

Crisis Management at Public Aquatic Facilities

How to handle, treat, and prevent water crises

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Executive summary

In the event of a crisis, your aquatic facility's management team and assistant staff play crucial roles in managing the situation to maintain control and safety of all patrons. This user manual contains information regarding emergency response at an aquatic facility and can be broken down into four main areas of content: **preventative lifeguarding, rescue performance, communication, and facility standards.**

Preventative lifeguarding is any action that involves the prevention of injury and rescues, as well as vigilance and training expectations. Rescue performance entails the types of rescue procedures, first aid, and emergency procedures that occur during or because of an emergency. Communication entails the delegation of tasks by management, informing patrons and the public of the situation, and creating incident reports to maintain thorough record-keeping at the facility. Facility standards are the tasks that maintenance and staff do in order to maintain safety standards. Such tasks include the use of appropriate signage, routine cleaning and sanitization, and maintaining chemical balances in pool water.

A glossary is provided at the end of the manual, which lists and defines all the important terms used. The purpose of this user manual is to inform and provide the relevant information in order to safely handle and prevent any type of crisis emergency in an aquatic center. This user manual details how to handle potential crises from the perspective of management, maintenance, lifeguards/internal employees, and audience. The primary audience for this manual is lifeguards and aquatic facility management. Other employees for your facility can refer to the manual's sections directly pertaining to them (e.g., assistant and maintenance staff).

How to use this manual

This manual should be used as your aquatic facility's primary reference for crisis management, communication, and response. All employees should read the manual in its entirety. Lifeguards, management, and other staff working around the pool itself should take special care to read and understand the approach to crisis response.

This manual provides you and your facility with critical information to effectively address various crises, helping to maintain a facility that prioritizes the health and safety of all its swimmers and patrons. In addition to crisis handling, this manual also contains information on how to address outside audiences that need or want information regarding the crisis, as well as post-emergency procedures and methods of improving lifeguard vigilance. As you read this manual, you may come across bolded terms; these terms can be found in the glossary section at the end of the manual with detailed definitions. By reading this user manual, your aquatic facility will be better equipped to handle a variety of crisis situations.

The user manual contains an overview of a variety of emergency rescue techniques to help you and your team assess how to handle a particular situation. For more detailed information regarding any crisis topics or rescue approaches, please refer to the sources provided in the reference section or the American Red Cross website.

Definition of a water rescue

Water rescue is defined as any incident that involves the removal of a victim from a body of water. According to safety recommendations published by the United States Lifesaving Association (USLA),

attentive lifeguarding significantly reduces the chance of drowning and severe injuries of swimmers (United States Lifesaving Association, 2018). This clearly illustrates the importance of water rescue training and how lifeguards' ability to respond in emergency situations is a crucial aspect of the operation of aquatic facilities and swimming as a whole.

Approaches to water rescue require continuous improvement by drawing on experiences of successful methods and receiving the necessary support from other rescuers in a team setting. This manual enhances first aid knowledge in the case of both active and passive water rescue situations to apply to all rescue situations in an aquatic environment.

Types of water rescues

Understanding the different types of water rescues is an essential part in aiding victims in crisis to prevent further injury. Lifeguards and any member of an active rescue staff should be familiar with all types of water rescues. There are four main types of water rescues that are outlined below that can be even further simplified into general water rescue and head, neck, and spine injury rescues (spinal rescues). To identify a standard water rescue, examine the situation closely. If the victim is in shallow water, there is a far higher likelihood of a spinal injury. Additionally, be able to identify swimmer **distress**, indicated by a lack of motion or high level of pain. In order to identify distress, one should examine four specific areas (American Red Cross, 2007).

1. *Breathing*: victim is struggling, but may be able to call out for help. An active victim is struggling for breath, potentially bobbing up and down below the surface. A passive victim is not breathing.
2. *Arm and leg action*: victim may be floating, sculling, or treading water if able to call or wave for help. An active drowning victim often uses their arms in an attempt to keep their head above water, with little supporting kick. A passive victim is motionless.
3. *Body position*: victim is typically horizontal or diagonal, depending on their level of distress. An active drowning victim is vertical in the water. A passive drowning victim is horizontal or vertical, either face-down, face-up, or submerged under the water.
4. *Locomotion*: victim makes little or no forward progress. An active drowning victim has limited forward motion, which indicates that there are 20-60 seconds before the victim submerges into the water. A passive drowning victim is motionless.

The section provides the necessary information to identify actively drowning victims, assess their state, and act accordingly for the situation at hand. The ability to recognize the victim's drowning stage is critical to their rescue and safety.

Active water rescue

When performing an active rescue, the victim is still conscious, and likely moving due to their status as an **active drowning** victim (American Red Cross, 2007).

When approaching from in front of the victim, thrust the rescue tube underneath the armpits of the victim. In the case of resistance from the victim, remain calm. The victim may attempt to grab you as opposed to the tube. In such a case, go under the water and remove their arms, back away from the victim, and attempt the rescue again. Verbal reassurances can help if the victim is obstructing the ability for the rescue to be performed safely.

When approaching from behind the victim, place the rescue tube against the victim's back, and link arms underneath the victim's armpits. Then place both the victim and yourself on your backs and tow towards the nearest pool edge (American Red Cross, 2007).

Passive water rescue

This section provides information to identify **passive drowning** victims and rescue them accordingly. The definition developed by the American Red Cross is that a passive drowning victim can be anywhere in a pool, face-up, down, above, or below the surface. They could be an active drowning victim and become unconscious because lifeguards didn't notice them, or it could be due to another cause such as a medical problem (e.g, stroke, seizure, or heart attack), injury (being jumped on by someone else in a swimming pool), alcohol use, and several other reasons. Positioning the lifeguard at the victim's shoulder or back level allows the lifeguard to support the victim face up (American Red Cross, 2007).

Encourage **front rescue** methods to rescue passive drowning victims. The left side of Figure 1 (below, right) illustrates the front rescue process in addition to the detailed instructions below:

1. *Approach the victim:* The lifeguard approaches the victim from the front. With the dominant hand, the lifeguard grabs the victim's opposite hand.
2. *Locate the rescue tube:* When the lifeguard begins to turn the victim's face up, the hose is extended while the lifeguard pulls the victim towards him. The rescue tube is placed at least over the shoulder but ideally in the victim's lower back.
3. *Instructions on the preferred hand position to bring the drowning victim to the nearest wall:* The lifeguard has to use their hands to support the victim's head. The rescuer's arm should be placed underneath the victim's armpit while kicking the victim against the nearest wall or designated exit point.

Encourage **rear rescue** methods to rescue passive drowning victims; the right side of Figure 1 illustrates this process alongside detailed instructions below:

1. *Approach the victim:* The lifeguard approaches the victim from behind and positions the lifeguard as low as possible under the victim's back.
2. *Locate the rescue tube:* The lifeguard pulled the victim onto the lifeboat. To avoid injury, lifeguards should make sure their heads are facing one side of the victim to ensure they are not hit in the face by the victim when placing them on the tube.
3. *Bring the drowning victim to the nearest wall:* The lifeguard will certainly use his hand to support the victim's head. The rescuer's arm should be placed underneath the victim's armpit while kicking the victim against the nearest wall or designated exit point.

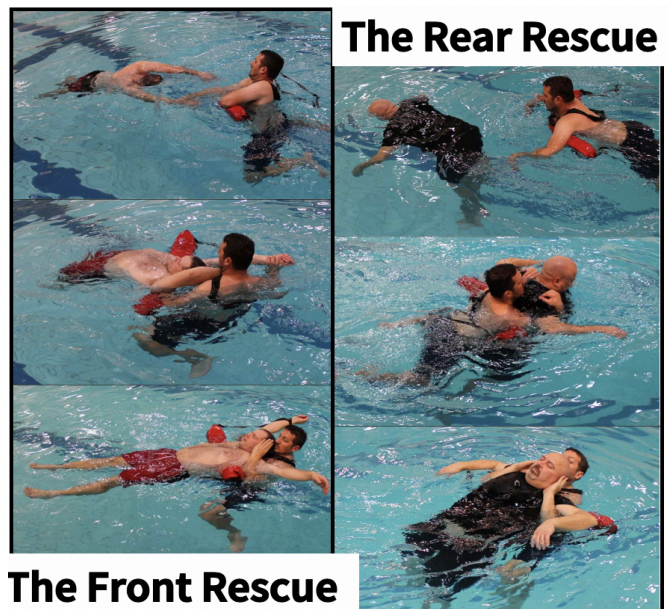


Figure 1. The front and rear rescue techniques provide support for a victim based on the sustained injury. Lifeguard University, 2014

Active spinal rescue

An **active spinal rescue** is a rescue that involves managing a spinal injury that has occurred in the water of a victim who is still conscious and facing upwards in four primary steps. Gerald Dworkin, a world-renowned water rescue expert from Lifesaving Resources explains these steps in the active spinal rescue process as follows (Dworkin, 2020):

1. Support the victim's spine and neck after reaching an upward facing (**supine**) position. Have another lifeguard or assistant provide a cervical collar to place around the neck.
2. Apply a spinal immobilization device (SID). See step 3 in the 'Passive spinal rescue' section directly below the section (or the section named '*Medical equipment and procedures*' for more detail) for the procedure of applying an SID.
3. Next, complete head and neck immobilization by placing restraints on each side of the victim's head and neck. This can be in conjunction with the cervical collar, which helps maintain alignment of the spine and prevent damaging motion from occurring.
4. Call Emergency Medical Services (EMS) and keep the victim immobilized until EMS takes over.

If the victim has left the water before alerting lifeguards to possible spinal injury, assist the victim by moving a deck chair, and assist them in sitting down. Continue by calling EMS, and emphasize to the victim that they need to move as little as possible. Once EMS arrives, allow them to take over.

Passive spinal rescue

A passive spinal rescue is a rescue that involves managing a spinal injury that has occurred in the water of a victim who is unconscious or floating on top of the water. This type of rescue is very similar to active spinal rescue. There are five steps laid out by Gerald Dworkin, who is a water rescue expert and published author on the topic (Dworkin, 2020):

1. Observe if the victim is face down in the water. If so, rotate to an **upward facing (supine) position** by placing one arm on the victim's chest and the other arm on the spine. Support the victim's head and neck with your hands (or with the help of another lifeguard) and rotate the victim while fully submerged in the water.
2. Support the spine and neck after reaching a safe supine position. It is important to provide a cervical collar to place around the neck. This should be done by another lifeguard or trained professional.
3. Apply a **spinal immobilization device (SID)**.
 - a. Hold the victim's head and shoulders, keeping the head directly in line with the spine.
 - b. Continue to hold the victim in this position while another worker places a cervical collar around the victims' neck.
 - c. Cross the victim's arms across the chest. Kneel down and place your hands on the victim's arm opposite the side you are kneeling.
 - d. Quickly rotate the victim to a perpendicular position while maintaining alignment of the spine. Have an assistant worker put a backboard under the victim and roll the victim onto the backboard.

- e. Make sure the victim is in the center of the board, with the board behind the entire head and body. Use straps to first connect the torso and then the rest of the body to the backboard.
- f. Place an immobilization device behind the victim's head to secure.
- g. Use tape across the forehead to secure the head to the backboard.
- h. After completing the spinal immobilization process, complete head and neck immobilization by placing restraints on each side of the victim's head and neck. This can be in conjunction with the cervical collar, which will help maintain alignment of the spine and prevent damaging motion from occurring.
- i. Finally, call Emergency Medical Services (EMS) and keep the victim immobilized until EMS takes over (Jung, 2016).

Drowning response

Drowning is the most common type of water-related crisis that occurs at aquatic facilities. According to the CDC, 3,536 people die each year of drowning (2021). Therefore, it is very important to understand the most effective approach to helping the victim, potentially saving his or her life. This section provides the best approach for addressing a drowning victim quickly.

Chain of drowning survival steps

The Red Cross developed the "Chain of Drowning Survival," which includes a clear five step process of how to address a drowning victim. When a victim is drowning, follow the process listed below, referring to Figure 2 for illustrations of each of the five steps (Appalachian State University Department of Student Affairs, 2021):

1. *Recognize* - Observe swimmers and recognize the signs of drowning, which is most often either a lack of motion or unconscious state. Shout for help from other lifeguards or aquatic employees. It is rare for a drowning victim to shout for help. You must stay vigilant to help a victim at any time.
2. *Rescue* - Enter the water and rescue/remove the person from the water. Ensure that you do not put yourself at risk. Protect yourself by creating a barrier between yourself and the victim.
3. *Call Emergency Services* - Have a standby lifeguard or employee call your local emergency medical services and/or 911.
4. *CPR* - Begin administering CPR as you wait for emergency medical services to arrive.
5. *Automated external defibrillator (AED)* - If available, use an **Automated external defibrillator (AED)** in an attempt to shock the heart back to a normal rhythm. The device provides you with step-by-step instructions for how to use it.

Chain of Drowning Survival

A person who is drowning has the greatest chance of survival if these steps are followed:



Figure 2. The Red Cross' illustration of the five steps in a drowning response; retrieved from Appalachian State University Department of Student Affairs, 2021.

Lifeguard training standards

The training for lifeguards must be standardized to ensure all lifeguards have sufficient knowledge of all the different techniques and approaches to handle an aquatic crisis situation and victim. These include certifications, water entrances, and preventative lifeguarding, which are all discussed in more detail below.

Certifications

Lifeguards must pass the American Red Cross lifeguard certification program. This program certifies the lifeguard in general skills such as first aid and CPR, as well as certification in using an Automated External Defibrillator (AED), as well as the various types of water rescues. Lifeguards need to renew their certification every two years by taking a written test, performing land skills, and performing water skills for a certified lifeguard training instructor.

Water entrances

In order to maintain the safety of an aquatic center there are four main types of water entries required by staff.

1. *Slide in:* Is the slowest of the four entries. When a victim has a suspected head, neck or spinal cord injury is when this technique is most effective.
2. *Stride jump:* This entry is specific to areas where the depth of the water is 5 feet or more if jumping from an elevated position. The lifeguard should also be no more than three feet above ground.
3. *Compact jump:* This is used primarily from the side of the pool or from the lifeguard chair. The pool depth should be at least five feet if jumping from an elevated position.
4. *Run and Swim:* Is used only in shallow waters to go from zero depth to at least three feet.

Preventative lifeguarding

The principle of preventive rescue operations is to intervene quickly to prevent dangerous behavior, which can lead to a drowning emergency. You must act immediately in these situations. First, intervene promptly to prevent potentially harmful behavior that could lead to an emergency. Then, depending on the case, not only pay attention when completing the preventative rescue but also ensure the safety of yourself and the victim. Donahue (2022) is an American Red Cross certified guide, and she offers actionable steps and sets out notes to follow to prevent possible crises:

- Make effective decisions based with the facts of your particular situation, and be assertive and confident in your buddy's decisions,
- Ensure your own safety is a top priority. Do not engage in verbal or physical arguments. In addition, rescuers need to carefully assess and take reasonable precautions to avoid unfortunate mistakes,
- And guarantee lifeguard rights by consistently enforcing the rules and taking disciplinary actions for violations. Lifeguards should call a manager for support if the concern cannot be solved with a reasonable, life saving amount of time (1-2 minutes)

Responsibilities during a crisis

Crisis management and resolution teams help to prevent dangerous situations in an aquatic crisis emergency. These include lifeguards, aquatic facility management, assistant staff, and maintenance staff. These crisis management employees have the power to make decisions in severe cases and devise strategies to recover from the crisis as soon as possible. In addition, the crisis team needs to respond promptly to emergency signals and implement relevant plans to deal with emergencies.

Lifeguards

Lifeguard team members are most often the first responders to an emergency. These responsibilities vary depending on the emergency. The American Red Cross (2007) lays out the general responsibilities of lifeguards as follows:

- Recognizing when someone needs help
- Activating the **emergency action plan (EAP)** according to facility standards
- Following water and land emergency procedures
- Completing incident reports
- Checking and replacing safety equipment

During a crisis, the lifeguard should activate the EAP using their whistle before entering the water. This alerts the entire staff that the EAP for water rescues is being initiated. The lifeguard then enters the water and performs a rescue based on water and land emergency procedures. The lifeguard continues treatment as appropriate, before assisting management in completing the incident report. Spinal injuries require a very specific approach in the rescue process; please see the 'Spinal injuries' section below.

Management and assistant staff

In the event of a crisis, your aquatic facility's management team and assistant staff play crucial roles in managing the situation. Management's first priority is to ensure the lifeguard and rescue team has enough support, namely a sufficient number of staff aiding in the management of the crisis. If not, they should intervene and aid in addressing the crisis victim or call in any other available staff with

prior crisis training. Assistant staff should provide any other critical assistance, which may include, but is not limited to, calling emergency medical services and gathering critical information about the victim from family or others in order to relay this to the emergency services.

Both management and assistance staff should address all other patrons in and around the pool area, as well as those just entering the facility. Calmly help all patrons exit the pool area with lifeguards and other staff on the rescue/injury management team attend to the victim. Block off the entrance area and hang up pre-made signs indicating a medical emergency is being addressed and that the facility will remain closed for a brief period. Prepare for the arrival of emergency medical services by providing a simple message from gathered information to explain what happened.

After emergency medical services have removed the victim from the premises, management needs to direct the process of cleaning the area where the victim and incident were located. Assistance staff should continue to reassure any patrons remaining in or around the facility that the crisis is under control and being taken care of safely. Four members of the assistant staff should be responsible for handling the address of outside audiences as explained in the section below on '*Addressing audiences*.' The audiences of swimmers/patrons, parents/families, news outlets, and social media should all be designated to one assistant staff member to promptly handle the process and steps as listed in this section below.

Maintenance staff

In the case of an aquatic emergency, maintenance staff are critical to maintaining the facility by ensuring a clean, safe, and healthy environment for patrons to swim.. Maintenance staff's number one priority is maintaining correct chemical levels, turning on and off water features as necessary, and assisting lifeguard team and management staff as needed.

Additionally, maintenance staff is responsible for cleanup of any biohazards such as blood, fecal matter, or other bodily fluids. When determining how to clean and sanitize an area after a biohazard, please see local and state guidelines, as well as facility procedures. Please see the following section for information on maintenance staff responsibilities during a spinal injury

Spinal injuries

Spinal injuries are a very life-threatening crisis that requires certain approaches by lifeguards and maintenance staff to prevent further injury of the victim.

Lifeguards: In a spinal injury emergency, lifeguards need to activate a pre-established EAP for this type of crisis. They should determine the victim's status (active or passive) and the severity of the injury. Lifeguards can then proceed with the correct form of spinal rescue as discussed in the '*Types of water rescues*,' beginning on page 3 (spinal rescue content begins on page 5).

Maintenance Staff: In the case of a spinal injury, maintenance staff's first task should be turning off any water features, working to limit any water movement that could cause further injury. To identify, staff should all know whistle signals to activate the EAP. After this, take instruction from management and assist in evacuating the pool.

Medical equipment and procedures

In a crisis type of situation, lifeguards and staff need to respond quickly and effectively to allow the victim the best chance for recovery. It is important for the staff of the aquatic center to know where to find and how to use the medical equipment available to them. Before any person starts their position they should be properly trained by a professional course or instructor. Make sure the lifeguard team knows where the equipment is located and is trained to use them properly. All safety equipment and supplies should be checked and restocked regularly.

Automated external defibrillator (AED)

An **automated external defibrillator** is a portable electronic device that assists in situations in which the heart has stopped or has an irregular beat. The AED determines a person's heart rhythm and can then proceed with the necessary process depending on the conclusions. It uses automatic voice prompts and a **microprocessor** inside the defibrillator interprets the victim's heart rhythm through adhesive electrodes; then through the application of electricity, stops the **arrhythmia**. This allows the heart to re-establish an effective rhythm and potentially save a potentially life threatening situation (American Red Cross, n.d.):

1. Expose the bare chest by removing all clothing. Make sure the chest is dry; wipe dry with a towel if needed.
2. Attach the pads to the individual's chest
 - a. Place one pad on the upper right side of the chest
 - b. Place the other pad on the lower left side of the chest, a few inches below the left armpit
 - i. Note: If the pads may touch, place one pad in the middle of the chest and the other pad on the back, between the shoulder blades
 - c. Plug the pad connector cable into the AED, if needed
3. Prepare to let the AED analyze the heart's rhythm
 - a. Ensure no one is touching the person
 - b. Say, "CLEAR!" in a very loud, commanding voice
4. Deliver a shock, if the AED determines a shock is needed by pushing the "shock" button on the device

After the AED delivers the shock, or if no shock is advised, immediately start CPR, beginning with compressions.

Cardiopulmonary resuscitation (CPR)

CPR is an emergency procedure used to save someone's life when either their heart or breathing has completely stopped as the result of a blocking of airways. There are two main types of ways in which CPR is performed as laid out by The American Heart Association (2020):

1. *Conventional CPR*: Complete the typical CPR process that includes chest compressions and **mouth-to-mouth resuscitation** with a rate of 30 compressions for every 2 breaths. Chest compressions should be performed at a rate of 100 to 120 compressions per minute with a depth of at least 2 inches and no more than 2.4 inches. The compressions should be done with hands (one on top of the other) in the center of the victim's chest.

2. *Hands-Only CPR*: This type of CPR (also called compression-only CPR) is CPR without mouth-to-mouth breaths. This form of CPR is recommended for use by individuals who may be uncomfortable with the conventional CPR procedure. This depth and technique of compressions listed in item 1 above should be followed in Hands-Only CPR as well.

CPR is a lifesaving technique but should not be substituted for professional medical aid. Have a bystander, another lifeguard, or employee call 911 while CPR is being performed.

Spinal immobilization device (SID)

A **spinal immobilization device** is a piece of equipment used when a victim develops a spinal injury while in the water (see Figure 3 below for an example of an SID). First, follow the steps listed in the *water rescue section* above to perform an active or passive spinal rescue on the victim. Then, before using this device on the victim, determine if a spinal injury is present.

A spinal injury is indicated by one or more of the following signs:

- altered spine curvature,
- indication of spinal or neck pain,
- spinal impact with a hard surface (e.g., wall of the pool), or
- an abnormal mental state (e.g., mild to severe confusion, difficulty speaking, unresponsiveness, etc.).

Once you have determined the presence of a spinal injury, follow the steps below, with at least one other person to assist, to help the victim before emergency medical services arrive (Jung, 2016):

1. Hold the victim's head and shoulders, keeping the head directly in line with the spine.
2. Continue to hold the victim in this position while another worker places a cervical collar around the victim's neck.
3. Cross the victim's arms across the chest. Kneel down and place your hands on the victim's arm opposite the side you are kneeling.
4. Quickly rotate the victim to a perpendicular position while maintaining alignment of the spine. Have an assistant worker put a backboard under the victim and roll the victim onto the backboard.
5. Make sure the victim is in the center of the board, with the board behind the entire head and body. Use straps to first connect the torso and then the rest of the body to the backboard.
6. Place an immobilization device behind the victim's head to secure.
7. Use tape across the forehead to secure the head to the backboard.

After completing these steps, assess the victim's state and adjust the straps or tape as needed. This process ensures the victim is not further injured while awaiting emergency services or in transport to the hospital.



Figure 3. The spinal immobilization device (SID) with the specific locations to apply tape (or to connect buckles if on the SID you are using), as discussed in the steps listed above (Spencer, n.d.).

Spineboard and backboards

Spine boards and **backboards** are tools lifeguards use when someone has a spinal or back injury underwater. The spine board and backboard are some of the most important components to spinal rescue as stabilizing the spine is one of the most important parts of spinal safety.

Determining the correct location and immobilizing it to the victim is essential to avoid possible damage. The EMT uses backboards as stretchers in cases of moving victims in an accident. The purpose of these tools is to keep the victim in a stationary position during movement. Transporting the immobilized patient is essential to ensure the patient has the best chance of recovery. Spineboards built-in head and strap fixings help make this possible. The goal of using a spinal table is to get the patient out of the water without causing any movement or damage to the spine. Make sure you're using a high-quality spine table you can trust by following successful rescue procedures:

1. Approach victims and take immediate action,
2. Place the backboard/spine board in the right direction and not impact the injured victim,
3. Stabilize the backboard and prepare to secure the victim to the spine board by repositioning them,
4. Secure the victim to the spine board and remove them from the water. Make sure to comfort and care for the victim until the emergency arrives.



Figure 4. An aquatic rescue team uses a spine board to rescue an injured swimmer. The victim has been secured to the spinal board before the rescue team begins removing the victim from the water; published on Pinterest by Wendy B. (n.d.).

Pool Maintenance

The maintenance routine of your pool or aquatic facility is a critical part of managing the health and safety of all patrons. The two main procedures for managing maintenance include regular cleaning and chemical treatment. This section provides detailed information and instructions on managing both of these maintenance procedures.

Cleaning

Regular cleaning and maintenance of the facility is crucial to maintain the health and safety of all patrons. Preventing **recreational water illnesses** (RWIs) requires participation from pool staff, swimmers, and health departments. The following cleaning and maintenance procedures can help decrease injuries and RWIs (American Red Cross, 2009):

- Regularly test and perform chemical treatments on pool water.
- Maintain proper maintenance and disinfectant activity records
- Drain and replace water on a monthly basis. Drain more often depending on usage and water quality
- Scrub pool, restrooms, and shower surfaces to ensure facility cleanliness
- Educate pool users about appropriate pool use

Chemical treatment



Chemical treatment and testing of pool water should be done in accordance with the **Model Aquatic Health Code (MAHC)** as defined by the **Centers for Disease Control (CDC)**. Failure to conform to the MAHC creates the potential for injury, both among staff and patrons. According to the CDC (2019), chemical-related injuries are predominantly caused by inhalation of toxic chlorine gas, which is created when pool chlorine is improperly mixed with certain acidic chemicals. See Figure 5 to the left for a sample pool testing kit.

Figure 5. Pool water test kit for acidity, bromine, chlorine, and pH levels. The chemicals in this kit are all important for the maintenance of your facility’s pool water to prevent bacteria growth and to ensure the water is a safe swimming environment for all patrons.

While a large portion of chemical-related injuries are reported from residential pools, the risk of injury is just as likely in a public setting if the MAHC is not upheld. Pool water should be tested for pH and chemical levels regularly—at least twice per day. In the event that chemical mistreatment is detected, lifeguards should evacuate the pool of all patrons and unprotected staff immediately. If the pool is located indoors, evacuate the entire enclosure in case of toxic gasses lingering in the air. Should toxic gasses be detected, it may be necessary for maintenance personnel to be equipped with respirators and goggles before attempting to resolve the issue. When administering pool chemicals, staff should wear gloves and goggles to avoid caustic burns from concentrated substances like chlorine and bromine.

Injury prevention

Injury prevention is a foundational component of setting up an aquatic center to protect the health and safety of all patrons and swimmers. These simple precautions are extremely important as they allow avoidable accidents to be minimized.

Injury prevention starts with the facility, particularly with signage. Ensure safety indicators are highly visible, repeated throughout the facility, and enforced consistently. Additionally, clearly mark your facility’s pool toy and attire policies at the entrance to the facility, as well as throughout the pool deck. Lifeguards are responsible for ensuring all patrons understand and adhere to facility rules.



Universal injury prevention measures include “walk” signs to avoid patrons running and slipping on a wet pool deck. Additionally, “no diving” symbols as shown in Figure 6 should be posted regularly throughout the shallow areas, which are commonly any areas that have less than eight feet of depth.

Figure 6. The internationally-recognized symbol for no diving in a shallow area of a pool. Similar signage is important in all aquatic facilities and swimming areas to help prevent head injuries.. DepthMarkersDirect (n.d.).

Addressing audiences

After an emergency occurs, the aquatic facility and team members have particular obligations to finalize the management of the crisis. Tasks include developing reports and responding to questions and concerns from outside audiences, including emergency services, other facility patrons, news outlets, and social media.

Reports

Everyone involved in the water rescue or the aquatic safety team should promptly and accurately report the incident for precise record keeping by the facility and to provide to a medical team as appropriate. Remember the following points:

- Be thorough when completing the report.
- Be specific when describing the injury and the event.
- Do not include assumptions or opinions of the incident or safety measures. Only include facts of the incident and what you saw.
- Receive confirmation (if possible) from the victims, and have them sign that the treatments described did occur.
- If the victim declines treatment, have them sign a waiver stating that they declined treatment to avoid liability for the facility and staff involved.

Emergency services

Addressing emergency services is essential because it is the first and most important source of contact after an incident occurs. Clear, consistent, and timely communication is critical to managing crisis response efforts. The first priority should be given to effectively communicating with emergency services after arrival at your facility. You need to relay information on the crisis and the victim.

Consider the following steps when communicating with emergency services:

- Develop a clear message. Information should be presented in a simplistic manner so that emergency services can understand what has occurred and what your crisis response team has done to manage the situation. Be specific about the victim’s current status. It is also important to use commonly known names of places and things, avoiding unnecessary details.
- Then, to be able to update specific timelines in a timely manner, it is necessary to provide clear timelines for emergency management; at the same time to prevent the spread of misinformation. It’s essential to keep everyone calm, and everyone can stay calm when they have updates and schedules to follow.
- Finally, another crucial point is to keep the message consistent. When information is presented, it should be given by a voice; this is especially important to avoid disorienting

information during emergencies. Not only does it maintain the same message, but it also needs to be updated promptly so that those in danger can react and adapt accordingly.

Communicating with emergency services is a necessary responsibility to stay safe during emergencies and disasters resulting in severe injury or death. The approach to handling a crisis from crisis leaders can make a difference in how people respond to extreme situations.

Other swimmers and patrons

Other patrons may want to know about the emergency that occurred; however, it is critical that the privacy of the victim is ensured due to **HIPAA (Health Insurance Portability and Accountability Act)**. The victim's name, details regarding treatments provided, and the identified condition may not be shared. When in doubt, assure other swimmers and patrons that the lifeguards have performed their jobs to the best of their abilities, and there is nothing for them to be concerned about. If swimmers were evacuated from the pool, inform them if and when they will be allowed to return to normal activities, and follow facility procedures regarding refunds, facility evacuation, and closures.

Parents and families

It is not uncommon for friends and family of injured patrons to become panicked or hysterical, which could obstruct emergency responses. In such a case, staff should attempt to maintain composure by answering questions and assuring the patrons that the situation is being handled to the best of their ability.

News outlets

News outlets may report about emergency situations, so it is important to train lifeguards and team members on how to handle questions and communicate with reporters. Remind team members of the following:

- Do not give out private information about the injured person or other pool patrons.
- Direct any questions from the media to management or designated spokesperson.
- Do not discuss the emergency with anyone outside of the lifeguard staff.

Social media

Social media platforms provide an easy way for the public to be informed about an emergency and a potential closure of your aquatic facility. . If your aquatic facility has any social media accounts, create a short, informative post explaining how an incident or crisis affects the use of the aquatic facility, while respecting the victim's privacy. Doing so will help maintain patrons' trust in your facility and prevent false assumptions about the situation from spreading in your community.. Ideally, you should create and publish your post within two hours of the crisis. At a minimum, your post should include the following information:

- Date
- Time at which the incident occurred
- Briefly explain the incident (maintain very general terms)
- Reassure the reader you are handling or have handled the situation
- Address any closures or delays of operations
- Phone number, email address, and/or other facility contact information

After you have created your short post, publish the information on your facility's social media platforms. Promptly respond to any follow-up questions or concerns with a statement that you are handling the situation to keep all patrons healthy and safe.

Improving lifeguard vigilance

Water competency means improving safety for yourself and others by avoiding common dangers, developing water safety skills, and knowing how to prevent water emergencies. Lifeguards must employ specific sets of skills, all of which should be covered in participant surveillance training as a part of the certification process. These skills can be divided into three categories:

Recognizing potential victims

There are a variety of visual and behavioral cues that may indicate whether a patron is at risk of injury. Factors that influence swimming ability should be taken note of, such as body position, stamina, breath control, and overall comfort in the water.

As these factors can be difficult to identify to inexperienced personnel, it is imperative that lifeguards are familiarized with these cues during training. Training should involve close study of the behaviors exhibited by patrons in distress, both in and out of the water. This can be accomplished through the use of surveillance footage, "shadowing" more experienced personnel, or live mock-scenario exercises (Tyrrell, 2019).

Conducting surveillance/scanning

It can be difficult to recognize when a swimmer is struggling to stay afloat, especially when the pool is crowded. Important visual cues can easily hide in plain sight, so lifeguards should be trained to prioritize *where* to look and *what* to look out for. Pools should be divided into **zones**, each at least one lifeguard post.

Lifeguards are expected to be able to prioritize numerous visual stimuli based on the immediacy of the threat they pose, as preoccupation with one visual task may lead to **inattentional blindness** to another (Safe-Wise, 2007).

1st Priority – Scan the bottom of the pool as victims underwater are at the greatest risk.

2nd Priority – Scan the surface of the water.

3rd Priority – Manage behavior and deck activity

Maintaining frequent rotation of on-duty lifeguards between posts can also help to prevent inattentional blindness. When surveying the area, lifeguards are expected to enforce standard safety precautions and behavioral expectations among patrons. Special attention should be paid to those who dive or jump into pools, especially near shallow waters. Poolside features like diving boards or waterslides should not be accessible to patrons unless staffed by qualified personnel. Lifeguards should also enforce a strict no-running policy on the pool deck.

Maintaining and Improving Vigilance

Lifeguards must be able to maintain a high level of awareness for extensive periods of time. This means avoiding all unnecessary distractions and focusing solely on the job of keeping all swimmers safe. Health and wellness is extremely important in allowing lifeguards to remain vigilant, so measures should be in place to treat and replace those who are unable to operate at full capacity.

Lifeguards should be trained in methods of reducing distractions, including the ability to interact with patrons without diverting too much attention from surveying the environment.

In order to prevent monotony and improve vigilance whilst scanning, Safe-Wise Consulting (2007) has outlined a Five Minute Scanning Strategy:

- *Posture:* Sit – Stand – Stroll
- *Position:* Switch position or posture every five minutes and include more frequent rotations.
- *Pattern:* Scan – Change visual patterns every five minutes and scan the pool bottom first and then the pool top.
- *Count:* Count or approximate swimmers in a zone every five minutes.

When on shift, lifeguard duties should be strictly limited to scanning and control. Secondary responsibilities like pool maintenance should be conducted in between shifts, or by other personnel. Vigilance can not be maintained at optimal capacity for more than 30 minutes, according to Safe-Wise Consulting. As such, it is suggested that lifeguards should be rotated every 20 to 30 minutes with a ten-minute break provided every hour (Safe-Wise, 2007).

If at an outdoor pool, lifeguards should be equipped with shirts, hats, and polarized sunglasses. Shade should be provided at all posts, as well as water bottles to maintain hydration. Environmental factors such as sun glare, water clarity, and weather conditions may impact visibility.

Establishing the best practices for your facility

As each facility has its own conditional requirements for proper risk management, it is important to identify the best practices that apply to your facility. As lifeguards are required to dedicate most of their attention towards surveillance, it is important that facility-specific policies do not interfere with lifeguard duties.

For example, work hours should allow for lifeguards to get sufficient sleep between shifts. The placement of lifeguard posts should be a conscious decision, as well as the distribution of personnel between zones.

In most cases, facility-specific policies like these come about in response to unforeseen complications. As it is impossible to predict every potential oversight in the policy-making process, management should always be prepared to make adjustments and additions to their policies.

Conclusion

Knowledge of swimming and water safety can reduce a victim's risk of drowning and provide lifeguards and other aquatic facility employees with the skills to rescue victims while also using aquatic policies to prevent emergencies. The user manual provides information to assess an emergency and decide on the appropriate steps to handle an injury or emergency situation with a swimmer. Knowing how to stay safe while participating in water activities is essential to avoid possible accidents. In particular, lifeguards must take on the responsibility to keep the victim in a proper rescue position and have instructions to follow up into the emergencies. It must be understood that this user manual is a crisis manual to help in extreme or emergency situations. In emergency situations, flexibility and critical thinking are two core values that cannot be put into a manual but are needed under crisis circumstances. Finally, it is important to remember that the user manual contains an overview of the necessary information to address a variety of crises. Please refer to the sources in the

'References' section for more information on handling emergencies not discussed in the manual or for more detail on any procedures.

Glossary

Active drowning: Drowning in which the victim is still conscious and moving.

Active spinal rescue: A rescue performed on a drowning and/or injured victim when the victim is still conscious and a spinal injury is present.

Arrhythmia: A medical condition in which an individual's heartbeat is irregular or abnormal.

Automated external defibrillator (AED): A portable electronic device that automatically diagnoses the life-threatening cardiac arrhythmias of ventricular fibrillation (VF) and pulseless ventricular tachycardia, and is able to treat them through defibrillation, the application of electricity which stops the arrhythmia, allowing the heart to re-establish an effective rhythm.

Backboards: A device that allows an injured victim to maintain spine and back alignment in an emergency rescue.

Cardiopulmonary resuscitation (CPR): An emergency procedure performed when the heart begins to stop beating. Immediate CPR can triple chances of survival. CPR becomes vital because keeping the blood flow active even just partially- exponentially increases the opportunity for a successful resuscitation once trained medics have arrived on site.

Centers for Disease Control and Prevention (CDC): The national public health agency of the United States.

Communication: How staff shares information with various groups, and what information can be shared.

Distressed swimmer: A swimmer who is struggling to make progressive forward motion or indicates a high level of pain due to their lack of motion.

Emergency action plan (EAP): A type of emergency plan that contains information on the immediate actions to take when someone's life is at critical risk of severe injury or death.

Emergency services: Services provided by public institutions with a mandate to act quickly to respond to emergencies as they arise, particularly fire departments, police, and ambulance services.

Facility standards: Sanitation and safety requirements set up by federal, state, and local governments that the pool must follow.

Front rescue: A passive water rescue technique in which a rescuer approaches the unconscious drowning victim from the front.

Health Insurance Portability and Accountability Act (HIPAA): A federal law requiring a patient's consent to release personal health information.

Inattentive blindness: Failure to recognize visual stimuli due to preoccupation with some other task.

Microprocessor: An integrated circuit that contains all the functions of a computer.

Model Aquatic Health Code (MAHC): A standardized model of best practices established by the CDC to minimize risks and promote healthy recreational water experiences.

Mouth-to-mouth resuscitation: A conventional CPR procedure in which a rescuer blows air into the victim's mouth in an attempt to revive the lung capacity for regular breathing.

Passive drowning: Drowning that occurs when the victim is motionless and floating face down on the bottom or near the surface of the water.

Preventative lifeguarding: A method of lifeguarding that emphasizes the avoidance of emergencies before they occur through rapid intervention to prevent potentially dangerous behavior can lead to life threatening injuries.

Rear rescue: A passive water rescue technique in which a rescuer approaches the unconscious drowning victim from behind.

Recreational water illness (RWI): Diseases that are spread by swallowing or breathing in mists from water contaminated with germs.

Rescue performance: How the rescue is performed by the staff, typically debriefed by management after a crisis.

Spine board: A spine board is a patient handling device used primarily in pre-hospital trauma care.

Water rescue: Any incident that involves the removal of a victim from a body of water

Zones: Areas of the pool assigned to a particular lifeguard. The assigned lifeguard should have a full view of the entire zone, preferably from an elevated position.

References

- American Heart Association. (2020). *What is CPR?*. American Heart Association.
<https://cpr.heart.org/en/resources/what-is-cpr>
- American Red Cross (n.d.). *AED steps*. American Red Cross Training Services.
<https://www.redcross.org/take-a-class/aed/using-an-aed/aed-steps>
- American Red Cross. (2007). *How to Prepare for and Respond to an Emergency*. Lifeguard Management (3rd ed., pp. 46–52).
https://drive.google.com/file/d/1_6MtXMNwLBSKBkEbcl8SNAs0eZf1KEd-/view?usp=sharing
- American Red Cross. (2009) *Swimming and water safety*. American Red Cross Swimming and Water Safety Program Resources.
<https://drive.google.com/file/d/12me0qcKxqhdVZQsF4w5VIMwmtmJtsN7F7/view?usp=sharing>
- Appalachian State University Department of Student Affairs. (2021, May 20). *Water safety: Chain of drowning survival*. Appalachian State University.
<https://studentaffairs.appstate.edu/stories/Entry/136/water-safety-chain-of-drowning-survival>
- Blantford, W.. (n.d.) *Staff Training on Spineboard*. Pinterest.
<https://www.pinterest.co.uk/pin/405112928966099307/>
- Blazovic, S., Jamal, Z., Quinn, K. (2018). *Pool safety*. StatPearls Publishing LLC.
<https://europepmc.org/article/nbk/nbk534235#free-full-text>
- CDC. (2014, August). *Crisis and Emergency Risk Communication Manual*. Centers for Disease Control and Prevention.
<https://drive.google.com/file/d/1iRr3yxXjY-z4FssJ5FSl4uvagtOf5shx/view?usp=sharing>
- CDC. (2021, June 17). *Drowning facts*. Centers for Disease Control and Prevention.
https://www.cdc.gov/drowning/facts/index.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fhomeandrecreational%2Fwater-safety%2Fwaterinjuries-factsheet.html
- CDC. (2008, November). *Model aquatic health Code*. Centers for Disease Control and Prevention.
<https://www.cdc.gov/healthywater/pdf/swimming/pools/mahc/structure-content/mahc-preface-user-guide-definitions.pdf>
- Ceramic swimming pool international no diving symbol deck abrasive non-slip finish*. (n.d.) DepthMarkersDirect.
<https://depthmarkersdirect.com/products/ceramic-swimming-pool-international-no-diving-symbol-deck-abrasive-non-slip-finish>
- Chan, J. S., Ng, M. X., & Ng, Y. Y. (2018). *Drowning in Swimming Pools: Clinical Features and Safety Recommendations*. Singapore medical journey, 59(1), 44–49.
<https://www.ncbi.nlm.nih.gov/labs/pmc/articles/PMC5778258/>
- Donahue, M. (2022) *Preventative lifeguarding*. [Blog post].
<https://marydonahue.org/preventative-lifeguarding>
- Dworkin, G.M. (2020, June 2). *Aquatic spinal injury management*. Lifesaving Resources.
<https://lifesaving.com/issues-safety-rescue/management-of-aquatic-spinal-injuries/>

- Elcarter. (2020, March 26). *Swim and water safety tips*. Emergency Management Mission Continuity. <https://emmc.ehps.ncsu.edu/2019/05/28/swim-and-water-safety-tips/>
- Esschert et al. (2019). *Pool Chemical Injuries in Public and Residential Settings—United States, 2008–2017, and New York, 2018*. MMWR Morb Mortal Weekly Rep, 68(19), 433–438. <https://dx.doi.org/10.15585%2Fmmwr.mm6819a2>
- Jung, J. (2016). *Spinal immobilization*. Society for Academic Emergency Medicine. <https://www.saem.org/about-saem/academies-interest-groups-affiliates2/cdem/for-students/online-education/m3-curriculum/group-traumatic-and-orthopedic-injuries/spinal-immobilization>
- Lifeguard University. (2014) *Passive drowning victim rescue*. Lifeguard University. <https://lifeguarduniversity.com/rescue-skills/passive-drowning-victim-rescues/>
- Markel Risk Management Department. (2014). *Risk management for your aquatic safety program*. Markel resource. https://drive.google.com/file/d/1u4g4p-9bEQBOKjKstwnd706ZVdUoqIV_/view?usp=sharing
- Pool Heaven. (n.d.) *5 Most Important Tests In Pool Water Testing In Orange County, Ca*. Pool Heaven. <https://poolheaven.net/articles/pool-water-testing/>
- Safe-Wise Consulting (2007). *Victim recognition, scanning & emergency drills for pools and waterfronts*. Safe-Wise Consulting, LLC. <http://safe-wise.com/phl/downloads/Scanning-and-Drills.pdf>
- SED Spencer extrication device (n.d.). Spencer. <https://www.spencer.it/en/products/immobilization/others-immobilization/sed-spencer-extrication-device>
- Tyrell, D. (2020, November 18). *A Change in Focus: Improving Lifeguard Vigilance*. American Camp Association. <https://www.acacamps.org/resource-library/camping-magazine/change-focus-improving-lifeguard-vigilance>
- United States Lifesaving Association. (2018). *USLA's top ten beach and water safety tips*. USLA. <https://en.calameo.com/read/00597039703d43ce10878?authid=pwRCuSOel7zV&page=1>