

Agency Review and Recommendation to Address Illness, Injury, and Death Prevention at Public Aquatic Facilities



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**Virginia Department of Health
Office of Environmental Health Services**

Table of Contents

Executive Summary1

Introduction.....2

The Aquatic Industry and Virginia Burden.....3

 Drowning.....3

 Recreational Water-related Outbreaks3

 Health Disparities6

Public Pools in Virginia6

 Virginia Public Pool Regulations.....7

 Additional Health Disparities.....8

 Comparison between States9

 Regulatory and Legislative Background11

 Gaps in Health and Safety Protections for Virginia Public Pools.....12

 State Agency and Locality Impact14

 Relevant Stakeholders14

 Business Impact.....15

 Fiscal Implications15

Recommendations18

Conclusion19

References.....21

List of Acronyms

ANSI	American National Standards Institute
AOAP	Association of Aquatic Professionals
APSP	Association of Pool & Spa Professionals
CDC	Center for Disease Control and Prevention
CMAHC	Council for the Model Aquatic Health Code
CSTE	Council of State and Territorial Epidemiologists
HB669	House Bill 669
ICC	International Code Council®
ISPSC	International Swimming Pool and Spa Code
MAHC	Model Aquatic Health Code
NACCHO	National Association of County and City Health Officials
NEHA	National Environmental Health Association
NOIRA	Notice of Intended Regulatory Action
NSPF	National Swimming Pool Foundation
PHTA	Pool and Hot Tub Alliance
RWI	Recreational water illnesses
SES	Social-economic status
USBC	Virginia Uniform Statewide Building Code
VDH	Virginia Department of Health

Executive Summary

Public pools and other aquatic venues (including pools, splash pads, water slides, lazy rivers, etc.) invoke a sense of excitement as Virginians across the state enjoy these popular recreational activities that provide aquatic fun and exercise. But public pools and aquatic venues can also provide a danger to the lives of Virginians through aquatic facility-related drownings and recreational water illnesses. From 2016 to 2020, 428 people fatally drowned in Virginia. 13.6% of those drownings occurred in a pool (Office of the Chief Medical Examiner). During that same time, 2,758 visits were made to Virginia emergency rooms and urgent care facilities for pool related drowning, submersion, and injuries (not including visits associated with bathtubs or natural waters) (Office of Family Health Services). Recreational water illnesses (RWI) caused by *Cryptosporidium*, *Legionella*, norovirus, *Escherichia coli*, and *Giardia* are also associated with aquatic venues.

The Virginia Department of Health (VDH) regulates public pools through two chapters of Administrative Code: 12VAC5-460, *Regulations Governing Tourist Establishment Swimming Pools and Other Public Pools*, and 12VAC5-462, *Swimming Pool Regulations Governing the Posting of Water Quality Test Results*. 12VAC5-460 is limited to governing pools and aquatic venues at tourist establishment pools (hotels, campgrounds, and summer camps), while 12VAC5-462 governs all public pools (municipal, fitness center, neighborhood, apartment complex, and tourist establishment pools).

There have not been any successful acts of legislation related to Virginia state health regulations at public swimming pools in over three decades. In 1990, § 32.1-248.1 of the Code of Virginia was established to regulate water quality standards and the daily testing and public posting of specific water quality parameters at public pools. This mandate provided VDH limited authority over public pools, including only the oversight over the daily testing and posting of water quality parameters at public pools, and does not apply to aquatic venues with less than 24 inches of water depth (i.e. splash pads). Examples of hazards VDH is currently unable to regulate include water clarity (affecting the ability to see persons in distress underwater), fecal incidents in the water, availability of lifesaving equipment (a reaching pole to assist with a drowning in progress), chemical storage and handling, and the general safety hazards and cleanliness of a facility (algae, broken glass).

In addition to physical dangers associated with public pools and aquatic venues, there are also significant racial and ethnic group disparities in drowning rates in Virginia.

Current VDH regulations do not include injury prevention and safety risk strategies at public aquatic facilities that are not associated with permitted tourist establishments; this limitation may be putting the lives of those recreating in the Commonwealth at risk. In order to reduce injury and illness potential at these facilities, VDH is recommending that the agency be granted relevant authority and oversight of general operations, maintenance, management, and safety at public pools. Through such granted authority, the agency recommends that the scope and content of associated regulations be developed through stakeholder engagement.

Introduction

Drowning is a danger faced across the nation, claiming over 4,500 lives in 2020. Nationwide, drowning is one of the top ten causes of unintentional injury death for all age categories up to age 44, and it was the number one cause of unintentional injury death for children aged one to four years old in 2020 (Centers for Disease Control and Prevention, 2022). For children under the age of 15, the Consumer Product Safety Commission found that from 2018 to 2020 there were an estimated 6,200 pool or spa-related hospital emergency department visits for non-fatal drowning injuries each year, and from 2016 to 2018 there were a total of 397 pool or spa-related fatal drownings (Yang, 2021).

Recreational water illnesses (RWI) are another danger faced by those who use public pools and aquatic venues. *Cryptosporidium*, *Legionella*, norovirus, *Escherichia coli*, and *Giardia* and are commonly reported pathogens associated with aquatic venues.

RWI outbreaks are found in every region of the United States, including Virginia. A 2021 study analyzed data voluntarily reported from 36 states (including Virginia) and Washington D.C from 2015 to 2019. A total of 208 recreational water outbreaks were reported; 199 of those outbreaks were associated with public pools, hot tubs, and water playgrounds. Of these reported outbreaks, there were at least 3,646 cases of illness, 286 hospitalizations, and 13 deaths identified. Of these outbreaks, 49% were caused by *Cryptosporidium* and 42% were caused by *Legionella* (Hlavsa MC, Aluko SK, Miller AD, et al., 2021). This study highlights the prevalence of RWI outbreaks, and the need for regulatory standards to help prevent outbreak occurrences.

In a national survey of over 84,000 pool and spa inspections conducted in 2013, almost 79% of inspections identified at least one violation. In over 12% of inspections, a serious threat to human health was identified, and the inspection resulted in the immediate closure of the facility. These threats included improper disinfectant and pH levels, disinfection system violations, and deficiencies in fences and safety equipment (Hlavsa MC, Gerth TR, Collier SA, et al., 2016). Although these findings cannot be directly extrapolated to Virginia, they demonstrate the high impact of pool and aquatic venue operations on swimmer health and safety.

The Aquatic Industry and Virginia Burden

The aquatic industry has evolved over the years to include aquatic venues and services beyond that of traditional swimming pools and hot tubs. The term, “aquatic venue” has expanded to include not only pools and hot tubs, but also a variety of active and interactive venues including:

- Lazy rivers, or tubing pools or leisure rivers, include a manmade channel where water is moved by pumps to mimic a slow-moving river and transports bathers along a designated path, often atop a raft or inflatable device.
- Wave pools are large manmade pools that generate waves for the purpose of swimming and play; Surf pools generate waves that mimic the breaking of waves in the ocean for the purpose of surfing as a sport.

- Waterslide flumes and associated landing pools include the flume slide and pool area at the bottom of a waterslide flume; these flume slides are often very high and allow a bather to travel at an increased speed that requires a specific size and depth pool to receive the bather at the flume exit; these do not include an area of a pool where a playground style pool slide exists.
- Splash pads, or spray pads, are otherwise referred to as interactive “water playgrounds” and involve an activity area (indoor or outdoor) that sprays or jets water onto bathers. These interactive splash pads may not include areas of standing water as part of the play area.

There is inherent risk associated with any kind of aquatic activity that should be acknowledged and addressed when considering public health and safety of public aquatic facilities throughout the Commonwealth. It is essential that VDH adapt to the evolving state of the aquatic industry and consider the potential risk, and injury and prevention strategies, associated with the various types of aquatic venues present throughout Virginia.

Drowning

Virginians face a significant fatality burden when it comes to aquatic venue-related drownings. From 2016 to 2020, 428 people fatally drowned in Virginia, with 13.6% of those drownings occurring in pools. Of those who drowned, 48% were age 19 and younger and 29.3% were under the age of five (Office of the Chief Medical Examiner). A total of 2,263 potential life years were lost before the age of 75 due to drowning (Office of Family Health Services).

Fatal drowning is not the only burden faced by Virginians, as hospital and treatment costs and time for non-fatal drowning can be devastating to families. Between 2016 to 2020, 2,758 visits were made to Virginia emergency room and urgent care facilities for pool related drownings, submersion, and other injuries (not including visits associated with bathtubs or natural waters). Most visits (71%) occurred among children aged 0-17, with the highest incidence being among children 0-4 years old (Office of Epidemiology, 2022). There were a total of 139 inpatient hospitalizations for non-fatal drownings, 14% of which could be identified definitively as pool related. The total drowning-related treatment cost for Virginians was over \$1.1 million, with the average hospital/medical treatment charge being \$59,548.20 and the average length of hospital stay being 4.7 days (Office of the Chief Medical Examiner).

Recreational Water-related Outbreaks

Cryptosporidium and Legionella are disease-causing agents that may be present in water at public pools and aquatic venues and are common culprits that cause RWIs. Cryptosporidium is a parasite that is released through fecal events or is carried into the water through a small amount of fecal material present on the body of an infected person, or is introduced through non-potable water. It is spread to swimmers when they swallow water containing the parasite.

Cryptosporidium is the leading cause of waterborne illness in humans across the U.S and the causative agent of Cryptosporidiosis, an illness that can be deadly, especially to those with compromised immune systems (National Center for Centers for Disease Control and Prevention, 2022). Cryptosporidium can be difficult to kill and can be present even when a pool is properly

treated. It is known as “chlorine-tolerant”, as it can take 10.6 days for chlorine to kill at normal pool concentrations (Centers for Disease Control and Prevention, 2022).

Legionella is a bacterium that specifically grows best in warm water ranging from 77-108 degrees Fahrenheit. This bacteria’s affinity for warm water allows it to thrive in warm aquatic environments, like hot tubs. Legionella exposure can occur via aerosol, a potential pathway also common for jetted hot tubs, or aspiration of water containing Legionella, and can lead to the development of Legionnaires disease or Pontiac fever (together, these are described as Legionellosis) (National Center for Immunization and Respiratory Diseases, Division of Bacterial Diseases, 2021).

In Virginia, from 2007-2016, there were 976 reported Legionellosis cases. The 10-year trend of this data shows that Legionellosis case counts more than doubled, going from 61 reported cases in 2007 to 144 reported cases in 2016 (VDH Office of Epidemiology, 2022). A similar trend was observed in Cryptosporidiosis cases during the same 10-year period, with 1,424 reported Cryptosporidiosis cases. Again, Cryptosporidiosis cases more than doubled, going from 90 reported cases in 2007 to 244 reported cases in 2016 (VDH Office of Epidemiology, 2022). Preliminary data from 2017 to 2022 suggests a continuation of this trend. Without the ability to regulate public pool or aquatic venue conditions that are settings for these outbreaks, case counts may continue to follow a similar trend.

In 2019, an outbreak at a Virginia community pool resulted in over 90 total cases of Cryptosporidiosis, including confirmed and probable cases (VDH Office of Epidemiology, 2022). While this parasite is chlorine tolerant, more robust prevention strategies can help lessen the outbreak burden on Virginians. For example, educational signage discussing the dangers of swimming while sick can help educate people who would not know otherwise. Virginia’s current regulations do not require signage for pools, whereas the addition of regulatory requirements for signage would allow for greater protection of aquatic facility patrons in the Commonwealth from recreational water-related outbreaks, such as Cryptosporidiosis. In addition, current regulations do not require public pool or aquatic venue operators to respond to fecal or other contamination events in or around pools or aquatic venues, nor do they require the removal of fecal material or other contaminants, removal of bathers from the venue in the event of a contamination event, hyperchlorination (shock chlorination) of the aquatic venue to remediate a contamination, cleaning and disinfection of contaminated surfaces, or reporting contamination events to the local health department.

Splash pads are a type of aquatic venue that are growing in popularity throughout Virginia. Splash pads are interactive water features where water is sprayed or jetted on, around, or above bathers. To reduce the risk of drowning, splash pads are often not designed to hold standing water. They are a safe way for children less than 5 years to have water play with little to no risk for drowning. However, splash pads are not without risk as they are a potential pathway to infection from RWIs and may be especially dangerous to children. Children are more likely to experience gastrointestinal illnesses because of their behavior, including:

- they are more likely to swallow recreational water,
- have inadequate toileting skills that may increase the likelihood of fecal incidents, and

- are more likely to sit on jets and spray apparatuses.

In Virginia, any aquatic venue (not associated with a permitted tourist establishment facility) with less than a 24-inch basin does not meet the definition of a pool and is therefore not regulated by VDH on a statewide level. However, some Virginia localities have adopted and implemented local code that provides oversight of interactive water features with a goal of protecting some of the most vulnerable Virginians. These local codes may provide requirements for the following:

- Inspection of interactive water features to monitor water quality and disinfection needed to reduce the risk of waterborne illnesses,
- Identification of practices that put patrons at risk
- The requirement to document patterns of non-compliance, and
- The closure of facilities when unsafe conditions exist that leave patrons in harm's way if uncorrected.

In 2021, an outbreak at a Kansas splash pad reported 21 cases of shigellosis (a bacterial diarrheal illness caused by *Shigella*) and six cases of norovirus. Both shigella and norovirus can be transmitted by contaminated water. Like Virginia, Kansas does not regulate splash pads through state code. The outbreak report identified the need to provide adequate water disinfection and signage informing patrons to not get in the water if sick, to not sit on jets, or swallow water associated with splash pads (Aluko SK, Ishrati SS, Walker DC, et al., 2022).

In 2007, and 2008, splash pads were linked to cryptosporidiosis outbreaks in Tennessee and Texas, respectively (Hlavsa MC, Roberts VA, Anderson AR, et. al., 2011). Later, in 2021, a Texas splash pad was linked to a child's death resulting from primary amebic meningoencephalitis (PAM) caused by the amoeba *Naegleria fowleri* (Centers for Disease Control and Prevention, 2022).

In 2015, an outbreak of confirmed *Campylobacter jejune*, was suspected at a Virginia community splash pad. *Campylobacter jejune* is a bacterial infection that causes gastrointestinal illness and can be transmitted by contaminated water. The outbreak linked small children in two separate families with onset of illness around the same time, and whose only shared experience was use of a splash pad at the same location and day. (VDH Office of Epidemiology, 2015).

That same year, another Virginia community splash pad was identified as a potential link to two confirmed reports of Cryptosporidiosis. Local public health, through the authority of a local ordinance, worked with the facility to close to patrons, hyperchlorinate the water, and then safely reopen to the public (VDH, 2015). Had this event occurred in another jurisdiction without a local ordinance, local public health would not have had authority over the facility.

Proper disinfection, contamination response, and preventative measures such as educational signage and posting and enforcing rules of splash pad use can help reduce the occurrence of RWIs associated with splash pads and could be achieved through the establishment of regulatory standards for all types of aquatic venues, including splash pads.

Health Disparities

Significant racial and ethnic group disparities in drowning rates are seen on a national level and in Virginia. A CDC study on fatal unintentional drowning rates (<30 years old; 1999-2019) found American Indian or Alaska Native people died by drowning twice as often as people who were White, and Black people experienced a drowning rate of 1.5 times the rate for people who were White. Further, disparities in drowning death rates between non-Hispanic Black and White persons increased from 2005 to 2019. When only pool-related deaths were considered, Black persons over 6 years old drowned more often than other racial/ethnic groups; Black youth ages 10-14 years drowned 7.6 times the rate of white youth of the same age group in pools (Clemens T, Moreland B, Lee R., 2021).

Virginia's population is 20% Black but represented 26% of fatal pool drownings (all ages) from 2016 to 2020. In 2014 to 2016 cases analyzed by the State Child Fatality Review Team, White children accounted for the highest number of fatal drownings; however, Black children died at 1.44 times the rate of children who were White or Asian (0.61 per 100,000 Black children, compared to 0.42 and 0.43 per 100,000 for White and Asian children, respectively) (Office of the Chief Medical Examiner, 2019).

The racial segregation of pools, fewer pools open to Black communities, and the White flight from municipal pools after desegregation (and the resulting loss of municipal support for integrated public pools), have all acted to deny access to swimming and learning to swim to the Black community. The impact of segregation practices in the 1950s and 1960s continues to be a driver for limited water survival skills among Black children. A 2017 USA Swimming Foundation study found children are 4.3 times more likely to have good swimming ability when their parents do. Black children are more likely to have poor swimming ability than White children (64% vs. 40%), and Black children and their families are three times more afraid of drowning than White children (USA Swimming, 2017). Continued lack of access in many communities, and cultural history of fear of water due to lack of swimming skills, continue to influence swimming skills today and have been exacerbated by the COVID-19 pandemic.

Beyond factors of race, social determinants of health are strong influencers. Approximately 223,617, or 12.2% of children 0-17 years in Virginia, were living at or below 100% of the federal poverty level in in 2020 (The Annie E. Casey Foundation, 2021). These families are often faced with prioritizing critical needs such as shelter, food, and clothing over items such as swimming lessons.

Recognizing the impact of historical and modern inequities, and the disparate drowning outcomes experienced by Black Virginians, places further emphasis on the importance of taking steps to ensure preventative measures are in place to reduce the risk for all Virginians at all public swimming pools and aquatic venues.

Public Pools in Virginia

In 2017, a study was conducted to estimate the total number of public pools in Virginia. PkData is a market research firm that has tracked the swimming pool and hot tub industry since 1992 and serves as market research counsel to the Pool and Hot Tub Alliance (formerly known as the Association of Pool and Spa Professionals). The 2017 data is considered reliable and

comparable to today as it is pre-pandemic data from what may be considered normal economic and social conditions. The study estimated a total of 3,983 non-tourist public pools that would be affected by any legislative change contemplated in this report.¹ Such pools include multi-family (apartment complexes), community, clubs, parks and municipalities, schools and universities, medical facilities, water parks, and YMCA/fitness center pools.

Public pools and other aquatic venues in Virginia are not issued a permit, and current regulations do not specify an inspection frequency or minimum inspection requirement. As a result, many public pools that are not associated with a permitted establishment (hotel, campground, or summer camp) may only be inspected on a complaint-based frequency, or as local health departments determine based on risk and staffing availability.

Virginia Public Pool Regulations

The Virginia Department of Health regulates public pools through two chapters of Administrative Code:

1. 12VAC5-460, *Regulations Governing Tourist Establishment Swimming Pools and Other Public Pools* (herein referred to as “Regulation for Tourist Pools”), and
2. 12VAC5-462, *Swimming Pool Regulations Governing the Posting of Water Quality Test Results* (herein referred to as “Regulation for Water Quality”).

The Regulation for Tourist Pools (12VAC5-460) is authorized by Code of Virginia §§ 35.1-13, 35.1-16, and 35.1-17, and is limited to governing tourist establishment pools (hotels, campgrounds, and summer camps). The Regulation for Water Quality (12VAC5-462) governs all public pools (municipal, fitness center, neighborhood, apartment complex, and tourist tourist pools). The Regulation for Water Quality (12VAC5-462) was adopted through authorities vested in the Code of Virginia § 32.1-248.1, which directs the Board of Health to regulate the daily testing and public posting of specific water quality parameters at public pools. The specificity of § 32.1-248.1 limits the scope of the Regulation for Water Quality (12VAC5-462) to minimal illness-targeted provisions, such as water disinfection standards at public pools (and does not include other aquatic venues). Consequently, VDH does not have the authority to govern the maintenance or operation of pool or aquatic venue equipment and premises, safety features, facility staffing requirements, safety messaging and signage, or water contamination response at any municipal, fitness center, neighborhood, apartment complex pool, or any other non-tourist (non-hotel, campground, or summer camp) public aquatic venue used by people in Virginia.

In addition to limited protections, the Regulation for Water Quality (12VAC5-462) defines a public "swimming pool" or "pool" as any structure, basin chamber, or tank, located either indoors or outdoors, containing an artificial body of water intended to be used for swimming, wading, diving or recreational bathing, including spas and hot tubs, and having a water depth of 24 inches or more at any point. The water depth requirement thus restricts VDH's ability to regulate and monitor the safety of splash pads and other interactive water features that

¹ In observing differences between the VDH database and PkData counts for tourist pools (VDH database 1,145 v. PkData 1,419; VDH database counts of tourist pools are considered reliable), it is assumed that PkData is counting multiple discrete units at a facility as multiple pools, whereas the VDH database counts these as one facility. To adjust for this difference, PkData on non-tourist pools was adjusted by the factor observed for tourist pools, estimating there will be 3,983 pool facilities affected by the proposed legislative change (total of \$206,670 for inspections of these existing facilities if conducted in 2017; see later analysis).

do not collect or pool water. While the risk of drowning is reduced in such venues, the risk of RWIs remains and may be increased due to the age of the targeted clientele of these venues (children <5 years).

Code of Virginia § 36-98 specifies that design and construction criteria in the Virginia Uniform Statewide Building Code (USBC), maintained by the Department of Housing and Community Development, supersedes the regulations of other state agencies; however, other state agencies, such as VDH, may enforce maintenance and operational parameters related to design and construction elements of an aquatic venue, such as operational pumps, recirculation systems, and chemical disinfectant equipment. On July 14, 2014, the International Swimming Pool and Spa Code (ISPSC) was adopted by reference into the VUSBC. Typically, compliance with the USBC is determined by local building officials at the time of the pool's initial operation after construction and building officials do not typically make routine visits to public pools. With the current language of § 32.1-248.1 limiting the scope of the Regulation for Water Quality (12VAC5-462), VDH cannot require that pool or aquatic venue premises be maintained in safe and sanitary conditions unless the pool or venue is located at a hotel, campground, or summer camp and governed by the Regulation for Tourist Pools (12VAC5-460).

At least 19 Virginia localities have established local pool or aquatic venue ordinances to supplement state requirements; the majority of these localities are located in affluent and summer tourism-focused northern and eastern regions of the Commonwealth and cover an extreme minority of the Commonwealth's geography. These localities have recognized the need to protect bathers in their communities through more stringent protections that address water quality, water clarity, water contamination, and conditions of equipment and premises to address the health and safety of bathers in their communities. Should VDH have the authority to set standards for all public pools and aquatic venues, this would not affect the ability of these localities to have and enforce their local pool or aquatic venue codes, as long as they are equal to or more stringent than state requirements, as provided in § 35.1-9 (Local ordinance superseded; exceptions) of the Code of Virginia. Having Virginia pool and aquatic venue regulations updated to align with local and national standards will help provide all Virginia localities with comprehensive and consistent protective standards, further reducing the burden or confusion on businesses borne because of inconsistent regulation and application.

Additional Health Disparities

As discussed, Virginia localities with higher tourism rates and higher income per capita are the areas with local pool or aquatic venue ordinances in place. Localities that have less tourism revenue and lower income per capita often lack local ordinances for pools or aquatic venues, and therefore offer less protection than localities with a higher social-economic status (SES). This inequity exists because there is no statewide regulation to provide for all localities to have equal protections at public aquatic venues, including pools. Statewide regulations (vs. reliance on local ordinance) would allow low SES localities to have protections they would not originally have, as resources and funds may not be available to create and enforce local ordinances.

Low SES communities often lack water safety education due to the absence of the resources and funds necessary to implement or partake in these educational programs. Approximately 190,016 children in Virginia under the age of six live in a family whose income is less than twice the federal poverty level. (U.S. Census Bureau, 2021). These families are often

faced with prioritizing critical needs such as shelter, food, and clothing over items such as swimming lessons.

Comparisons between States

Out of the 26 states east of the Mississippi river, only four, including Virginia, do not have statewide standards for injury and drowning prevention. Alabama, Mississippi, and Vermont regulate public pools through county-based rules. All four states (including Virginia) contain counties who have local ordinances, but are all lacking equal, statewide regulations (Table 1). Virginia has locality-based rules in approximately 19 jurisdictions, representing a significant geographic minority of the state, which is why it is labeled as having a partial statewide regulatory authority of aquatic venues (Figure 1).

Table 1. Summary of states lacking statewide standards for injury and drowning prevention

State	Statewide Authority for Illness Prevention	Statewide Authority for Injury & Drowning Prevention	Authority Coverage
Alabama	No	No	County based rules
Mississippi	No	No	County based rules
Vermont	No	No	County based rules
Virginia	Yes	No	Partial Coverage: State & county rules, public, excludes single family residence pools

Source: VDH, 2022

Many states that have statewide regulatory authority for aquatic venues have comprehensive standards for injury, drowning, and illness prevention (Figure 2). For example, Florida regulations address fecal incidences, supervision and safety (lifeguard staffing and training requirements), water treatment, circulation standards, aquatic deck safety standards, and water quality standards (Florida Department of State). South Carolina pool regulations address lifeguards, lifesaving equipment, water clarity and disinfection methods, in addition to water quality, as well as contamination response and pool closure (South Carolina Department of Health and Environmental Control). Georgia pool regulations discuss imminent health hazards and identifies increased risk facilities, has extensive water quality parameter requirements and recommendations and hyperchlorination standards, rules and signage specifications, dressing room and sanitary facility requirements, pool operator requirements, and contamination response plan requirements (Georgia Department of Public Health). Kentucky public swimming and bathing regulations address water quality and the presence of chloramines (or combined chlorine in the air), personnel standards, safety equipment, provides standards and limitations on patron access in regard to public health (disease, sunburn, food, behavior), and even regulates natural waters that are used as bathing beaches (Kentucky General Assembly). These states’s regulations are much more robust than Virginia’s and aim to protect aquatic venue patrons from a variety of risks.

Figure 1. Statewide Regulatory Authority of Aquatic Venues by State (Source: VDH, 2022)²

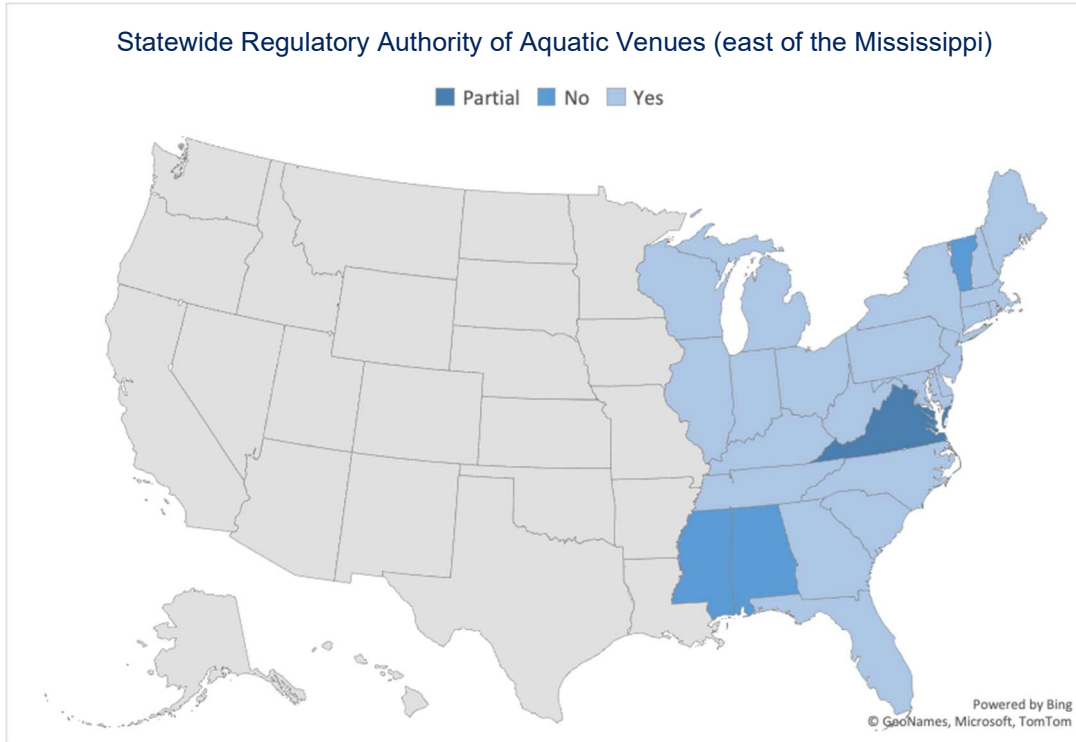
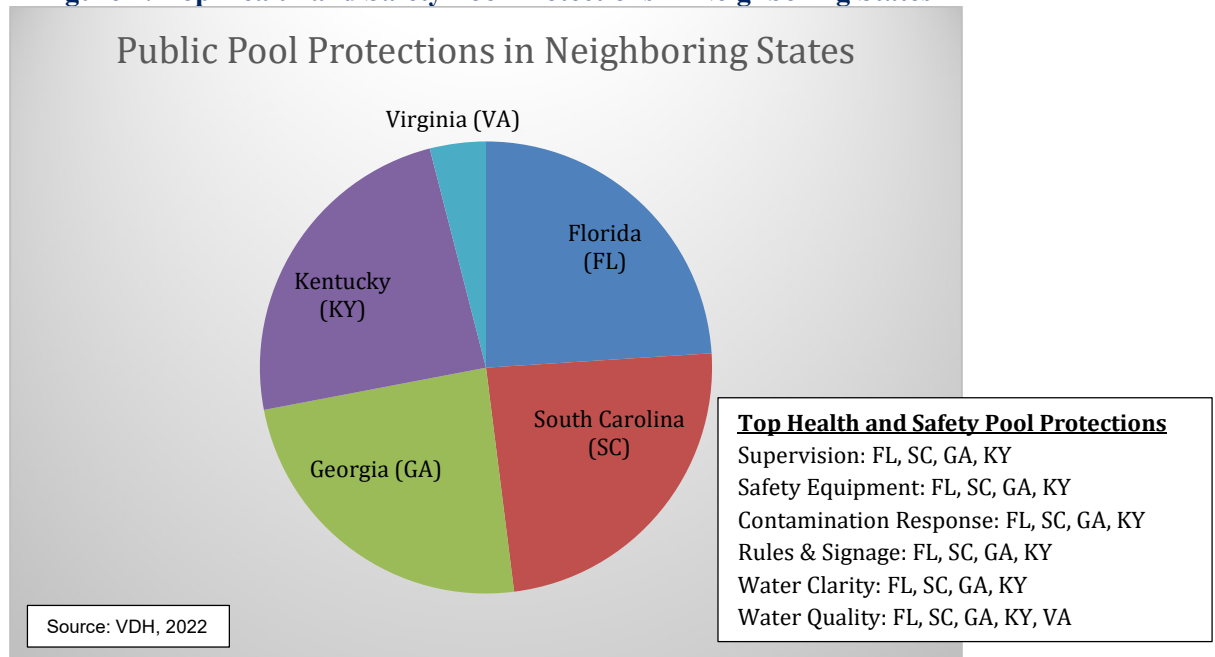


Figure 2: Top Health and Safety Pool Protections in Neighboring States



² Virginia does have authority for preventative measures for illness, such as water chlorination levels and testing requirements, which is why it is labeled as having a **partial** statewide regulatory authority of aquatic venues.

Regulatory and Legislative Background

To the knowledge of the Virginia Department of Health, there have not been any successful acts of legislation related to state health regulations for swimming pools in over three decades prior to 2022 (since 1996). The last significant act of legislation related to state pool regulation was in 1990, establishing § 32.1-248.1 of the Code of Virginia (mandate to regulate water quality standards and the daily testing and public posting of specific water quality parameters at public pools).

In the 2022 General Assembly session, House Bill 669 (HB669) was introduced and proposed expanding the scope of § 32.1-248.1 beyond that of just monitoring and posting water quality standards. The bill proposed the addition of provisions for safety equipment and features, maintenance and safety of equipment and premises, operational requirements, facility staffing, and incident response. The bill also provided that the Board of Health would convene a stakeholder workgroup to include representatives of the Department of Housing and Community Development, the Pool and Hot Tub Alliance, the Centers for Disease Control and Prevention Healthy Swimming Program, municipal parks and recreations departments, and injury and illness prevention experts that would provide recommendations for the scope and content of the proposed regulations.

During the 2022 General Assembly session, a substitute to the bill proposed that prior to any development of regulation that the workgroup be convened to study whether swimming pools and other water recreational facilities for public use or in conjunction with a tourist facility or health spa should be regulated by the Department of Health. The bill was successfully passed in the House and Senate. The Governor then vetoed the bill citing concerns of duplicative agency efforts, as a workgroup for the review of the Regulation for Tourist Pools (12VAC5-460) was already underway.

The Commonwealth of Virginia requires that every regulation be reviewed every four years to ensure it is supported by statutory authority, determine that the regulation is necessary for the protection of public health, safety and welfare, and is clearly written and easily understandable, and ensure its economic impact on small business is minimized. A periodic review of the Regulation for Water Quality (12VAC5-462) was completed in April 2022 with a recommendation to amend the regulations prompting the Agency to submit a Notice of Intended Regulatory Action (NOIRA).

The NOIRA summarized that the regulations, which have not undergone a thorough review in approximately thirty years, do not appear to reflect current industry standards for recommended safe levels of water quality parameters, such as disinfectant types and concentrations for a safe swimming environment. The NOIRA closed in October 2022 and proposed amendments and new provisions to the regulation included amending, adding, or repealing text related to definitions; standards for water quality; administrative processes; and any additional amendments deemed necessary.

Prior to the COVID-19 pandemic, a workgroup was established for the review of Regulation for Tourist Pools (12VAC5-460). The workgroup reconvened in December 2022 to continue the review of the Regulation for Tourist Pools (12VAC5-460). Should additional authority be granted to VDH as contemplated in this report, the agency intends to invite the

stakeholders within the existing workgroup, as well as other identified stakeholders, to convene and engage in the development of regulations for operations, maintenance, and management at all public pools.

Gaps in Health and Safety Protections for Virginia Public Pools

With an agency mission “to protect the health and promote the well-being of all people in Virginia,” and a vision to “become the healthiest nation in the state,” Virginia may consider how the regulation of public pools can help meet those objectives.

As discussed, state code does not require health and safety protections of non-tourist public pools beyond that of water quality standards. In accordance with Virginia Code §32.1-248.1, VDH has limited authority over non-tourist public pools and may only regulate the daily testing and posting of three water quality parameters at public pools: chlorine, bromine, and pH. Examples of dangers VDH is currently unable to regulate include:

- Water clarity (affecting the ability to see patrons in distress underwater)
- Required response to fecal incidents in the water
- Lifesaving equipment (a reaching pole to assist with in progress drowning)
- Chemical storage and handling
- General safety hazards and cleanliness of a facility (algae, broken glass)
- Water quality standards at public interactive water features such as splash pads.

Current regulations do not address the safety hazards associated with public pools and other aquatic venues; this limitation may be putting the lives of those living in and visiting the Commonwealth at risk. Current Virginia Code language does not reflect the evolving industry of aquatic venues and interactive water features. Outdated definitions limit VDH’s oversight of many interactive aquatic venues that are constructed to hold less than 24 inches of water, or those that are designed without a basin (i.e. splash pads). While the danger of drowning within these features is reduced, the threat of RWIs remain, as do other health and safety concerns related to the operation and management of such venues. Overall, injury, drowning, and illness prevention is not largely addressed by current pool regulations. Table 2 summarizes the status and need of key components for protections of public pools in Virginia.

Table 2. Summary of Status and Need for Public Pool Protections in Virginia

Foundational Capacity	Status
Supervision	Absent - Needs support
Safety Equipment	Absent – Needs support
Contamination Response	Absent – Needs support
Rules & Signage	Absent – Needs support
Water Clarity	Absent – Needs support
Water Quality	Needs attention / update

Source: VDH, 2022

To reduce injury and illness potential at public pools and other aquatic venues, VDH is recommending that the agency be granted relevant authority and oversight of general operations, maintenance, management, and safety. The agency recommends that the scope of regulations deriving from such authority be developed through stakeholder engagement.

National guidance provides a framework for public pool operation and maintenance. As currently in-process with the Regulation for Tourist Pools (12VAC5-460), the agency intends to use the CDC's Model Aquatic Health Code (MAHC) and other national standards, such as the PHTA/ICC Standard for Public Pool and Spa Operations and Maintenance, ANSI/APSP/ICC-1 2014 American National Standard for Public Swimming Pools, ANSI/PHTA/ICC-11 2019 American National Standard for Water Quality in Public Pools and Spas, among others, as a starting point for stakeholder engagement.

The MAHC is a national set of standards, based on available science and best practices, for aquatic facilities created by the CDC through the input of industry experts, academics, regulators, and other stakeholders. It is maintained with the assistance of the Council for the Model Aquatic Health Code (CMAHC), a 501(c)3 non-profit that engages stakeholder and regulator input and subsequent member voting recommendations to provide recommended updates to the CDC every 3 years. This national standard covers the design, construction, operation, and maintenance of swimming pools, spas, hot tubs/spas, and other public aquatic venues (such as splash pads, lazy rivers, wave and surf pools and other interactive water venues). Since its release in 2014, the MAHC has helped U.S jurisdictions save time and resources that would otherwise have been used in developing and updating the codes themselves. It is a nationally recognized guidance document that is regularly updated and has been supported across the United States by public health and aquatic sector stakeholders, such as the National Environmental Health Association (NEHA), the Council of State and Territorial Epidemiologists (CSTE), the Association of Aquatic Professionals (AOAP), and the National Swimming Pool Foundation (NSPF) (Centers for Disease Control and Prevention, 2022).

The American National Standards Institute (ANSI) is a non-profit organization that works with government and industry stakeholders to develop voluntary standards for a variety of systems and activities to strengthen and protect business and industry across the globe (American National Standards Institute, 2022). This process allows for the development of standards that industry can voluntarily conform to illustrate a desire and intention to provide actions, services, and products to increase safety, efficiency, reduce cost, and increase consumer confidence. The International Code Council® (ICC) is an international provider of model codes and standards (International Code Council, 2022), including in the International Swimming Pool and Spa Code (ISPSC) that addresses minimal requirements for public and residential pools and hot tubs. The Association of Pool & Spa Professionals (APSP) was a member forum that provided a platform for members and other interested stakeholders to develop standards through the ANSI consensus process. It has since been absorbed by the Pool and Hot Tub Alliance. The Pool and Hot Tub Alliance (PHTA) works with industry stakeholders and organizations in the development of consensus-based standards and codes, including standards for public swimming pools and national standards for water quality in public pools and spas (Pool & Hot Tub Alliance, 2022).

State Agency and Locality Impact

Any proposed legislation expanding VDH authority would have little to no impact on other state agencies unless the agency operated a public swimming pool or other aquatic venue. Oversight of public pool and aquatic venue operations may result in an increase in referrals to building officials, who may have to issue building permits to authorize aquatic-related facility repairs. The Office of Environmental Health Services has spoken with the State Building Codes Office at the Department of Housing and Community Development regarding this proposal; they have no opposition to efforts to expand VDH’s ability to protect families at public pools.

Localities may be impacted by legislation to expand the scope of regulations for all public aquatic facilities if they have an existing ordinance or local code that addresses public pools and aquatic venues. If the regulatory changes expanded the scope of state oversight beyond what the current local ordinance or code provides, then a locality may have to revise the content and scope of their local code to ensure that the requirements meet or exceed the state regulations, or separately enforce the more stringent sections of state regulation.

Relevant Stakeholders

Due to the potential impact to localities with existing pool or aquatic venue ordinances or codes, locality stakeholders would be primary contacts for review and comment on the proposed regulatory changes for all public aquatic facilities. These locality stakeholders will include local administration, local building and zoning departments, code compliance agencies (including local health departments), municipal parks and recreation departments, and local businesses. Many of these stakeholders have already participated in the workgroup related to the review of the Regulation for Tourist Pools (12VAC5-460). In addition, pool management companies may have great interest about the content of future regulations as the changes could impact their industry and scope of services.

There is anticipated and known support for the goals of this proposal from organizations and individuals with interests in pool and spa safety, and the safety and well-being of children, including:

- ★ Safe Kids Virginia
- ★ Trauma Systems Injury Prevention
- ★ Virginia Department of Social Services
- ★ VDH Office of the Chief Medical Examiner; Emergency Management Services
- ★ Red Cross
- ★ National Environmental Health Association (NEHA).
- ★ Council of State and Territorial Epidemiologists (CSTE).
- ★ American Academy of Pediatrics
- ★ National Association of County and City Health Officials (NACCHO)
- ★ Association of State and Territorial Health Officials
- ★ Pool and Hot Tub Alliance (formerly the Association of Pool and Spa Professionals and the National Swimming Pool Foundation, national association of pool management industry)

- ★ Council for the Model Aquatic Health Code
- ★ Centers for Disease Control
- ★ SwimRVA
- ★ Virginia Lifesaving Association
- ★ and, organizations that train certified pool operators and certified lifeguards.

Those that may not support this proposal include entities owning or operating public pools, spas, and other aquatic venues who generally oppose legislation establishing standards for public facilities. Owners and operators of facilities with conditions that may be deemed unsafe by future regulation may bear costs associated with compliance and voice opposition to any proposal that would lead to the establishment of a standard.

Business Impact

Amending the pool regulations could provide a positive impact on business as consistent regulation throughout the state would reduce differences in regulatory requirements and implementation. Consistent pool requirements may increase or improve expectations and understanding by business owners and improving public perception of safety and overall concern of patron wellbeing could bolster confidence in the tourism industry overall.

In addition, providing standards for the operation, management, and maintenance requirements for all public pools may provide for enhanced management of properties. Regulations that provide for consistent management and upkeep of aquatic facility equipment and structures may assist businesses in consistently maintaining their facilities and in return, reduce potential liability from management or costly maintenance issues.

An expansion or alteration of regulatory requirements may involve an increase in cost to facility owners or operators. Such costs could come from equipment updates to the facility, an increase in staffing, or other costs. Because of financial implications that changes to the regulations could have on the industry, it is essential that the industry be involved in the development of any future regulation. To safeguard against any unnecessary financial burden, and to minimize financial impacts, industry stakeholders have been, and will continue to be, part of the workgroup driving the development of the regulation.

Fiscal Implications

The direct fiscal impact of potential legislation expanding VDH authority would be the cost of promulgating regulations (nominal, typically estimated at \$5,000). In this case, agency staff would build upon existing work on the Regulation for Tourist Pools (12VAC5-460), an effort that has engaged a wide variety and significant number of aquatics industry stakeholders, to minimize required effort and maximize the use of state resources.

It is not possible to accurately depict regulated industry or agency costs associated with a future regulation when provisions of that regulation have not yet been determined. VDH is committed to active stakeholder involvement in any regulatory process, with a goal to develop a minimally intrusive regulation that is easy to implement and protective of public health and safety.

The Office of Environmental Health Services performed an analysis of the fiscal impact to agency payroll if the current costs of VDH’s tourist pool inspections were projected on all public pools and aquatic venues in Virginia. This analysis used information derived from the environmental health database on the duration and count of tourist pool inspections conducted in 2018. This year (2018) is still preferred as the best data source as it is pre-pandemic (COVID-19) information, and there was a database transition that occurred in 2019, making 2019 data less comprehensive and less desirable for analysis. To evaluate potential costs conservatively in this analysis (highest probable cost), VDH assumed that the current cost of tourist pool inspections would be projected on all public pools and aquatic venues in Virginia, and that inspections per non-tourist pool or aquatic venue would occur at the same rate as observed for tourist pools in 2018 (e.g. 1.2 times per year, per facility).

The following were identified as core payroll costs associated with current (2018) inspection programs:

1. Time spent conducting inspections,
2. Time spent conducting plan reviews for new or renovated facilities, and
3. Time spent conducting administrative duties (data entry, travel, general file maintenance).

Data on swimming pool facilities came from three sources:

1. Information derived from the environmental health database on the duration and count of tourist pool inspections conducted in 2018. (This year is still preferred as the best data source as it is pre-pandemic and a database transition occurred in 2019, making that data less complete or desirable for analysis),
2. A randomized survey of local health districts on core payroll costs noted above, and
3. PkData’s 2017 US Commercial Swimming Pool marketing report^{3*}.

Inspection time data was analyzed from a sample^{3**} of tourist pool inspections. Using a comparison of inspection times tracked and reported by the survey, and time spent on plan reviews for inspections and administrative duties as reported by the survey, the following values were estimated for these aspects of inspections of tourist pools (i.e. those already under broad-scope regulation).

- Average time, plan review: 2 hours 30 mins
- Average time, inspection: 35 minutes
- Average time, administrative duties (per inspection): 45 minutes

With the average hourly salary of an Environmental Health Specialist at \$45.22 (includes fringe benefits), the following payroll costs were determined:

- Plan review: \$174.21 per facility

³ * PkData is a market research firm that has tracked the swimming pool and hot tub industry since 1992, and serves as market research counsel to the Association of Pool and Spa Professionals

**sample sizes selected represents a 95% confidence level wherein results utilizing the above referenced sample size should reflect, to a ±5% margin of error, the overall data points such as inspection time within the database (using total count = mean of VDH database counts and PkDats counts). Standard Deviation between sample size and total: 1.24

***Other: Medical, Waterpark, YMCA

- Review of plans (2 hours 30 minutes: \$113.05) + single inspection of the new facility (35 minutes: \$26.72) + associated administrative cost (45 minutes: \$34.44) (total 3 hours 35 minutes) = \$174.21
- Single inspection: \$61.16 per facility
 - Site inspection (35 minutes) + associated administrative cost (45 minutes) (total 1 hour 20 minutes) = \$61.16

To extrapolate these figures to the overall costs of inspecting non-tourist public pools, counts of total public pools were obtained from PkData’s 2017 US Commercial Swimming Pool marketing report (P.K. Data, Inc., 2018) (Table 3). External data was required for these calculations, as many local health districts do not maintain data on non-tourist pools. Commercial pools by segment are listed below. Residential pools are excluded, as VDH does not regulate them.

Table 3. 2017 US Commercial Swimming Pool Type/Location (P.K. Data, Inc. , 2018)

State	Tourist	Multi-family	Community	Clubs	Parks & Municipalities	Schools & Universities	Other ² ***
VA	1,419	2,696	659	619	463	287	216

In observing differences between the VDH database and PkData counts for tourist pools (VDH database 1,145 v. PkData 1,419; VDH database counts of tourist pools are considered reliable), it is assumed that PkData is counting multiple discrete units at a facility as multiple pools, whereas the VDH database counts these as one *facility*. To adjust for this difference, PkData on non-tourist pools was adjusted by the factor observed for tourist pools³, estimating there will be approximately **3,983 pool facilities affected by any proposed legislative change (total of \$243,600.28 for inspections, including administrative costs, of these existing facilities if conducted at current payroll rates for 2022: 3,983 x \$61.1 = \$243,600.28).**

A rate of pool facility growth of 4% was used to estimate future costs of plan reviews and inspections for new facilities (anticipating growth in year one), and projected costs for all pool and aquatic venue activities (plan reviews and inspections) for future years. Table 4 provides a summary of the estimated cost to the agency to incorporate plan review and inspections with non-tourist pools and other aquatic facilities.

Table 4. Total projected agency costs of inspection and plan review program (VDH, 2022).

Year	# Facilities	Cost to inspect facilities (\$61.16/facility)	Rate of growth (est.)	Total # new facilities	Cost for plan review (\$174.21/facility)	Total cost (est.)
1	3,983	\$243,600	4%	167	\$29,143	\$272,743
2	4,150	\$253,831	4%	174	\$30,367	\$284,198
3	4325	\$264,492	4%	182	\$31,642	\$29,6134
4	4506	\$275,601	4%	189	\$32,971	\$308,572
5	4695	\$287,176	4%	197	\$34,356	\$321,532

The primary limitation of this analysis, as summarized above, is that the future regulation’s content cannot be predicted. Any future regulation may not include annual inspections or plan reviews, and the above figures may be higher than the actual payroll cost for administering the

future program. Additionally, this analysis does not include potential costs to the agency for the following:

- Training (time and effort or development and delivery)
- Equipment needed for inspection
- Public outreach to industry (years 1-3)
- Technology and database development for inspection module

Recommendations

VDH identified potential options and provides recommendations for addressing gaps in health and safety protections for Virginia public pools.

Recommendation #1

The General Assembly should grant the Board of Health authority to regulate all public aquatic venues, including swimming pools, under a single, comprehensive, and inclusive regulation. It is recommended that § 32.1-248.1 of the Code of Virginia be amended to grant the Board of Health the authority to promulgate regulations for the operations, management, safety, water quality, and other public health concerns at all public aquatic facilities, including but not limited swimming pools, wave pools, lazy rivers, surf pools, spas (*including spa pools and hot tubs*), therapy pools, waterslide landing pools, spray pads, and other interactive water venues. Such regulations shall not apply to private residential water recreational facilities, as defined by the Board.

This recommendation would allow all public pools in Virginia (tourist and non-tourist) to be regulated under a single chapter. The streamlining of regulation may reduce burdensome and confusing oversight of aquatic venues, including swimming pools and hot tubs in Virginia. Currently, public pools not associated with a permitted tourist establishment facility are regulated by the Regulation for Water Quality (12VAC5-462); whereas pools associated with a permitted tourist establishment facility are regulated by the Regulation for Tourist Pools (12VAC5-460) and the Regulation for Water Quality (12VAC5-462). Reducing the regulatory oversight of aquatic venues by combining the scope of two regulations into one comprehensive authority may reduce or eliminate confusion surrounding two separate regulations deriving from two different parts of the Code of Virginia.

In order to effectively update and combine the two existing pool regulations, the least resource-intensive solution may be to repeal the two regulations currently in effect and then combine them into a new singular and concise chapter. This action would provide a more comprehensive set of regulations and would promote and improve public health and safety of all aquatic venues throughout the Commonwealth, reduce regulatory burden and confusion for pool

and aquatic venue owners and operators, and provide consistent oversight of Virginia’s public aquatic venues.

Recommendation #2

Convene a robust workgroup that represents all impacted organizations, businesses, industries, and local stakeholders to develop a comprehensive set of regulations referencing national standards that promote and improve public health and safety of all aquatic venues throughout the Commonwealth.

A stakeholder workgroup was convened for the review and development of the proposed Regulation for Tourist Pools (12VAC5-460). This workgroup developed a proposed draft of regulations that address operations, maintenance, management, and safety for public swimming pools associated with tourist facilities. The agency proposes to use the existing work performed by the Tourist Pools workgroup; this workgroup already has strong participation from municipal aquatics staff and other aquatics professionals not directly associated with the tourist industry. As previously done with the Regulation for Tourist Pools (12VAC5-460), the agency proposes to use the CDC’s Model Aquatic Health Code (MAHC) and other national standards, such as the PHTA/ICC Standard for Public Pool and Spa Operations and Maintenance, ANSI/APSP/ICC-1 2014 American National Standard for Public Swimming Pools, ANSI/PHTA/ICC-11 2019 American National Standard for Water Quality in Public Pools and Spas, among others, as a starting point for stakeholder engagement. The updated regulations may reflect aquatic venue operation and maintenance standards and policies and management requirements outlined in national standards and as otherwise determined by the stakeholder workgroup. The agency does not anticipate the changes arising to the length and complexity of the MAHC, PHTA, or ANSI standards.

Conclusion

This report identifies the gaps in the Commonwealth’s authority to implement and enforce risk-reduction strategies related to fatal and non-fatal drownings, recreational water-related illness and outbreaks, and other preventable injuries that take place at public pools and other aquatic venues. These facilities pose a variety of dangers to the public, and without comprehensive oversight, these preventable injuries and outbreaks will continue to threaten the health and safety of Virginians.

It is the mission of VDH to protect the health and promote the well-being of all people in Virginia, and it is expected that this mission extends to anyone visiting and recreating in Virginia. Every patron of a public aquatic facility (swimming pools, hot tubs, splash pads, etc.) has the right to adequate and equal protections and they often assume or expect that these protections are already in place throughout the Commonwealth. While industry may often self-regulate, it is not an acceptable status quo to expect all public aquatic facility operators to voluntarily understand

and meet appropriate operation, maintenance, supervision and other health and safety standards. Rather than relying on local ordinances present in only a few localities, basic health and safety standards should be implemented at a statewide level to ensure equitable protections of all swimmers and bathers throughout every region and locality of the state. Therefore, VDH recommends that the agency be granted relevant authority and oversight of the general operations, maintenance, management, and safety of Virginia’s public aquatic venues.

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