations for adopting, implementing, and enforcing these new guidelines at a state level.

If time permits, PDPHE may explore options to modify the Colorado state statute to include apartment complexes and condos. Though they are currently not allowed to inspect these areas due to the state statute, there is an opportunity to educate pool operators at these facilities through voluntary education opportunities to ensure there is an awareness around public safety at recreational water venues.

In addition, they are planning to create a Basic Recreational Water Safety class they could offer to operators and potentially to residential pool owners looking to operate their pools safely. This class would be a pre-CPO level course, with condensed information that is covered in Chapter 6 of the MAHC guidelines, such as calculating pool volume, safe handling and storage of chemicals, and the proper uses of PPE when manually adding chemicals to a venue. This course would be helpful for public pool operators that have other essential duties, such as those who work in hotels where the pool facility may not be the primary focus of that person's daily duties. A CPO would still be required to be on staff, but this pre-CPO course would ensure pool handlers are knowledgeable and skilled.

- ★ Share experience and act as model for other states/counties trying to implement the MAHC.
- ★ Community-wide study to assess the impact of MAHC adoption.

Resources

Local health departments interested in learning more about, and using the MAHC, to update their pool codes are encouraged to access some of the resources below.

MAHC Implementation Toolkit

[Download NACCHO's toolkit](#) with resources developed by Pueblo County during their MAHC implementation. Resources include stakeholder presentations, inspection reports, facilities survey, a draft of Pueblo's updated pool code, and more.

MAHC Network (A NACCHO-CDC Initiative)

Receive updates on the code, gain access to and provide input on newly developed resources, and join webinars featuring the code and its users. Sign up for free at naccho.org/mahc.

MAHC Network Webinars

[Access](#) more than 30 webinars available on demand on NACCHO's YouTube Channel on tools, resources, and best practices related to the MAHC.

CDC's MAHC Tools and Training

[Explore](#) CDC's tools and trainings on the MAHC, including example forms, mini-MAHCs on specific aquatic health topics, aquatic facility protocols, and more.

Resources

CDC Healthy Swimming Communications Resources

[Access](#) CDC communications resources such as factsheets and infographics related to Healthy Swimming.

Council for the Model Aquatic Health Code (CMAHC) Resources

[Check out](#) CMAHC's website to keep up to date on the latest MAHC news, submit change requests for future editions of the MAHC, and explore MAHC-related resources.

NEHA's SAFE-D Best Practices Guide

[View](#) the National Environmental Health Association's Standard for Aquatic Facility Environments – Data (SAFE-D) model, a new model that allows jurisdictions to share and compare aquatic facility inspection data from numerous agencies, designed based on critical fields within the MAHC.

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The mission of the National Association of County and City Health Officials (NACCHO) is to improve the health of communities by strengthening and advocating for local health departments.

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