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Here Come the Surf Venues and Artificial Swimming Lagoons

Editor's Note: The National Environmental Health Association 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 this column on environmental health services from the Centers for Disease Control and Prevention (CDC) in every issue of the *Journal*.

In these columns, authors from CDC's Water, Food, and Environmental Health Services Branch, as well as guest authors, will share tools, resources, and guidance for environmental health practitioners. The conclusions in these columns are those of the author(s) and do not necessarily represent the official position of CDC.

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In September 2018, the Centers for Disease Control and Prevention (CDC) and state and local public health partners in Texas investigated a fatal case of *Naegleria fowleri* infection likely associated with a surf venue (Miko et al., 2023). Investigators found that the surf venue water was not recirculated or filtered, and water quality testing and treatment were not documented. *N. fowleri* can infect people when water containing the amoeba enters the nose and then travels up the olfactory nerve and into the brain. Once in the brain, trophozoites (the infective life stage) destroy brain tissue, causing primary amoebic meningoencephalitis (PAM). While PAM rarely occurs, it is over 97% fatal.

N. fowleri can be found in untreated recreational water venues (e.g., lakes, rivers, hot springs), particularly in the sediment at the

bottom. During 1962–2021, of the 154 known cases of PAM in the U.S., 85 (55%) were associated with such venues and 7 (5%) with aquatic venues (e.g., pools, splash pads, surf venues). Linking an aquatic venue, or a venue with treated (e.g., filtered and chlorinated) water, to a PAM case is a red flag for inadequate water treatment in that aquatic venue.

Surf venues are novel, large format aquatic venues dedicated to surfing on a surfboard—or other similar surfing and wave riding devices—and have equipment and a floor shaped to generate traveling and surfable waves that mimic those in oceans. The CDC Model Aquatic Health Code (MAHC) provides guidance to help prevent public aquatic venue-associated illness and injury through venue design, construction, operation, and management. Because the risk of illness and

injury associated with surf venues is inherently different from that associated with other aquatic venues, a change request proposing inclusion of text specific to surf venues was submitted for the fourth edition of the 2023 MAHC. It was not, however, approved.

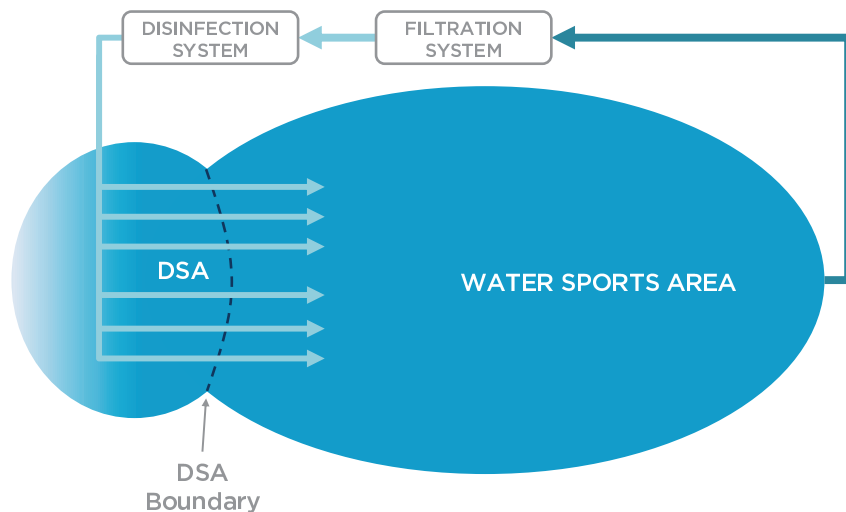
With multiple surf venues being planned before the release of the fifth edition of the MAHC, the Council for the Model Aquatic Health Code (CMAHC), a key CDC MAHC partner, reconvened its surf venue ad hoc committee in August 2022. The ad hoc committee is made up of public health officials and representatives from across the surf venue sector. Committee members have been categorizing each recommendation in the MAHC as “properly addresses surf venues,” “is not applicable,” or “needs revision to properly address surf venues.” The committee is focusing on the recommendations in the “needs revision” category.

Based on these discussions, CDC has been drafting interim guidance and the committee will then develop and submit a change request that proposes inclusion of text specific to surf venues for the fifth edition of the MAHC. To prevent injuries, discussion topics have included revising: 1) MAHC recommendations for slip-resistant finish where waves break in less than 3 ft of water, 2) depth marker recommendations for where water depths change substantially, and 3) lighting recommendations given that light basin color and shallow water combined can cause glare.

Artificial swimming lagoons (ASLs) are being similarly addressed with support from the CMAHC artificial swimming lagoon ad hoc committee. ASLs are novel, large-format (up to hundreds of millions of gallons of

FIGURE 1

Diagram of an Artificial Swimming Lagoon



Note. Artificial swimming lagoons combine swimming and nonswimming activities into one venue, which pose challenges for keeping water clean and healthy for swimmers. DSA = designated swimming area.

water) aquatic venues designed to mimic a natural lagoon. ASLs include one or more designated swimming areas (DSAs) for traditional aquatic venue activities (e.g., swimming, wading). The rest of the lagoon—the water sports area—is designated for non-swimming aquatic activities such as kayaking and sail boating (Figure 1). The completely artificial environments, including artificial bottoms, simultaneously have clear water giving the appearance of a pool and can be several acres like a pond or lake.

The challenges with developing guidance for ASLs stem from the fact that two types of recreational water venues (i.e., an aquatic venue and an untreated recreational water venue), each designated for different purposes, share water. Areas designated for swimming will need to be monitored and regulated as aquatic venues, in which water is filtered and disinfected. But most of the venue will be open water for nonswimming aquatic activities and not subject to the same water quality

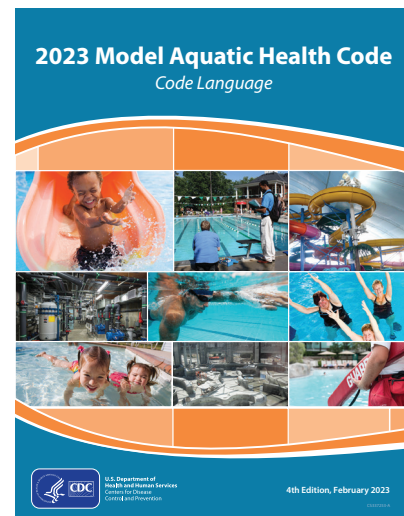
requirements. Open water will need microbiological water quality monitoring as conducted at untreated recreational water venues with freshwater. The ad hoc committee also focused on treated water renewal, or displacement (rather than turnover time in DSAs); restricted access to DSAs to prevent unauthorized entry; water clarity maintenance throughout the entire ASL; and lifeguarding.

CDC posted the fourth edition of the 2023 MAHC in February on its MAHC website at www.cdc.gov/mahc (Figure 2). CDC will also post interim guidance for surf venues and ASLs later this year on its Healthy Swimming website at www.cdc.gov/healthyswimming. CMAHC will accept change requests for the fifth edition of the MAHC from spring through fall 2023 and will hold the Vote on the Code Conference and the vote on change requests in early 2024. ✿

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FIGURE 2

Fourth Edition of the 2023 Model Aquatic Health Code



The latest edition of the Model Aquatic Health Code is now available. It includes updated guidance on preventing illness and injury associated with public aquatic venues, including preventing pathogen transmission, pool chemical injuries, spinal cord injuries, and drowning. You can explore the new edition at www.cdc.gov/mahc/editions/current.html.

ing and Zoonotic Infectious Diseases, Centers for Disease Control and Prevention, 1600 Clifton Road, MS H24-9, Atlanta, GA 30329. Email: acz3@cdc.gov.

Reference

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Did You Know?

According to the U.S. Census Bureau, there are more than 30 million swimmer visits each year in the U.S. We have a webpage of resources that can help you keep your communities safe, especially with the summer months approaching. Explore our recreational water resources at www.neha.org/recreational-waters.