



Why Pool Operator Training for Medical Fitness Professionals

September 2011

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Whether you are working with clients in the water who are wounded warriors, athletes recovering from injury, everyday folks healing from joint replacement surgery, or asthmatics and arthritics seeking greater endurance and reduced pain and swelling – swimming pools and hot tubs need to be safe and healthy environments.

Introduction

The benefit of basic certification training to prevent injury and illness and to preserve capital investment is compelling. Training costs are minimal when compared to the cost of loss of life, limb and litigation.

There are several scientific disciplines that apply to proper pool and spa operation including chemistry, microbiology, engineering, public health and mathematics. It is rare to find aquatic and facility professionals with formal training in two or more of these disciplines. Operator certification courses are designed to build awareness of and apply these disciplines to help reduce the risk of illness and injury, additionally teaching how to minimize damage to the substantial capital investment represented by a pool or spa.

The business, ethical, and scientific positions to train **all** persons who maintain, operate, and manage medical fitness facility pools and spas to a minimum, verifiable level are compelling. Those who choose otherwise assume a substantial and often catastrophic risk. The best-case scenario is to have verifiable, unbiased training from a non-profit organization that is compliant with the Centers for Disease Control & Prevention (CDC) “Operator Training” <http://www.cdc.gov/healthywater/pdf/swimming/pools/mahc/structure-content/mahc-module-6.1-operator-training-code.pdf> module of the Model Aquatic Health Code issued in 2011. This model code documents that certified operators reduce the likelihood of public health violations. This code also details the key topic areas that operator training should include. The Certified Pool/Spa Operator® (CPO® certification program, which over 23,000 operators chose in 2010), complies with the CDC code. The code went out for public comment and was updated to include those comments and changes on 4.8.2011.



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Science supports operator training

The Model Aquatic Health Code requirement from the CDC, is based on science. The annex of the code

http://www.cdc.gov/healthywater/pdf/swimming/pools/mahc/structure_content/mahc-module-6.1-operator-training-annex.pdf details the research studies that verify trained operators are less likely to have violations that risk the health of the user and staff. In a medical environment, protecting the user is even more important since users may be more vulnerable.

In addition, CDC studies reveal a substantial need to operate facilities more effectively. For example [according to a recent study by the CDC](#), pool inspection data from 15 jurisdictions across the United States indicated that 12.1% of inspections resulted in immediate closure because of the seriousness of identified violations; violations regarding the following issues are frequently identified: Free Chlorine level (10.7% of inspections), pH level (8.9%), other water chemistry (12.5%), filtration/recirculation system (35.9%), water test kit (3.3%), record keeping (10.9%) and licensure (2.7%). [CDC. Violations identified from routine swimming pool inspections – selected states and counties, United States, 2008. MMWR Morb Mortal Wkly Rep. 2010;59(19):582-587]

If we accept that trained and certified operators will reduce risk at pools and spas, the data published by the CDC becomes more disturbing. Regions where operator training and certification is required by law accounted for 97 percent of the data in the CDC study; about one in four facilities violated this requirement. The National Swimming Pool Foundation® (NSPF®) internal data indicates that training and certification rates are much lower when not required by the health code. If one in 10 facilities have health violations that warrant immediate closure, it is unsettling to consider how few operators are certified and how poorly facilities are operated when trained operators are not employed.

Risks and prevention

Aquatic facilities have unique hazards and operational challenges including drowning, recreational water illness (RWI), injuries, chemical exposure and suction entrapment. One of the first impressions many people have about pools and spas is based on all-too-numerous news stories about tragedies that happened as a result of system failures. These occurrences reinforce the need to raise standards to minimize injury and illness.

Drowning

The CDC reports that every day, about ten people die from unintentional drowning. Next to car accidents, drowning is the second leading cause of unintentional injury death for children ages 1 to 14. In 2007, there were 3,443 fatal unintentional drownings (non-boating related) in the United States, an additional 496 people died



from drowning in boating-related incidents.

<http://www.cdc.gov/HomeandRecreationalSafety/Water-Safety/waterinjuries-factsheet.html>. The U.S. Consumer Product Safety Commission estimates that an average of 5,100 pool- or spa-related submersion injuries were treated in hospital emergency departments each year from 2008 through 2010. From 2006 to 2008 an annual average of 383 pool- or spa-related fatalities involved children younger than 15. More than three-quarters of the reported fatalities and nearly 80 percent of the treated injuries involved children younger than 5. The summer of 2011 was marred by tragedy. Tracked by USA Swimming, at least 416 children, ages 12 and younger; 204 teenagers, ages 13 to 19 and 972 adults were reported to have drowned according to news reports gathered from May 1 through August 26. Nearly 84 percent of all reported drownings involved males.

<http://www.poolsafely.gov/news-resources/pool-safety-data-reports>.

Although more than half of drowning occur at residential pools, drowning remains a substantial risk at public pools. Swimmers in distress are more easily recognized when water clarity is maintained. A 2011 tragedy at a public pool in Fall River, Massachusetts demonstrated the importance of water clarity. The drowning victim lay on the bottom of the pool for over two days. Lifeguards and swimmers were not aware due to cloudy water. Clear water also helps prevent collisions that can render a person unconscious and susceptible to drowning.

Recreational Water Illness

There were at least 15 documented RWI outbreaks in 2006 according to a CDC report presented at the 2006 WAHC. Pools and spas are an ideal environment to harbor, grow and spread disease-causing germs that result in illness. Bacteria, viruses and cysts from the users' skin and rectal area and from fecal accidents are regularly added to the water and the environment. It is vital that chemicals are used properly to reduce the risk of contracting illness. Inadequate disinfectant levels remain a major cause of disease outbreaks. This deficiency conflicts with local codes and training material covered in all operator training courses.

Chemical exposure

To a trained professional, it would be obvious that mixing chemicals is dangerous. Similarly, it would be clear that automatic chemical feeder systems should not pump chemicals when the circulation system is off. Trained operators know to periodically replace flexible tubing used to feed liquid chemicals. Yet many chemical handling accidents occur each year exposing consumers and employees to harmful chemicals.

Mixing incompatible chemicals can generate large quantities of chlorine gas. This gas can spread great distances. Such incidences occur every year and require



evacuations. Toxic gas and evacuations are particularly risky at medical fitness facilities since vulnerable patients who are not easily evacuated are near by.

Often, it is not obvious to an untrained technician that mixing two colorless liquids like sodium hypochlorite (aka bleach or liquid chlorine) and hydrochloric (aka muriatic) acid (often placed side-by-side) will release toxic chlorine gas. Despite this emphasis on maintaining proper disinfectant and pH levels, the CDC published results for pools and spas show that improper disinfectant levels are common and alarmingly high at 11 percent and 17 percent, respectively.

Many chemicals have unique hazards. Fortunately, material safety data sheets (MSDS) and product labels contain handling guidelines and should be followed. Disinfectants are often classified as oxidizers, which is a unique hazard class since they can release toxic gas, cause fire, or explode if contaminated, mixed, or mishandled. When treatment chemicals are added to water they can react with contaminants and create hazardous byproducts. The chemicals themselves, or their byproducts, can create risks due to inhalation, ingestion and dermal contact.

Suction-entrapment

Water circulation, filtration and chemical treatment are key tools in the battle to prevent RWI. However, using pumps to circulate water creates risks due to suction entrapment. Entrapment, entanglement, or evisceration occur when a limb, the torso, the body, hair, or the buttocks come into contact with a suction outlet, resulting in the victim being held to the outlet by the vacuum created by the pump. An untrained operator or service person may fail to recognize entrapment as a hazard and fail to implement prevention strategies. In fact, the Virginia Graeme Baker Pool & Spa Safety Act (P&SS Act) requires every public pool to have newly certified drain covers and possibly other layers of protection. For free online training go to [\[insert hyperlink\]](#).

Protecting the capital investment

Pools and spas are important amenities at medical fitness centers. In addition, they are a substantial capital investment. Beyond the operational knowledge to prevent injury and illness, there are several factors to consider to protect the investment and to minimize costly repairs:

- Maintain proper water balance to prevent corrosive damage to pool surfaces and equipment requiring costly repair and to prevent scaling that can increase heater energy expense. .
- Perform preventative maintenance to minimize costly structural and equipment repair or replacement.



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- Implement start-up and shut down checklists to improve efficiency.
- Implement seasonal start-up, shut down and maintenance procedures to preserve the pool/spa and surrounding areas.
- Maintain good records to prevent liability and to guide maintenance programs.

Conclusion

Operator training and certification courses exist that provide broad, basic information on the proper care for pools and spas. There are obvious reasons why training is important; however, it is important to raise some caveats. The Certified Pool/Spa Operator® certification training involves 14 to 16 hours water chemistry, testing and problems, filtration and circulation, automation, heating and circulation, safety, maintenance and troubleshooting, regulations, management and other topics. Such a short course cannot sufficiently train every person to prevent every type of accident that happens at a pool or spa. Nor would such minimal training make every operator or service person aware of all the possible solutions. Yet, verifiable training from a non-profit, nationally-recognized organization is an intelligent minimum standard for education.

The most widely accepted program is the Certified Pool/Spa Operator® (CPO®) training program, which leads to a CPO certification by the NSPF. Inexpensive and effective training is readily available for medical fitness organizations operating swimming pools around the world. In fact, The National Swimming Pool Foundation has trained over 300,000 operators in 70 countries and maintains a database of international classes at <http://www.nspf.org/en/CPO/CPOSchedule.aspx>. The course materials (handbook, PowerPoint presentation, instructors and exams) are also available in Spanish and metric.

The Pool Operator Primer™ online class covers the basics of how to care for a pool and may also be the first step to earning your CPO Certification. It includes the NSPF Pool & Spa Operator™ Handbook, the most widely used reference book in this field. In addition, courses on blood borne pathogens, risk management, facility audits, emergency response planning, chlorine safety, and dozens of other topics are available online through the National Swimming Pool Foundation.

Three most important elements of swimming pool maintenance

The most important elements of pool maintenance consistently remain the same: Preventing drowning, illness, and injury are the most critical goals when maintaining a pool. Fortunately, when the pool facility is operated properly to



prevent these issues, the water is also clear and inviting.

There are a few simple rules of prevention. The first one is to make sure that the person who operates the pool is trained and certified because no “simple rules” can prevent every hazard.

Here are several tips that can help ensure the swimming pool is a valuable amenity rather than a source of pain and liability. Of course, the same rules apply for spas and wading pools.

- Reinforce the importance of adult supervision to prevent drowning is paramount.
- Install self-closing, self-latching gates and barriers to delay entry of children to prevent drowning.
- Maintain chlorine levels, pH, and water turn-over rates through the filtration system consistent with those required by the local code or the facility’s design specifications. Discourage people from using the pool if they have had diarrhea within two weeks – this is critical since some disease-causing organisms like *Cryptosporidium* are resistant to chlorine.
- Close the pool if the bottom is not clearly visible.
- Close the pool if all suction drains do not have an anti-entrapment cover.
- Budget and convert all single-main-drain pools to dual-drain pools with anti-entrapment covers to prevent entrapment.

What do medical fitness organizations most need to know to keep the users happy with a well-maintained pool?

- The pool is under the care of a certified operator
- The chlorine and pH in the water chemistry is maintained at all times and tested/verified at least three times per day. Automated water testing and chemical feeders help make pool care easier.
- All drain covers are anti-entrapment covers that comply with the **APSP/ANSI-16 standard**.
- The pool bottom is clearly visible.
- The self-closing, self-latching gate(s) is (are) operating properly.
- The barrier surrounding the pool is functional.
- The spa is regularly drained, cleaned and water replaced before a bad smell or foaming occur.
- The pool rules are posted and clearly visible
- The filter pressure is not too high and the water is circulating.



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- The spa water does not exceed 40 ° C. (104 ° F)
- Appropriate warning signs and shutoff switches should be posted
- Vulnerable populations should consult with physicians before using.
- Automatic timer should limit exposure to 15 minutes
- A pool operator verifies the pool is operating properly when it receives the most use, for example weekends and holidays.

About the author

Thomas M. Lachocki, Ph.D., is CEO of the National Swimming Pool Foundation (NSPF). He earned his Ph.D in chemistry from Louisiana State University and his BS from Lock Haven University, Pa. Dr. Lachocki has researched and published in diverse fields including catalysts, detergents, solvents and recreational water. He was awarded six patents that have been issued and are practiced in at least eight countries. Contact him at (719) 540-9119, (719) 540-2787 (fax) or tom.lachocki@nspf.org; for complete information about NSPF and its programs, visit www.nspf.org.