



# Risk Management for Your Aquatic Safety Program

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# Risk Management for Your Aquatic Safety Program

## Introduction

Drowning and spinal injuries at swimming pools and aquatic areas are some of the most traumatic and costly events any program can face. The trauma is not restricted to the child who is injured or dies, but encompasses the family, lifeguards, facility staff, and community. A death or injury claim involving drowning can result in multimillion dollar awards and significant, undesirable media attention.

In June 2002, the World Congress on Drowning adopted a more appropriate, uniform definition of drowning: "Drowning is the process of experiencing respiratory impairment from submersion/immersion in liquid." Under this definition, drowning is a process that can be interrupted, by rescue for example. This new definition excised the use of the term *near-drowning*.



The National Safe Kids Campaign estimates 5,000 children ages 14 and under are hospitalized annually as a result of drowning incidents; 15% die in the hospital, and as many as 20% suffer severe, permanent neurological disability. The typical medical costs for a drowning victim who survives the event can range from \$75,000 for initial emergency room treatment to \$180,000 a year for long-term care. Costs for caring for a drowning victim who suffers brain damage can be more than \$4.5 million. These figures do not include legal fees, court-awarded judgments, damage to the program's reputation (which could impact donations), or bystander claims from a relative.

Two factors make a youth program drowning very difficult to defend in court: it's reasonable to expect the facility to be maintained safely, and it's reasonable to expect appropriately trained supervisory personnel on the job during swimming activities.

This safety guide discusses the major areas that aquatic managers must address:

- Principal causes of drowning
- Staff certification and training
- Rescue equipment and emergency procedures
- Communications equipment
- Facility design
- Managing visiting groups

Appendix A is an aquatic safety checklist you can use at your facility.

## Principal Causes of Drowning

In a controlled environment, after you eliminate the alcohol factor, there are three primary causes of drowning and spinal injuries: unsafe conditions, unsafe acts, and errors in judgment.

Unsafe Conditions	Unsafe Acts	Errors in Judgment
Broken equipment	Inadequate rescue equipment	Desire to please others
Inadequate area security	Inadequate instruction	Trying to adhere to a schedule
Weather	Inadequate supervision	Misperception
Obstructed view	Shallow water dives	New or unexpected situation
Cloudy water	Inadequate food/drink or medication	Fatigue
Zone of coverage is too large	Poor position of lifeguard	Distraction
Physical profile of participants/staff	Unauthorized or improper procedure	Miscommunication
Inappropriate rails on diving boards	Failure of lifeguard to use corrective eyewear	Disregarding instincts
Insufficient depth of water beneath diving board or an object/person in the water		

Ultimately, responsibility for the health and safety of program participants, visitors, and staff falls on the facility director. The responsibility (liability) of an aquatic program extends beyond the water to the deck or beach area (electrical appliances, glass hazards, inappropriate patron behavior) and into locker rooms and showers (slip hazards and areas for potential sexual molestation). Pool facilities must also provide a safe environment for contractors who come to your site. Falls into unguarded pits in pump rooms, inhalation of powder or gas chlorine, and injuries from slip-and-fall accidents could result in claims against your organization.

## Staff Certification and Training

Staffing qualified lifeguards, and training them to follow your organization's specific procedures, is the first step toward a successful aquatic program. Aquatic administrators should address two separate areas of training:

- Lifeguard certification by an outside organization (i.e., American Red Cross, Jeff Ellis, USLA, YMCA).
- In-service, facility-specific training designed to verify and improve lifeguards' skills and teamwork.

Every aquatic facility should have emergency and operational procedures that address the hazards, activities, and patrons specific to their organization. Due to the variety in quality and content of lifeguard certification programs, aquatic directors should not rely on them as the sole means of staff training. It is advisable to work with an aquatics professional to design an in-service and skills testing program to address your site-specific needs.

### Lifeguard Certification

Over the past few years, there have been a number of significant course revisions within the American Red Cross and YMCA aquatic programs. Training priorities have changed and some courses have been eliminated or revised. For example, the American Red Cross Head Lifeguard course has been replaced by Lifeguard Manager. The following is a list of courses offered by the major lifeguard training organizations:



American Red Cross	Jeff Ellis and Associates	U.S. Lifesaving Association (USLA)	YMCA
<b>Lifeguarding Courses</b>			
28.5 hours, including 1.25 hour pre-course session.	Ellis clients are licensed for their entire aquatic program, which includes lifeguard training, equipment requirements, operational audits, and site inspections. Non-clients may receive a Course Completion card upon successful completion of lifeguard course. Courses are skill based and may vary in length.	40 hours of lifeguard training, plus 21 hours of first aid training, plus CPR for professionals	30 Hours (CPR, First Aid, AED, Oxygen Administration are prerequisites)  ARC, ASHI, AHA, and NSC have courses that meet YMCA prerequisite requirements.
<b>Lifeguard Instructor Courses</b>			
Approximately 27 hours including 6-hour precourse. Instructors may teach lifeguard training, lifeguard mgt., first aid, CPR and AED Equipment, Oxygen Administration, and Preventing Disease Transmission.	Approximately 24 hours. 10-hour renewal course. Instructor may teach lifeguarding, CPR, first aid, and AED.	1,000 hours of lifeguard experience, plus high school diploma, plus appropriate first aid and CPR teaching qualification.	18 hours. (LGI is not authorized to teach CPR, First Aid, AED, or Oxygen Administration).
<b>Water Safety Instructor Courses</b>			
30 hours for instructors of swimming and water safety programs.	Program Coordinator authorized to train in-house swimming instructors.		Fundamentals of Teaching YMCA Swim Lessons (16 hours)  YMCA Swim Lessons: Preschool Instructor (8 hours)  YMCA Swim Lessons: Parent/Child Instructor (8 hours)  YMCA Youth and Adult Instructor (12 hours)
<b>Lifeguard Manager Courses</b>			
7.25 hour course designed to prepare lifeguard supervisors for managing lifeguards. This course replaces the prior certification of Head Lifeguard.	6-8 hour Basic Leadership Training Program (BLT). Designed as a facilitated program to provide training for aquatic leadership positions.		YMCA Aquatic Management (32 hours). Includes basic aquatics program development and management, program promotion, communication, lifeguard management, aquatic facility management, professional development and management skills.
<b>Waterfront Lifeguard Module</b>			
5.5 hour course designed to expand upon Lifeguard training course to include waterfront emergencies, surveillance and rescues.	Special Facilities Training Lifeguard course is approximately 24 hours, skill based, and appropriate to open-water environments and waterparks.		Included in YMCA Lifeguard course.  Waterfront management included in YMCA Aquatic Management course.

\*Note: The USLA program certifies employers who provide in-house training to their lifeguards. It is, in effect, an accreditation program for employers who wish to fully control their training programs. Lifeguards trained under the program are not certified by USLA, and recognition of the training is limited to the agency that conducted the training. USLA's programs cover still-water and surf beaches, but not pools.

## Lifeguard Management Courses

The American Red Cross, Ellis and Associates, and YMCA have provided Lifeguard Management courses for several years. The courses are designed for people who supervise lifeguards, and cover topics such as selecting and training lifeguards, inspecting facilities, and managing an aquatics program.

The training is recommended not only for those who have direct supervisory responsibilities for lifeguards, but also for people who have overall responsibilities for lifeguards. The American Red Cross Lifeguard Management course is classroom only (no in-water elements) and has no pre-course skills requirements. Any currently certified Lifeguard Instructor can teach the course.

Markel recommends that at least one facility member becomes certified in Lifeguard Management or has documented training to the equivalent level. That person should also be at least 21 years old, and have a minimum of six weeks of experience in a management/supervisory position in a similar aquatics program.

See Appendix B for additional courses available to lifeguards.



## In-Service Training

If your lifeguards received training from several different organizations, your in-service training becomes even more critical for consistent responses and teamwork.

The following lists the skills that you can incorporate into your in-service training program, depending on your organization's activities, equipment, and conditions:

- Bag-valve mask and oxygen therapy.
- Deep-water back boarding with a lifejacket on victim (lifejacket creates a challenge for head stabilization and neck alignment).
- Submerged victim search patterns for zones of coverage to take place in under three minutes (longer than that and lifeguards are doing body recoveries, not rescues).
- Rescue breathing in deep- and shallow-water conditions.
- Stabilizing a fractured leg in deep water from a waterskiing injury.
- Retrieval of a weight representative of a 180-pound person in 12 feet of water.
- Submerged victim search with the use of fins and face mask.
- Victim retrieval practice with a rescue board or other rescue device.
- Multiple victim retrieval practice (simulated lightning strike).
- Unruly patron intervention.
- Retrieving multiple boats blown by the wind.
- Seizure victim stabilization.
- Allergic reaction simulation.
- Hostile visitor simulation.
- Whole rescue simulations, not just the rescue itself.
- Emergency and reporting procedures.
- Scanning and zone coverage skills.
- Victim recognition.
- Decision making and problem solving scenarios.
- Guarding individuals with disabilities.
- Communicating in common terms in language commonly used.

The YMCA recommends at least two hours of in-service training per month during high season, and at least one hour at other times of the year. Additional time would be needed for facilities that have play elements or open water, as these require special procedures. Ellis and Associates mandates in-

service training four hours per month for full-time employees, and one hour per month or four hours per quarter for part-time employees. USLA requires providing lifeguard time for daily workouts to maintain physical fitness and stamina, recommends monthly drills involving mock rescues and other emergencies for all employees, and requires a minimum 16 hours per year in rescue skills refresher training.

## Pre-Employment Screenings

To ensure your facility hires properly trained lifeguards who are physically able to provide rescue services, conduct the following pre-employment screenings:

**Check certification records.** During the application process, it's essential to check with the certifying agency to verify that your facility's lifeguards have completed formal training. Don't assume that certification cards are genuine; several aquatic facilities have discovered forged lifeguard certifications. These cards had been sold on college campuses, and the forgery came to light only when the lifeguard's swimming and rescue skills were observed to be lacking. A call to the issuing American Red Cross chapter showed they had no training records for the lifeguard.

**Conduct a physical screening.** Conducting a physical screening of lifeguards provides your organization with necessary information on whether a lifeguard will be able to perform all the essential functions of the job. Most importantly, it helps you determine any physical limitations that might impact the lifeguard's performance of lifesaving duties.

**Conduct a vision screening.** If lifeguards cannot see clearly without corrective eyewear, they must have that eyewear with them to perform their jobs. Some programs have accommodated lifeguards who wear contact lenses by providing eye goggles. Other programs, such as those operating in open-surf conditions, have determined that contact lenses are a job disqualification because they are likely to be dislodged in turbulent surf conditions, even with the use of goggles. Job disqualification for the use of corrective eyewear is a site- and condition-specific consideration that needs careful study and even legal advice. The bottom line is that if lifeguards can't see the victim, they can't perform their jobs properly, and the chance of a successful rescue diminishes.

**Offer the Hepatitis B vaccination.** Aquatic directors should be aware that the Occupational Safety and Health Administration (OSHA) requires your organization to offer lifeguards, in writing, the Hepatitis B vaccination series. Although lifeguards may initially refuse the vaccination, they may change their minds (while still in your employ) or request it following a blood-borne pathogen exposure. In most states, this vaccination series is not covered by Worker's Compensation insurance, but might be covered under an employee health plan.

## Faster Response Time Saves Lives

Rapid response time is critical if a youth is to make a full recovery after a drowning incident. Most CPR classes state that brain damage does not begin until a youth has been without oxygen (underwater) for about four to six minutes. However, a 12-year study of drowning and near-drowning claims received by Markel indicates that the timeframe for full recovery is much shorter. In fact, nearly all youths died when they were underwater for more than an estimated 90 to 120 seconds. Although there are exceptions to this timeframe, youths who recover often have severe cardiac, respiratory, or brain damage.

Make sure your lifeguard training focuses on quick response times and searching large areas quickly. In cloudy water lakes, provide swim fins and face masks to facilitate search efforts, and train lifeguards in their use.

## Opening and Clearing Airways

It's impossible to overstate the importance of opening, and if possible, clearing the airway of drowning victims. Simply opening the airway when the victim's mouth is above water often results in spontaneous respirations.

There are some fundamental differences between the American Red Cross, YMCA, Jeff Ellis, and USLA airway-clearing training. American Red Cross lifeguards are taught to bring the victim out of the water onto a backboard or side of the pool before beginning rescue breathing and CPR. USLA, Jeff Ellis, and YMCA lifeguards are taught to try to establish an airway as soon as possible, even in the water. It's important that aquatic directors understand the airway-clearing protocols their lifeguards were taught, especially when lifeguards received training through several different organizations, and match lifeguard training to their organization's facilities and activities.

If your aquatics program operates at a lake with a large swim area, speak with your lifeguard training agency about which airway-clearing protocols to use in your specific situation.

## Keeping Lifeguards Alert

Many factors can contribute to lifeguard fatigue, including noise, amount of time spent in the sun, high temperatures, amount of water consumed, sleep deprivation, alcohol consumption, monotony, and medications prescribed. Studies have shown that fatigue can reduce peripheral vision by as much as 30%. Combine that with a lack of vigilance and you have a deadly combination for almost any activity.

To keep lifeguards alert, Markel advises 20- to 30-minute rotation schedules and a body position change (stand, sit, or kneel on one knee) every 5 to 10 minutes. Lifeguards must also be positioned so that they can clearly see 100% of their zone of coverage. Chairs set back from the edge of the pool create blind spots in front of the lifeguard. Provide lifeguards with shade and clothing that reduces the effects of sun exposure. Sunglasses are essential to reduce eye fatigue and protect eyes. Polarized sunglasses are highly recommended, as they greatly reduce the effects of glare.

## Rescue Equipment and Emergency Procedures

Over the past 10 years or so, lifeguard training organizations have moved toward an increasing reliance on rescue floatation equipment (primarily rescue tubes), rather than swimming and rescue skills that do not rely on equipment. Without question, rescue tubes have helped save many lives and kept lifeguards in a safer position so that they did not become victims themselves. However, there have been numerous occasions when reliance on a rescue tube has contributed to lifeguards permitting their rescue skills to diminish, particularly the underwater search and retrieval skills. It's good practice to train your staff to use rescue equipment in addition to other rescue skills.

### Rescue Tubes and Buoys

**Rescue tubes:** Because rescue tubes are subject to ultraviolet light and chlorine damage, there have been numerous occasions when an old rescue tube has split during a rescue. Storing rescue tubes in the pump room, where they are subject to chlorine vapors, or leaving the tubes on the lifeguard stand will significantly reduce their life expectancy. If the vinyl is cracked or damaged, the strap is threadbare, or the metal strap connector is corroded, it's time to replace the tube.

**Inflatable rescue tubes:** There are a number of situations, such as wilderness trips or unapproved aquatic side trips, where a rescue tube is unavailable. For these trips, inflatable rescue tubes are an excellent option. They're easy to transport, lightweight, and inflate quickly with a CO2 cylinder (even under extreme heat conditions, approved CO2 cylinders will not explode). For underwater recovery, it may be easier to grab the body and inflate the device for lift rather than pulling a buoyant rescue tube underwater.

**Rescue buoys:** Rescue buoys are hard plastic rescue devices primarily used by surf lifeguards. Inspect these devices periodically to ensure the nylon straps have not corroded or worn out, which will compromise the buoy's effectiveness.

## Backboards

Most aquatic programs use commercially made plastic backboards. If your facility uses handmade plywood backboards, replace them immediately with plastic backboards. Plywood boards are very difficult to sterilize thoroughly, and some won't fit into helicopters if the victim needs to be airlifted. The best backboards for aquatic use are floating backboards, which are available from several manufacturers. A lifeguard can swim the backboard to the victim or deploy it from a rescue boat. These backboards will not fully float the victim, but will provide buoyancy.

### Backboard Straps and Restraints

There are a variety of different types of straps used on backboards. Many programs use spider straps with Velcro attachments. If the staff has practiced sufficiently, spider straps are very easy and quick to use. If they have not practiced, spider straps can be time consuming, improperly placed, and fail to secure the victim in position. Over time, the Velcro often loses its ability to hold together, particularly when wet. Train staff to alert the director when spider straps need to be replaced.

Seat-belt straps on backboards have their own set of problems. Because they are usually semi-permanent attachments to the backboard, they may line up inappropriately on the victim's body for proper stabilization. This is especially true for very large or very small victims. Seat-belt clasps can also rust and corrode quickly.

Another problem frequently encountered with backboard restraints is the Velcro wearing out on the head stabilization pads. Often, the Velcro is much less effective in the water than when dry. Your staff in-service practices may be the only indicator that the head stabilization pads are ineffective and could compromise the victim's spine. A rolled towel is a good temporary substitute if the aquatic staff finds the head stabilization unit to be ineffective, but the best solution is to buy a new head stabilization unit.

American Red Cross lifeguard courses no longer teach the use of cervical collars while back boarding; however, YMCA lifeguard courses continue to teach the skill but stress the need for in-service practice. Application of a cervical collar requires practice and teamwork. Without proper training, lifeguards may inadvertently compound the injury by twisting the victim's spine or failing to support the airway. Markel strongly encourages you to evaluate the risks of having a policy for applying a cervical collar as opposed to maintaining a stabilized head until EMS personnel can take over. If you decide to train staff to apply a cervical collar, seek professional assistance from your local rescue squad.



How many hazards and problems can you see in this picture?

1. Backboard has no head stabilization system.
2. Backboard used to secure high dive. (How will the diving board be secured when the backboard is needed and the lifeguards are distracted?)
3. Low diving board handrails do not extend all the way over the concrete.
4. Slick concrete deck with water accumulation.
5. Lifeguards sitting in chairs on left side are sitting too low to see properly, and positioned back from edge, creating blind spots.

## Throw Ropes and Inflatable Rescue Tubes

Throw ropes are one of the best pieces of rescue equipment available in remote aquatic environments or on canoe and kayak trips. Used properly, they can extend the reach of rescuers up to 50 feet or more in environments that make swimming rescues difficult or hazardous. When using throw ropes, there are several important issues to consider:

- Throw ropes only work with conscious victims who can grab the rope.
- If the rope is tangled in the throw bag, the rescuer is left with a time-consuming mess and the victim is still in trouble.
- Consistent accuracy with a throw bag takes practice, practice, and more practice. A rope floating in the water 10 feet from the victim does no good.
- Successful use of a throw rope is frequently a factor of the rescuer being ready to use it.

There are a number of professional courses, such as Swift Water Rescue, that are excellent for teaching staff to use a throw rope in a variety of situations. This knowledge is not limited to white-water rivers, but could also be applied to groups swimming in remote locations where a rescue tube is not available.

## First Aid Kits

First aid kits are frequently neglected. Supplies are used and not replaced, or there are insufficient supplies to handle a serious trauma, such as an impact with a diving board. The following is a list of minimum suggested first aid supplies for aquatic facilities:

Item	Description	Number
Bandages	1x3"	25 or more
	2x4" (extra Large)	4
	Butterfly (large)	8
	4" Elastic	2
Sterile gauze sponges	2x2"	10
	4x4"	5
Non-sterile gauze pads	4x4"	15 or more
Large trauma dressing	8x24"	1
Roller gauze	4" Sterile	2
	4" Non-sterile	3
Medical tape	1"	2 rolls
	2"	1 roll
Antibiotic ointment		15 packets
Betadine pads		10 or more
Medicine swabs For bee stings		10
Trauma scissors		1
Penlight		1
Tweezers		1
Saline solution (eyewash)		1 bottle
Emergency blanket		1
SAM splint		1
Ice pack		2
Accident report forms		2 minimum
Pens		2
Bodily fluid protection equipment	Non-latex gloves	6 pairs or more
	Pocket mask	1
	Germ mask with eye shield	2
	Hazardous waste bag	1
	Hand cleaner solution	1 bottle
	Exposure to Blood or Bodily Fluids Report	2 minimum
Additional equipment	Oxygen cylinder and associated equipment	1
	Bag-valve mask	1
	Ear wash and eye dropper	1
	Epi-Pen and Benedryl	1

## AEDs and Oxygen Delivery

### Automated External Defibrillators (AEDs)

AEDs are portable units used to electrically stimulate the heart during sudden cardiac arrest. Cardiac arrest has been reported in youth programs for a variety of reasons, such as a congenital heart defect, electrical shock, a blow to the chest during a fight or being hit with a baseball.

Older adults attending your aquatic facilities could have a sudden cardiac arrest unrelated to drowning. For these people, an AED may be critical.

Drowning results in suffocation, which eventually results in failure of the heart muscle to continue beating. Establishing an airway and rescue breathing is critical in these situations.

Many people theorize that in some drowning cases defibrillation may be possible, but at this time, there are no studies that prove this one way or another. Certainly if you have an AED and the staff are trained, they should use the AED.

Although AEDs are expensive (generally \$2,700 to \$3,000 each), they can save lives. (One-time-use AEDs are available for about \$800 to \$1,000, but most of these models are not designed for the rigors of an aquatic environment.) Talk to your regional American Heart Association or American Red Cross to see if they know of a funding source in your region. Also, make sure you add your AED to your insurance policy in case of theft or vandalism.

Some aquatic administrators may think they don't need AEDs because of their facility's close proximity to a rescue station. That is a very risky proposition. The American Heart Association says that when a person suffers a sudden cardiac arrest, their chances of survival decrease by up to 10% for every minute that passes without defibrillation. At most facilities, the absolute minimum time between the occurrence of a cardiac arrest and the arrival of an ambulance is at least five to ten minutes.

You should obtain advice from legal counsel and research your state and local regulations that might affect your program, including training requirements, medical control, notification of AED use, location, and immunity provisions.

### Oxygen Delivery

Increasing oxygen delivery in rescue breathing can reduce brain and cardiac damage, so it is important to provide the electrical stimulus from the AED in conjunction with oxygen.

The International Life Saving Federation (ILSF) takes the following position on oxygen delivery: "The physiological benefit of providing oxygen to spontaneously breathing drowning victims or during CPR in drowning victims in respiratory arrest is clear and advocates that oxygen should be used in all drowning victims."

The ILSF recommends using reliable oxygen equipment that is simple to assemble and operate. They recommend a non-rebreathing mask with a fixed flow of 15 litres of oxygen per minute for spontaneously breathing victims, and a bag-valve mask with oxygen inlet for patients in ventilatory arrest. Make sure the oxygen container is large enough to allow oxygen delivery until professional medical personnel arrive on the scene. Protect your staff and satisfy OSHA requirements by adding non-latex gloves and a blood-borne pathogen kit to your AED.

Proper use of a bag-valve mask and portable oxygen requires practice. This would be a good in-service skill to practice with your staff, including interaction with EMS.

Handling and storing oxygen safely requires special care. Although oxygen does not burn, it will fuel fires and cause them to burn hotter and faster. Keep the area surrounding the oxygen cylinder clear of electrical devices, flammable items, or hazards that might cause sparks, damage, or deterioration. If a fire occurs, alert fire fighters to the presence of the cylinders.

Refill oxygen bottles before they reach a residual pressure of less than 200 p.s.i. If the response time for your rescue squad is more than five minutes, you may wish to increase your residual pressure requirements. Use the following formula to calculate the remaining useful oxygen to determine if your aquatic facility has enough oxygen to maintain until EMS arrives:

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$$\frac{(\text{Gauge Pressure minus Safe Residual Pressure}) \times \text{Cylinder Factor}}{\text{divided by Flow Rate}}$$

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The following are factors for some of the common cylinder types:

Type	Capacity	Factor
D	400 liters	0.16
E	625 liters	0.28
H, K	6900 liters	3.14
M	3450 liters	1.56

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Try it out: At your waterfront, you have a small, D cylinder oxygen tank with gauge pressure of 800 p.s.i. The flow meter is set to deliver 15 liters of oxygen per minute. How long will it last?

*Answer: 6.4 minutes*

*Solution: (800 minus 200) times 0.16) divided by 15 = 6.4*

## Personal Floatation Devices (PFDs)

There are five types of PFDs, each constructed to specific design requirements listed in U.S. Coast Guard Specification 46 CFR Subpart 160. The use of life jackets saves many lives each year, especially in boating accidents.

**Type I—Off-Shore Life Jacket:** These devices are designed to turn an unconscious person to a vertical or slightly backward position. They have more than 20 pounds of positive buoyancy, and are frequently designed with high collars and floatation high on the torso.

**Type II—Near-Shore Buoyant Vest:** Usually less bulky than the Type I PFDs, these devices have a minimum floatation of 15.5 pounds and are also designed to right an unconscious person. They are not as well secured to the body and therefore are suitable only in relatively calm inland waters.

**Type III—Floatation Aid:** Less bulky and more comfortable, these PFDs will not right the user from a face-down position. They have a minimum of 15.5 pounds of floatation. This is the most common PFD used for canoeing, kayaking, and lake sailing.

**Type IV—Throwable Device:** These devices are meant to be thrown to someone in the water. They are not to be worn, but rather held to the chest for immediate assistance. Canoes and kayaks are exempt from requiring throwable devices, but all other vessels greater than 16 feet must have at least one on board. Examples are a commercial life ring buoy, buoyant cushions, and throwable devices.

**Type V—Special Use Device:** These are wearable devices approved only for certain activities as described on the attached label. Examples include sail board harness PFDs, inflatable vests, commercial white-water rafting vests, and hybrid PFDs.



## Communications Equipment

Many states mandate the presence of telephones at swimming pools. Most states have not specified whether cell phones are adequate, and concrete walls of indoor pool buildings may compromise cellular reception. At larger aquatic facilities and at many lake operations, walkie-talkies have proven to be very effective at communication within the facility, but they can't directly communicate with EMS.

**Horns and whistles:** These devices are often the communications equipment of choice for lifeguards and aquatic staff. Most aquatic programs develop their own communications signals. Make sure to explain these signals to all participants during your swimmer orientation program. Reliable communication methods are critical to keeping lifeguards and patrons aware of potentially unsafe circumstances and dispatching lifeguards to emergencies. As the size of your facility increases, the need for reliable communication methods becomes ever greater, because lifeguards may be too far from each other to speak clearly or even see each other.

**Canoes and kayaks:** These craft have their own communication system with paddle or arm positions. The American Canoe Association offers courses and publications on this form of communication.

**Lightning-warning systems:** Some aquatic programs, particularly those in coastal areas or locations known for sudden lightning storms, have added lightning-warning systems connected to a horn. Lightning can be very dangerous to indoor pools as well. Lightning can travel through windows or an open door, and the electrical current could pass through the ground to piping or cables that go into your pool or locker rooms. All programs should have specific plans for quickly evacuating the waterfront or pool in the event of lightning.

**Weather boards:** Many programs post a weather board at the entrance to their aquatic areas that is updated daily with the expected weather conditions. This is a great method to communicate to staff and participants about potential inclement weather, as well as to indicate when additional sunscreen should be applied.

## Facility Design

While the majority of drowning incidents at youth recreation programs are directly related to lack of supervision, the design and shape of the pool can create blind spots for lifeguards. Facility design also contributes to spinal injuries. Shallow-water dives make up the majority of the spinal injuries, followed by an insufficient distance from the end of the diving board to the slope of the diving well, followed by horseplay.

## Signage

Most states require you to post *No Diving* signs and water depths on the deck of the pool or lake pier. Some states require you to post the water depths on the side of the pool above the water line. It's a good risk management practice to do both. Make sure you indicate the unit of measure (feet or meters) for water depth. A pictogram for the *No Diving* sign is also a good idea for those who can't read or don't read English.

All aquatic areas should have signage posted detailing the rules for use. Many states have specific regulations about not only the wording of various rules, but also the specific font size, contrasting colors, and language.

All pools and lake swimming areas should have a safety-float rope separating the deep end from the shallow area. State regulations vary on the water depth, but most regulations fall around 4 feet 6 inches. There is no magic depth that is safe for swimmers. Lifeguards should be aware that many drowning incidents occur in water 4 to 6 feet deep—the child bounces on his toes with his nose in the air, and the lifeguard fails to recognize that the child is in danger. A key indicator that lifeguards should always watch for is a swimmer's ability to make forward progress in the water.

## Slides

Slides can be a great attraction for aquatic areas. They can also be a huge liability if installed improperly or designed poorly. Markel recommends:

- Slide should exit into at water at least 4 feet deep.
- Slide exit should be horizontal to the water and no more than 18 inches above the water.
- Slide ladders should have handrails.
- Ladders should have a non-skid rubber mat at their base out to a minimum distance of 8 feet, particularly over concrete decks.
- Slide sides should be designed to permit exit at the bottom of the slide only.
- A lifeguard should be specifically dedicated to the slide.



*This slide exit is almost too vertical. A participant coming down head first could hit the concrete bottom.*

## Blobs, Water Tramps and Other Floating Activities



*Many floating activities (blobs, icebergs, water trampolines, etc.) have blind spots that necessitate additional lifeguards for full zone supervision.*

Blobs are a unique and fun activity at many camps. They also offer the potential for a wide number of injuries. Staff blobbing other campers has resulted in a number of very expensive Workers Compensation claims. Fathers on parent visitation days have received spinal compression back injuries while blobbing their children. Markel advises the following safety practices for blobs:

- Enforce a maximum 25-pound weight difference between participants.
- Blob only one person at a time.
- Ensure there are two lifeguards supervising at all times, one on the platform and one stationed in the water in a canoe, kayak, or rescue boat.

- Ensure lifeguards have 360-degree visibility around the blob.
- Do not allow swimming beneath the blob.
- Post the rules in a prominent place.
- Create a barrier to prevent access to an unsupervised blob.
- Use steps to access the platform—they're safer than a ladder.

## Water Trampolines

Water trampolines have many of the same safety issues as blobs. It's nearly impossible for a single lifeguard to have 360-degree visibility around the trampoline, so two lifeguards are advisable. The area beneath the trampoline can pose a significant danger if a camper swims beneath while someone is bouncing. The most common injuries for this activity are fractures and contusions from two participants hitting each other. There should only be one bouncer at a time.

## Competitive Race Starting Platforms

Starting platforms for competitive racing have also contributed to a number of shallow-water dive injuries. There are five different sets of standards for the water depth used with starting blocks, in addition to state or local regulations. A general rule of thumb is that the more stringent rule applies.

For most youth recreation programs, Markel advises the YMCA standard for starting blocks. Most programs have moved starting blocks to the deep end of the pool.



### POOL DEPTH COMPARISONS (as of May 17, 2004)

#### FINA

A minimum depth of 1.35 meters from 1 meter to 6 meters from the end wall

The height of the platform shall be at least 0.5 meters to 0.75 meters above the surface of the water

No provision for starting from the side or in the water

#### NCAA

Water depth shall be no less than 4 feet

The height of the platform may not exceed 30 inches above the surface of the water

Provision for starting in the water (2.1, article 1, page 25 of 2004 NCAA rules)

#### NFHS

Minimum depth of 4 feet at start measured from the end of the wall to 5 meters from the end wall

Platform can be no more than 30 inches above the surface of the water when water depth is 4 feet or greater

Minimum water depth of 4 feet required out from end of wall to 5 meters from the end wall at start for all swim competitions

#### USA-S/USMS

Minimum depth for starts in competition is 4 feet measured from 1 meter to 5 meters from the end wall

For teaching racing starts: 5 ft

<4' must start in the water

4'> - platform maximum of 2'6" above water (local, state and municipal ordinances frequently have regulations that conflict with this standard)

#### YMCA

Only in deep end of pool in no less than 5 feet of water

9 feet minimum for teaching

They are used only under the direct supervision of a training competitive swim coach or a certified YMCA swim lesson instructor

Safety warnings are posted regarding starting block use. Starting blocks are removed or capped off to avoid unintended use

*From Our Kids Initiative, Pool Depth Comparison, USA Swimming, 2004*



## Diving Boards

A study of diving board traumas conducted by Dr. M. Alexander Gabrielsen and Mary Spivey found that every neck trauma resulting from a 3-meter board occurred at the up-slope of the diving well. None of the injured divers struck the bottom of the pool at the pool's maximum water depth. This study helps to explain why many insurance companies recommend the removal of diving boards. Although the depth directly beneath the board may be adequate, the slope of the diving well is too close for a diver performing an arched dive.

Markel recommends that all 1-meter boards have a minimum water depth of 10 feet out to a distance of at least 16 feet from the end of the board to the beginning slope of the diving well. The YMCA requires a minimum depth of 11.5 feet for 1-meter boards. For 3-meter boards, the water depth should be a minimum of 12 feet out to a distance of 18 feet from the end of the board to the beginning slope of the diving well.

For 1-meter and 3-meter competitive boards, a minimum depth of 12 feet in front of the board is recommended and 13 feet preferred, with this depth carried forward a minimum of 20 feet from the edge of the board.

## Managing Visiting Groups

Should you allow a visiting group to swim in your pool or lake, or use your boats without your qualified lifeguard present? Absolutely not. Pools are viewed as attractive nuisances, and the host program (camp, school, club, conference center) can easily be held responsible for any injuries or deaths. Even in the winter, an outdoor pool is potentially dangerous in ways that many directors never consider. For instance, many youths roller blade or skateboard and would like access to a pool. Add accumulated rain water in the deep end of the pool and an unlocked fence, and your facility could soon be under new ownership.

What if the visiting group wants to bring its own lifeguard? Legally, this is a complicated issue because the answer will vary according to the laws, statutes, and legal precedents set in each state. The legal concept is referred to as negligence per se, which means that if a program violates a statute/law/regulation, the program is negligent. Some states specifically prohibit the use of a pool without a lifeguard provided by the owner. Asking a visiting group to sign waivers or release forms is of little value in these states. The host program cannot transfer the responsibility for the safety of the group at a pool (and probably a lake) facility. Here are two options for a visiting group wishing to swim at your facility:

- Any lifeguards with the visiting group would serve as extra spotters, not lifeguards. The host program takes full responsibility for the visiting group.
- The visiting group respects the host program's liability concerns and does not swim at the host facility.

Groups that have access to canoes and other boats must also have access to the lifejackets. If you don't want groups to have access to the equipment, lock it up.

## Swimming at Other Facilities

If your organization takes groups to the local YMCA or community pool, you still have some liability. Depending on how frequently your organization uses the community pool, you might ask the pool director to add your facility and staff as additional insureds to their insurance policy. Also, ask your attorney about other methods that might protect your organization. Ask parents to sign informed consent forms, which include a release of liability.

# Resources

## Aquatic Organizations

- American Camp Association: [www.acacamps.org](http://www.acacamps.org)
- American Canoe Association: [www.acanet.org](http://www.acanet.org)
- American Red Cross: [www.redcross.org](http://www.redcross.org)
- Jeff Ellis & Associates: [www.jellis.com](http://www.jellis.com)
- International Life Saving Federation: [www.ilsf.org](http://www.ilsf.org)
- U.S. Sailing Association: [www.ussailing.org](http://www.ussailing.org)
- U.S. Lifesaving Association: [www.usla.org](http://www.usla.org)
- USA Swimming: [www.usaswimming.org](http://www.usaswimming.org)
- YMCA: [www.ymca.net](http://www.ymca.net)
- YMCA SCUBA: [www.ymcascuba.org](http://www.ymcascuba.org)

## Aquatic Standards and Source Materials

- *Accreditation Standards for Camp Programs and Services*, American Camping Association, 1998.
- *American National Standard for Public Swimming Pools*, ANSI/NSPI-1, 2003.
- *CPR/AED for the Professional Rescuer*, American Red Cross, 2002.
- *Lifeguard Management Course*, American Red Cross, 2003.
- *Lifeguard Training*, American Red Cross, 2001.
- *Open Water Lifesaving: The United States Lifesaving Association Manual*, United States Lifesaving Association, 2003.
- *YMCA Aquatic Management: A Guide to Effective Leadership*, YMCA of the USA, 2002.

## AED Program Resources

- American Heart Association: [www.americanheart.org](http://www.americanheart.org)
- American Red Cross: [www.redcross.org](http://www.redcross.org)
- National Center for Early Defibrillation: [www.early-defib.org](http://www.early-defib.org)
- Public Access Defibrillation League: [www.padl.org](http://www.padl.org)

## Regulatory Agencies

- Department of Transportation: [www.dot.gov](http://www.dot.gov)
- Environmental Protection Agency: [www.epa.gov](http://www.epa.gov)
- Equal Employment Opportunity Commission: [www.eeoc.gov](http://www.eeoc.gov)
- Occupational Safety and Health Administration: [www.osha.gov](http://www.osha.gov)
- State Agencies: Health Departments, Divisions of Youth Services, Water Control Boards
- U.S. Coast Guard Office of Boating Safety: [www.uscg-boating.org](http://www.uscg-boating.org)

## Video Resources

**On Drowning by Frank Pia:** This video records the movements of people actually drowning from the beginning of their plight through their subsequent rescue. It teaches lifeguards to understand and recognize the Instinctive Drowning Response. The recognition and rescue concepts contained in this video have been incorporated into nearly all the major lifeguard training textbooks in United States. Water Safety, Films, Inc., 914-834-7536, \$68.



## Appendix A—Aquatic Safety Checklist

	Yes	No	Action Items
<b>Lifeguard Screening and Training</b>			
Do lifeguards hold current, valid certification from an aquatic organization (i.e., ARC, YMCA, etc)?			
Does your facility conduct in-service training that teaches lifeguards your site-specific procedures?			
Do you conduct a physical screening for lifeguards?			
Do you conduct a vision screening for lifeguards?			
Does at least one facility member hold current, valid certification in Lifeguard Management?			
Do you train your lifeguards to follow the same airway-clearing procedures?			
Do you have 20- to 30- minute rotation schedules, and do you require lifeguards to change body position every 5 to 10 minutes to prevent fatigue?			
<b>Equipment Use and Maintenance</b>			
Do you regularly inspect rescue equipment, such as tubes and buoys, for wear and replace them as necessary?			
Does your facility use plastic backboards, and are lifeguards trained to use a variety of straps and restraints?			
Do you regularly inspect your first aid kit and replenish items as necessary?			
If your facility uses AEDs, are lifeguards trained in their use?			
Are lifeguards trained to deliver oxygen?			
Does your facility have the proper type and sufficient numbers of PFDs for your aquatic activities?			
Are lifeguards trained to use communications equipment (telephones, walkie-talkies, whistles)?			
Do you post signs that detail rules for use in your aquatic area?			
<b>Slides, Blobs, Water Trampolines, Starting Platforms, and Diving Boards</b>			
Do slides exit into water at least 4 feet deep?			
Is one lifeguard dedicated to the slide?			
Does your facility enforce a 25-pound maximum weight difference between participants on a blob?			
Are two lifeguards dedicated to supervising the blob—one on the platform and one in the water in a boat?			
Is there a barrier to prevent unauthorized access to the blob?			
Are two lifeguards dedicated to supervising the water trampoline?			
Does your facility follow the YMCA standard for starting platforms?			
Do diving boards, including competition boards, meet YMCA standards for minimum water depth and distance from the beginning slope of the diving well?			
<b>Visiting Groups and Use of Other Facilities</b>			
Do you require your own lifeguards to be on duty when visiting groups swim in your pool?			
If you take youth to swim at another facility, do you require parents to sign informed consent forms, including release of liability?			
If you take youth to swim at another facility, are you named as an additional insured on the host's insurance policy?			

## Appendix B—Additional Courses Available for Lifeguards

### Additional Courses Available for Lifeguards

	American Red Cross	Jeff Ellis and Associates	YMCA
Oxygen Administration	2 hours for lay responders, 3 hours for professional rescuers	Included in the Comprehensive NPWLTP Lifeguard Training.	ARC, ASHI, AHA, and NSC have recognized courses that meet the YMCA requirements.
Automatic External Defibrillation (AED)	2 hours additional time to CPR course	Included in the Comprehensive NPWLTP Lifeguard Training.	ARC, ASHI, AHA, and NSC have recognized courses that meet the YMCA requirements.

### Aquatic Facility Water Quality Certifications

Certification	Organization	Content Description
Aquatic Facility Operator (AFO)	National Recreation and Park Association	18-hour course instruction on filtration, disinfection, water testing and treatment, design considerations, facility management, risk management, and facility trouble shooting.
Certified Pool Operator (CPO)	National Swimming Pool Foundation	16-hour course covering pool and spa chemistry, testing, treatment, filtration, maintenance, and government requirements.

Markel Insurance Company recognizes both CPO and AFO certifications, but check with your local and state authorities to verify acceptability with them as well.

### American Canoe Association Boating Certifications

Type of Water	Canoe	Kayak
Lake or Flatwater	Basic River Canoe Instructor Certification – for instructors who will teach on water up to and including Class I rivers.	Basic River Kayak Instructor Certification – for instructors who will teach on water up to and including Class I rivers.
Whitewater	Whitewater Canoe Instructor – for instructors who will teach in water up through Class II.	Whitewater Kayak Instructor – for instructors who will teach in water up through Class II.
	Advanced Whitewater Canoe Instructor – for instructors who have held Whitewater Canoe Instructor for more than 24 months and plan to teach in Class III and/or IV rivers.	Advanced Whitewater Kayak Instructor – for instructors who have held Whitewater Kayak Instructor for more than 24 months and plan to teach in Class III and/or IV rivers.
Swiftwater Rescue	Introduction to River Safety Instruction – 16 hour course for instructors who will teach on Class I water.	Introduction to River Safety Instruction – 16 hour course for instructors who will teach on Class I water.
	Basic Whitewater Safety Instructor- 16 hour course for those who will teach on waters up through Class II.	Basic Whitewater Safety Instructor- 16 hour course for those who will teach on waters up through Class II.
	Advanced Swiftwater Rescue Instructor – 24 hour minimum course for instructors in whitewater greater than Class II.	Advanced Swiftwater Rescue Instructor – 24 hour minimum course for instructors in whitewater greater than Class II.

**US Sailing Association Courses (additional courses in specialized areas available)**

Sailing Counselor Training	2-day course designed for summer camp counselors. Many counselors go on to obtain Small Boat Instructor Certification.
Windsurfing Instructor	4-day course designed for those wishing to teach beginners the sport of windsurfing.
Small Boat Instructor	40-hour course designed to teach sailing instructors on-the-water group management and instruction techniques. Approved by U.S. Coast Guard and National Association of State Boating Law Administration.

## It's All About Safety

Safety is your primary goal. It's ours, too. The best way to keep people safe is to prevent accidents from happening in the first place. Markel's *Safety 1st* Education program and risk-management experts can show you how. The program includes:

- Safety Guides
- Risk Management Newsletter series
- Video lending library
- Web-based safety reviews
- Seminars

Please explore our web site, [www.markelinsurance.com](http://www.markelinsurance.com), to find out more about our programs, or call us at 800-431-1270.



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