

BASIC WATER RESCUE

City of Lynwood WA & American Red Cross

Participants Manual



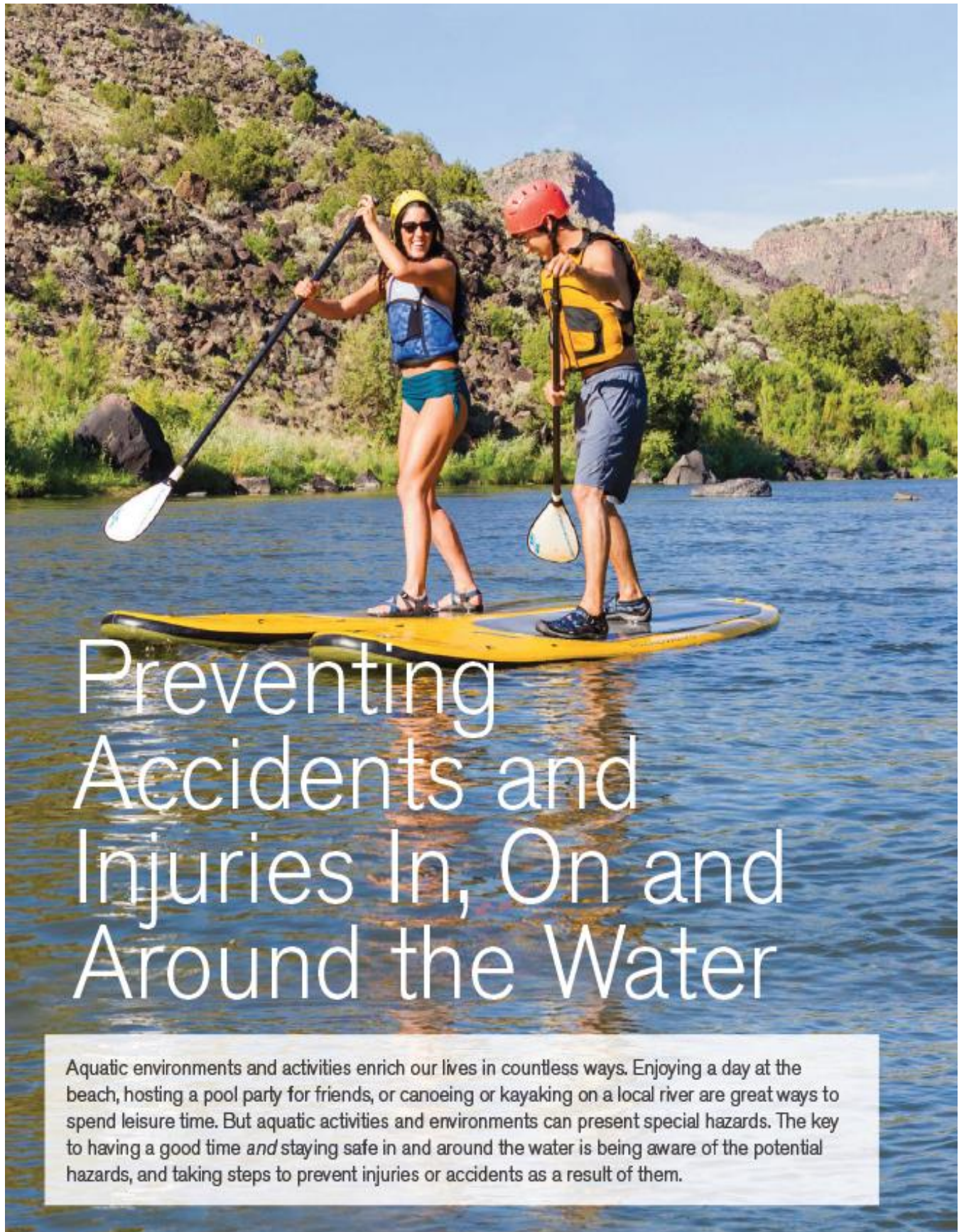
Basic Water Rescue

Chapter 1: Preventing Accidents and Injuries In, On and Around the Water

Lowering the Risk for Drowning	2
Using Life Jackets	7
Staying Safe from Environmental Hazards	9
Staying Safe in Specific Aquatic Environments	15
Staying Safe While Engaging in Water Activities	27

Chapter 2: Recognizing and Responding to Aquatic Emergencies

Recognizing an Emergency	36
Responding to an Emergency	38
Basic Water Rescue: Helping Others in an Aquatic Emergency	41
Basic Water Rescue: Helping Yourself in an Aquatic Emergency	45



Preventing Accidents and Injuries In, On and Around the Water

Aquatic environments and activities enrich our lives in countless ways. Enjoying a day at the beach, hosting a pool party for friends, or canoeing or kayaking on a local river are great ways to spend leisure time. But aquatic activities and environments can present special hazards. The key to having a good time *and* staying safe in and around the water is being aware of the potential hazards, and taking steps to prevent injuries or accidents as a result of them.

The American Red Cross and Water Safety

It is the mission of the American Red Cross to prevent, prepare for and respond to emergencies. Today, the American Red Cross Swimming and Water Safety program helps fulfill that mission by teaching people to be safe in, on and around the water through water safety courses, water orientation classes for infants and toddlers and comprehensive Learn-to-Swim courses for people of different ages and abilities.

The American Red Cross has a long history of helping people to be safe in, on and around the water. In the early 1900s, Wilbert E. Longfellow, the Commodore in Chief of New York City's newly formed U.S. Volunteer Life Saving Corps, identified the need for a nationwide program of swimming and lifesaving instruction and presented a plan for the "waterproofing of America" to the American Red Cross in 1912. Soon after, the Red Cross Life Saving Corps (forerunner of the present-day Red Cross Water Safety courses) was created. Longfellow was appointed to organize the new lifesaving program and was awarded the very first Red Cross Lifesaving Certificate and the lifesaving emblem that has since been earned and proudly worn by millions of people (Fig. 1-4).



Fig. 1-4 Commodore Wilbert E. Longfellow (third from left), with members of the Red Cross Life Saving Corps, made it his life's work to achieve the goal of "Every American a swimmer, every swimmer a lifesaver!"

For the next 33 years, until his death in 1947, Longfellow worked tirelessly in support of the nationwide Red Cross Water Safety program. As a result of his efforts, the nation's drowning rate was cut almost in half—from 8.8 people per 100,000 in 1914 to 4.8 in 1947—and there was a tremendous upsurge in the popularity of swimming, boating and other water activities, to the point where nearly 80 million Americans were participating in some form of aquatic recreation.

Water Safety Education and Learning to Swim

While aquatic environments and activities are a great source of enjoyment, they are associated with some risks, most notably that of **drowning** (the process of experiencing respiratory impairment from submersion or immersion in liquid). Drowning can be fatal or nonfatal. Death by drowning is a leading public health problem in the United States and throughout the world, but the majority of deaths by drowning can be prevented (Box 1-1).

Box 1-1

International Life Saving Federation (ILS) Position Statement: Swimming and Water Safety Education

1. Death by drowning is a leading public health problem in all countries. Prevention requires public and government support.
2. The vast majority of deaths by drowning can be prevented.
3. Everyone, ideally commencing at a young age and regardless of ability and background, should have access to training in water safety, personal survival and water rescue.
4. Knowledge and understanding of water environments and their associated hazards should be taught to everyone at the earliest possible age.
5. This awareness training should be accompanied by the provision of swimming teaching, in the safest manner possible and to at least a basic level of skill that provides the capacity for survival after unexpected and sudden immersion in water.
6. Acquisition of more advanced water safety knowledge and swimming skills, to include water rescue and competitive swimming, should be encouraged as these enhance aquatic safety.
7. Water hazards should be reduced wherever possible, particularly where swimming and water safety education take place.
8. Trained lifeguards should provide prevention, rescue and treatment where recreational swimming and water safety education take place.
9. Wherever possible, organizations with drowning-prevention expertise, based in high-income countries, should provide assistance to lower-income countries.
10. Accessible and affordable training in water safety and swimming skills should, ideally, be made available for everyone, particularly children, in all countries, to a level consistent with the ILS International Water Safety and Swimming Education Guidelines.

Excerpted from International Life Saving Federation: Lifesaving Position Statement LPS 06. Swimming and Water Safety Education. (www.ilsf.org).

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There are two keys to lowering the risk for drowning: water safety education and knowing how to swim.

Water Safety Education

Water safety education seeks to give people the knowledge they need to recognize potential risks posed by aquatic environments and activities and teaches them strategies they can use to lower those risks (**Fig. 1-1**). Water safety education also teaches people personal survival and water rescue skills, which can improve the chances for a positive outcome should an aquatic emergency, occur. Research provides evidence of a strong link between water safety education and a reduction in drowning deaths.

Learning How to Swim

Knowing how to swim is a basic life skill that everyone should possess (**Box 1-2**). Learning how to swim if you do not already know how can help you to feel more confident when you are in and around water and it will open up a whole new world of opportunities for enjoying water-based recreational activities. But more importantly, knowing how to swim can save your life or someone else's life.

Box 1-2

Water Competency

Water competency is possessing the basic, minimum skills needed for water safety and survival. Providing participants with the skills they need to achieve water competency should be an objective of every swim instruction program. More than just knowing “how to swim,” water competency includes the ability to:

- Enter the water and completely submerge.
- Recover to the surface and remain there for at least 1 minute (floating or treading).
- Turn 360° and orient to the exit.
- Level off and propel oneself on the front or the back through the water for at least 25 yards.
- Exit the water.

The ability to demonstrate the skills that constitute water competency in one aquatic environment may not translate to another. For example, a person who is water competent in a pool may not be water competent in a lake, river or ocean because of different environmental conditions, such as cooler water temperatures or currents. Therefore, the definition of water competency should specify the environmental context.

A definition of water competency allows swim instruction programs to establish specific goals that lead to water competency, and provides participants with the knowledge that after completing a certain level of the swim instruction program, they should possess the minimal skills needed for water competency in that environment.

Lowering the Risk for Drowning

In the United States, drowning ranks fifth among the causes of death from unintentional injury. And, even when a drowning incident does not result in death, it can result in significant long-term disability. Drowning happens quickly and suddenly. Lowering the risk for drowning requires following general principles of water safety (**Box 2-1**) and establishing layers of protection (**Fig. 2-1**). Having layers of protection in place provides “backup” if one protective strategy fails, reducing overall risk. The American Red Cross has established five layers of protection for lowering the risk for drowning:

1. Learn swimming and water safety survival skills.
2. Swim **ONLY** in lifeguarded areas.
3. Have children, inexperienced swimmers and boaters wear U.S. Coast Guard-approved lifejackets.
4. Provide close and constant supervision to children who are in or near the water.
5. Fence pools and spas with adequate barriers to prevent unsupervised access

Age is a major risk factor for drowning incidents. In the United States, drowning ranks second, behind motor vehicle crashes, as a cause of death from unintentional injury in children ages 1–14; Children between the ages of 1 and 4 years have the highest rate for drowning. Most of these incidents occur in home swimming pools, but any source of water, including a bathtub or partially filled bucket, is a potential drowning hazard. An infant can drown in as little as 1 inch of water.

Box 2-2 contains tips for lowering the risk for drowning for children

Box 2-1

General Guidelines for Staying Safe Around the Water

- Learn to swim.
- Do not use alcohol or drugs while engaging in aquatic activities.
- Obtain the knowledge and skills you need to prevent, recognize and respond to aquatic emergencies (for example, by taking a boating safety course before operating any watercraft).
- Never swim alone. Swim only in designated areas and areas supervised by a lifeguard.
- Set up specific swimming rules for each member of your family or group based on swimming abilities. Closely supervise children in, on or around the water, even when a lifeguard is present.
- Read and obey all rules and posted signs. Pay special attention to water-depth markings and “no diving” signs.
- Enter the water feet-first, unless you are in an area that is clearly marked for diving and has no obstructions.
- Watch out for the “dangerous too's”: too tired, too cold, too far from safety, too much sun and too much strenuous activity.
- Have a means of summoning help (such as a mobile phone) close by. Aquatic emergencies often happen quickly and unexpectedly.
- Get trained in first aid, cardiopulmonary resuscitation (CPR) and automated external defibrillator (AED) use. To enroll in a Red Cross first aid, CPR and AED class, visit www.redcross.org.



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The City of Lynnwood offers many different Safety courses – from CPR to Babysitting. Pet First Aid and CPR to wilderness First Aid

Visit www.playlynnwood.com or stop by Customer Service to learn more

Circle of Drowning Prevention

Layers of protection are essential to help prevent drowning.
Plan ahead for aquatic activities:



American Red Cross

Box 2-2

Tips for Reducing the Risk for Drowning in Children

- Enroll children in Red Cross Parent and Child Aquatics, Preschool Aquatics and Learn-to-Swim courses. Providing early aquatic experiences to a child is a gift that will have lifelong rewards.
- Young children are curious and their interests and abilities change from day to day. Do not leave a young child unattended near any source of water, even for a moment.
- Closely supervise children in, on or around the water, even when a lifeguard is present, no matter how well the child can swim or how shallow the water. Stay within an arm's reach of any weak or inexperienced swimmer who is in the water.
- Know each child's swimming ability and set specific rules for each child based on her swimming ability.



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Box 2-2 (continued)

- Do not rely on the use of water wings, swim rings, inflatable toys and other items designed for water recreation to replace a U.S. Coast Guard-approved life jacket or adult supervision. These devices can suddenly shift position, lose air or slip out from underneath the child, putting the child at risk for drowning. They may also falsely increase a child's sense of confidence, causing him to venture into water that is too deep.
- Teach children not to engage in competitive underwater games, such as seeing who can hold his or her breath the longest underwater or seeing who can swim the farthest before coming up for air. Hyperventilation (that is, taking a series of rapid, deep breaths before submerging in an effort to hold the breath longer underwater) affects the body's drive to breathe. The child could pass out and then instinctively take a breath underwater, leading to drowning.
- Teach children to stay away from pool drains and other openings that create suction. The suction can hold the child underwater, leading to drowning.
- Prevent access to standing water in the home. Empty bathtubs, sinks, kiddie pools, buckets and other containers immediately after use. Keep toilet lids down and bathroom and laundry room doors closed and secured with safety locks.
- Never leave a child in a bathtub alone; always stay within arm's reach. Do not rely on bathtub floating aids to protect your child from drowning.
- If you own an inground swimming pool, aboveground swimming pool (including inflatable "easy-set"-type pools) or hot tub:
 - Surround the entire pool or hot tub area with a fence that is at least 4 feet high, has a self-closing and self-latching gate, and is designed so that a child cannot climb over, under or through it.
 - Be sure that all gates, windows and doors leading to the pool or hot tub area are locked.
 - Make sure that pools and hot tubs are covered when not in use, and that the cover is secured.
 - Keep pool toys out of the water and out of sight. (A child may see a pool toy floating in the water and try to go after it.)
 - To prevent the child from climbing over a fence and getting into the pool or hot tub area, keep chairs, tables and other items the child could climb on away from the pool or hot tub enclosure.
 - If a child is missing, always look in the pool area first. Seconds count in preventing death or disability.
- If there are bodies of water, fountains or other water features on or near your property or in the community, teach children that these areas are off-limits unless they are accompanied by an adult.
- When visiting another home, check the site for potential water hazards and always supervise your children.
- Never let a child play near storm drains. (Storm drains are especially dangerous after it has rained.)

School-age children often have the opportunity to attend day trips to aquatic facilities that are organized and hosted by a school or community group. In addition, many parents enroll their school-age children in summer camps, where water activities may be a major attraction. In these situations, parents may not be present to directly supervise their children, so it is important for parents to evaluate the host organization's attention to, and provisions for, aquatic safety (**Box 2-3**).

While pools are a source of danger for younger children, a large number of drowning accidents involving older children, teens and young adults take place in natural bodies of water. The percentage of drowning incidents in natural bodies of water increases with age, with more than half of all the victims in these incidents being 15 years of age and older. Nearly every community has some type of natural body of water, such as a canal, pond, creek, stream, river, lake, drainage basin, reservoir, wetlands area or shoreline that can be accessed easily. In many communities, these areas are frequently features of public parks. Easy access to natural water environments, combined with the growing independence of older children and adolescents, can make these environments especially dangerous to children who are old enough to explore on their own (**Fig. 2-2**). For this reason, it is important to teach older children and teens about the dangers natural bodies of water in the community present, and to make and enforce rules related to visiting these areas. Also, be

aware that aquatic emergencies do not always happen when people are swimming. A hike along a mountain stream or a canoe-camping trip poses just as much risk for an aquatic emergency to develop.

Box 2-3

Promoting Safety During Children's Group Aquatic Outings and at Summer Camps

Group outings

Planning and preparation are essential when organized groups attend a day trip to an aquatic environment. Parents can ask the following questions of the group's organizers to evaluate the measures that have been put in place to help keep their children safe during the outing:

- May I have a copy of the written safety plan? (Group organizers should prepare a written safety plan that identifies the safety measures that will be taken and the provisions for appropriate supervision that will be made for maintaining safety during the planned aquatic outing.)
- Will the group be allowed to swim only in designated areas supervised by a certified lifeguard?
- What is the adult chaperone-to-child ratio? (Lifeguards should not be counted as part of this ratio.)
- What activities are planned, and will they be supervised by appropriately trained personnel?
- What system will be used to evaluate each child's swimming ability? Is a system in place for easily identifying each child's swimming ability, such as color-coded tags or caps?
- Are criteria in place (such as height and weight requirements) for attractions such as water slides? How will children be prevented from participating in activities or going on attractions that are beyond their skill level or are otherwise unsafe for them?
- Is there a system (such as roll calls or buddy checks) in place to ensure that staff can quickly account for all children in the group at all times?
- What training and certifications must facility staff (such as lifeguards) have? Do adult chaperones who will be attending the trip know how to swim, and are they trained in water safety and CPR?



Summer camps

Similar information should be sought before enrolling a child in a summer camp. First, make sure the camp meets the government's standards for aquatic safety. Government safety standards for swimming at camps may be covered in state bathing codes or they may be found in separate regulations specific for day and residential camp programs. Because codes vary from state to state, also check to see if the camp follows the aquatic safety standards established by national organizations such as the American Camp Association (ACA), the Boy Scouts of America or the YMCA of the USA. Finally, use the following questions to evaluate the camp's attention to, and provisions for, aquatic safety:

- What is the condition of the pool, waterfront or any other aquatic features? Is the staff properly trained and qualified to supervise and teach aquatic activities?
- What are the aquatic activity areas like? Are they well-designed and maintained, free of obvious hazards and closely supervised by adequate numbers of alert, trained staff? What is the condition of any equipment being used?



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Box 2-3 (continued)

- Does the camp use a system for easily identifying a camper's swimming ability, such as color-coded tags or caps?
- Are campers classified by their swimming ability? Are instructional and recreational activities consistent with the campers' abilities?
- Is there a system (such as roll calls, buddy checks or buddy tags) in place to ensure that staff can quickly account for all campers at all times?
- Does the camp have a system for promptly accessing emergency personnel and facilities?
- Does the camp require additional information about any temporary or chronic medical condition that might require special precautions in, on or around the water?



Fig. 2-2 Natural bodies of water in the community can be enticing to older children and teens who are old enough to explore on their own. Accidents can happen when children and teens do not know, or fail to appreciate, how dangerous these areas can be.

Using Life Jackets

Life jackets, also known as personal flotation devices (PFDs), are not just for boaters. Young children, weak or inexperienced swimmers and nonswimmers should also wear life jackets whenever they are in, on or around the water. Life jackets are available in many styles and for many different activities. The U.S. Coast Guard has categorized PFDs into five types according to their buoyancy and purpose.

Types I, II, III and V are referred to as life jackets because they are worn on the body, whereas type IV is a throwable device. When choosing a life jacket, select one that has been approved by the U.S. Coast Guard. PFDs that have been approved by the U.S. Coast Guard will have an approval label stamped directly on the device (**Fig. 2-3**). In addition, consider swimming ability, the planned activity and the water conditions. Type II and type III life jackets are most often used in pool, waterpark and waterfront settings.

Before using a life jacket, make sure that it fits properly. Life jackets are sized according to weight. A properly fitted life jacket feels comfortably snug. Also check to make sure that it is in good condition.

Check any buckles or straps to make sure that they function properly and look closely for any rips, tears or holes. Discard any life jacket with torn fabric or straps that have pulled loose. Test the life jacket in shallow water and see how it feels. Practice swimming with it. Then relax and let your head tilt back. Notice if the device can keep your chin above water, allowing you to breathe easily. The life jacket should not ride up on your body in the water.

Water wings and items designed for water recreation (such as inner tubes and inflatable rafts) are not designed or tested for safety and cannot be used as a substitute for a U.S. Coast Guard approved life jacket and adult supervision (Fig. 2-4). In fact, these pool toys may actually increase a non-swimmer's or an inexperienced swimmer's risk for getting into a dangerous situation in the water, by giving the swimmer a false sense of security. For example, the swimmer may move into water that is too deep, fall off the toy and into the water, or the toy may overturn, setting up the potential for a drowning situation.

Table 2-1 Personal Flotation Devices






Type	Description	Advantages	Disadvantages
I: Life jacket 	<ul style="list-style-type: none"> Intended for boating on open, rough or remote waters where rescue may be slowed or delayed May help to turn an unconscious person from a face-down position to a vertical, face-up position or to a face-up slightly tipped back position 	<ul style="list-style-type: none"> Offers the most reliable flotation Comes in highly visible colors and may have reflective markings to aid search and rescue 	<ul style="list-style-type: none"> Bulky in and out of the water
II: Buoyant vest 	<ul style="list-style-type: none"> Intended for recreational boating on calm or inland waters where rapid rescue is likely Suitable for supervised use in pools and waterparks May help to turn an unconscious person from a face-down position to a vertical, face-up position or to a face-up slightly tipped back position 	<ul style="list-style-type: none"> More comfortable to wear Available for infants through adults; good choice for children 	<ul style="list-style-type: none"> Not recommended for long hours on rough water Less buoyant than a type I life jacket
III: Flotation vest 	<ul style="list-style-type: none"> Intended for fishing or sailing on calm or inland waters where rapid rescue is likely Suitable for supervised use in pools and waterparks May help to keep a conscious person in a vertical, face-up position or in a face-up slightly tipped back position; wearer may have to tilt the head back to avoid going face-down 	<ul style="list-style-type: none"> Most comfortable to wear continuously Available in many styles Appropriate for boating and specified water activities 	<ul style="list-style-type: none"> Must be water-tested by inexperienced swimmers before boating Wearer may need to tilt head back to avoid turning face-down in the water
IV: Throwable device 	<ul style="list-style-type: none"> Intended to be thrown to a person in the water; not to be worn Not intended to take the place of a wearable life jacket 	<ul style="list-style-type: none"> Able to be thrown from boat or land Backup to wearable life jackets Possible use as seat cushions (some styles) 	<ul style="list-style-type: none"> Not suitable for children, inexperienced swimmers or unconscious victims
V: Special-use device 	<ul style="list-style-type: none"> Intended for specific activities such as whitewater rafting May be worn instead of another life jacket only if used according to the approval condition(s) on its label Worn continuously 	<ul style="list-style-type: none"> Designed for specific activities Continuous wear provides continuous protection 	<ul style="list-style-type: none"> Limited use



Fig. 2-3 Only use U.S. Coast Guard-approved personal flotation devices (PFDs, or life jackets).

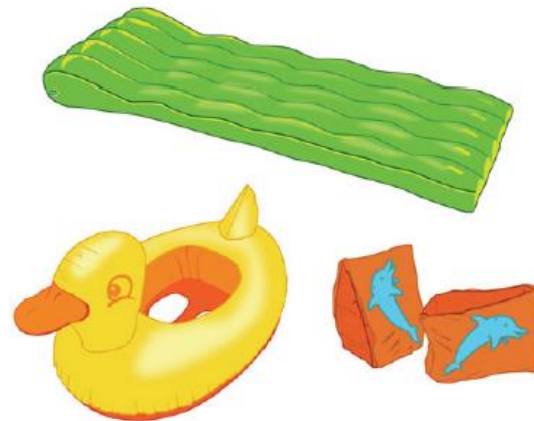


Fig. 2-4 These items are just toys. Do not count on them to provide flotation or to keep a nonswimmer or inexperienced swimmer safe in the water.

Staying Safe from Environmental Hazards

Many aquatic activities provide a great opportunity to get outside and enjoy fresh air and sunshine. Make sure your experience stays enjoyable by being aware of environmental hazards and taking steps to protect yourself from them.

Sun Overexposure

Overexposure to the sun has been linked to multiple health problems, including painful sunburns, skin cancer and eye damage (such as cataracts), and can cause premature aging and wrinkling of the skin. Everyone, regardless of age or skin color, is advised to take steps to limit overexposure to the sun, such as wearing protective clothing, seeking shade when the sun's rays are strongest and consistently using a broad-spectrum sunscreen.

Energy from the sun is called solar radiation. Solar radiation reaches the Earth in a range of wavelengths or rays. Some of these rays are blocked by the atmosphere, but ultraviolet A (UVA) and ultraviolet B (UVB) rays are able to penetrate the atmosphere and reach the Earth's surface. In the past, the ozone layer of the atmosphere offered more protection from dangerous UV rays, but this layer is becoming depleted, permitting greater amounts of UV radiation to reach the Earth's surface. Worldwide efforts are being made to stop the production of chemicals that have contributed to thinning of the ozone layer. The current belief is that with full compliance with these efforts, the ozone layer can return to normal levels by 2050. However, people living and growing up during this timeframe will live most of their lives with increased levels of UV radiation. It is overexposure to UVA and UVB rays that can lead to skin cancer and other health problems.

Skin cancer is the most common type of cancer in the United States, and it is reaching epidemic proportions. According to the American Academy of Dermatology, current estimates are that one in five Americans will develop skin cancer. Despite these statistics, skin cancer is one of the most preventable types of cancer. Of the different types of skin cancer, melanoma is the most serious and also one of the fastest growing types of cancer in the United States. The major risk factor for melanoma is exposure to UV light, and dermatologists think that sunburns experienced in childhood may lead to melanomas later in life. Non-melanoma skin cancers, including basal cell carcinomas and squamous cell carcinomas, are less deadly than melanomas but can be disfiguring and cause more serious health problems if left untreated.

One of the most important actions you can take to reduce your risk for health problems as a result of sun overexposure is to use sunscreen regularly and properly. Choose a sunscreen labeled “broad-spectrum” (this means it will provide protection against both UVA and UVB rays) that has a sun protection factor (SPF) of at least 30. Apply the recommended amount of sunscreen to all exposed skin at least 15 minutes before you go outside, even if it is cloudy out (it is still possible to burn on a cloudy day). Be sure to remember commonly missed areas, such as the lips, ears and the tops of the feet. Reapply sunscreen every 2 hours and after swimming or sweating. Use sunscreen every day, even if you are not going to be outside for long. The sun’s rays can also damage your skin through the windows of a building. **Box 2-4** summarizes the actions you can take to protect yourself and your family from sun overexposure.

Box 2-4

Safe Fun in the Sun

- Use sunscreen regularly and properly. Generously apply a broad-spectrum sunscreen with a sun protection factor (SPF) of at least 30 in ample amounts to all exposed skin 15 minutes before going outdoors, even on cloudy days and even if you do not intend to be outdoors for long. Reapply every 2 hours and after swimming or sweating.
- Be aware that sunscreen is not recommended for babies younger than 6 months. If a baby younger than 6 months is outside, it is best to protect the baby from the sun by making sure she is dressed in adequate clothing and by keeping her in the shade (for example, underneath an umbrella or the canopy of a stroller). If you do choose to apply sunscreen to a baby younger than 6 months, apply only a small amount to the baby’s face and the back of her hands.
- Wear protective clothing, such as a wide-brimmed hat and sunglasses, when possible. Choose sunglasses that offer 99–100% protection against UV rays. If the temperature is not too warm, long-sleeved shirts and pants can offer some protection from the sun too.
- Pay attention to the UV Index to help you plan your outdoor activities in ways that prevent overexposure to the sun. The National Weather Service calculates the UV Index daily for most zip codes across the United States, predicting the level of solar radiation expected and the risk of possible overexposure, using a scale from 0 to 11+. A UV Index of 0 to 2 indicates a low risk whereas a UV Index of 8 or higher indicates a very high risk.
- Pay attention to the time of day. The sun’s rays are strongest between 10 a.m. and 4 p.m. During these hours, avoid exposure to the sun or seek shade, if possible. Follow the Shadow Rule: *Watch Your Shadow. No Shadow, Seek Shade!*
- Know that water, sand and snow reflect the sun’s rays, increasing exposure and the risk for sunburn. Avoid sun tanning and tanning beds. If you want to look like you have been in the sun, use a self-tanning product. Be aware that self-tanning products do not offer protection from the sun so you will also need to use sunscreen.
- Eat foods high in Vitamin D rather than using the sun to get this vitamin.
- Early detection of skin cancer can save your life. Visit a dermatologist for an annual skin exam, and examine all of your skin yourself once a month. Have any new or changing moles evaluated by a dermatologist.

Heat-related Illnesses

Heat-related illnesses can occur on hot, humid days when the body is not able to effectively cool itself through sweating. As a result, the body temperature rises and serious illness can result.

Although it might seem hard to believe that you can overheat while in the water, it can and does happen. Heat-related illnesses occur when fluid is lost during heavy sweating and is not replaced. Just because you are in the water does not mean that you are not sweating, particularly if you are playing or exercising! Working hard or exercising in the heat also increases a person's risk for developing a heat-related illness. And sometimes, just being out in the heat and humidity for a long period of time can be a problem.

The best prevention strategy for heat-related illnesses is to stay properly hydrated. Staying hydrated helps to make sure the fluids lost from sweating are replaced, which keeps fluid levels in the body balanced and gives body tissues what they need to function well. Water is the best choice of fluid for staying hydrated, but commercial sports drinks, fruit juices or milk are also acceptable. Drink a few ounces every 15–20 minutes or however much you need to not feel thirsty. The feeling of thirst means that the body is already dehydrated.

Avoid gulping down fluids quickly. Small amounts taken in slowly work best

There are three types of heat-related illnesses, of increasing severity:

- **Heat cramps** are painful muscle spasms, usually in the legs and stomach. Heat cramps can quickly turn into heat exhaustion or heat stroke.
- **Heat exhaustion** occurs when the body's cooling system is not able to keep up. The person's skin may be cool and moist, and either very pale or gray, or red. The person may be sweating heavily and may complain of a headache, nausea or dizziness. The person may feel very weak or exhausted.
- **Heat stroke** is the most severe form of heat-related illness. It occurs when the body's cooling system is completely overwhelmed and stops functioning properly. Heat stroke is life threatening! The person's skin will be red and hot, and it may be moist or dry. The person may seem confused, have changes in consciousness or lose consciousness. Breathing may be rapid and shallow, and the pulse may be rapid and weak. The person may vomit.

When a heat-related illness is recognized in its early stages, it usually can be reversed. Move the person to a cooler environment with circulating air. Loosen or remove as much clothing as possible; apply cool, wet cloths and fan the person. If the person is conscious and able to swallow, give small amounts of a cool fluid such as a commercial sports drink, fruit juice, milk or water.

If the person's condition does not improve or you suspect heat stroke, call 9-1-1 or the local emergency number immediately

If the person becomes unconscious, be prepared to give CPR.

Hypothermia

In hypothermia, the body is not able to keep itself warm and the body temperature falls far below normal. Hypothermia can lead to death if it is not treated. In an aquatic setting, hypothermia can result from exposure to cold water or air temperatures, or both. The air or water temperature does not have to be below freezing for hypothermia to occur. This is especially true if a person is wet and there is wind. For example, a child who is wet from swimming could develop hypothermia, even in the summertime!

Children and older adults are particularly susceptible to hypothermia. Environmental conditions and prolonged exposure to water or wet clothing (which speeds up the rate at which body heat is lost) can also increase susceptibility to developing hypothermia—even during the summer or in indoor

facilities. Immersion in cold water (for example, as a result of breaking through ice, falling off a pier or being thrown into the water from a boat) also puts a person at risk for hypothermia.

Box 2-5 summarizes actions you can take to lower the risk for developing hypothermia when engaging in aquatic activities.

Box 2-5

Lowering the Risk for Hypothermia

- Avoid being outdoors during the coldest part of the day.
- Be aware that many people who fall into cold water never intended to go into the water in the first place.
- Whenever you are near cold water (for example, playing, working, hunting or fishing), remember that cold water can be dangerous, and take the appropriate precautions.
 - In cooler weather, wear an outer layer that is water-resistant and breathable, a warm hat, and lightweight layers of clothes or insulated clothes.
 - Avoid cotton, which traps moisture. Instead, wear wool or synthetic blends, which help to move moisture away from the skin.
 - Know that clothing can help you float and stay warm if you fall into the water.
 - If you are in a remote area, carry matches in a waterproof container. It may be necessary to build a fire to warm up after a fall into cold water.
- Always wear a U.S. Coast Guard-approved life jacket while boating in cold water.
- Wear a wet suit for skin diving, surfing and kayaking, or other activities that take place in the open water or involve repeated submersion.
- Only participate in aquatic activities when and where it is possible to get help quickly in an emergency.
- Drink warm fluids that do not contain alcohol or caffeine to help the body maintain a normal temperature.
- Although alcohol may temporarily make you feel warmer, it actually increases loss of body heat and susceptibility to hypothermia.

Inclement Weather

Weather conditions can change suddenly. Always check the weather forecast before heading out, and know what to do in case inclement weather suddenly arises. You can learn about different kinds of weather events, and how to be prepared for them, by visiting the American Red Cross website (www.redcross.org).

Thunderstorms

Electricity and water do not mix! Leave the water at the first sound of thunder or sight of lightning. Remember the 30/30 rule: take cover when the time between a flash of lightning and a roll of thunder is 30 seconds or less, and remain under cover until 30 minutes after the last flash of lightning was seen or the last roll of thunder was heard. If you are outside and cannot reach safety inside of a building, look for a low area. Avoid high ground, tall trees that stand alone, and structures such as sheds, dugouts, bleachers and picnic pavilions. These areas are not safe in a thunderstorm; if no safe shelter is available, squat with your feet together and your arms wrapped around your legs. You want to stay low, but you do not want to lie flat; the less of your body that is in contact with the ground, the better.

Floods

Floods are among the most common water hazards that occur in the United States. Anywhere it rains, it can flood. Being aware of local flood hazards is important for everyone, but especially for

people who live near water, in low-lying areas, behind a levee or downstream from a dam. Flooding occurs when waterways such as rivers or streams overflow their banks. It can also occur when rainfall or snow melt exceeds the capacity of underground pipes or drains designed to carry floodwater away from urban areas. Some floods build gradually over a period of days, but flash floods can develop within minutes or hours without any obvious signs of rain. They often produce powerful and destructive walls of water and debris.

When a flood watch or warning is in effect, head to higher ground and stay away from the water. If emergency officials advise evacuation, do so immediately. Remember the motto, “*Turn around, don’t drown!*” According to the National Weather Service, most of the fatalities during flood events result from people attempting to drive or walk on flooded roadways. It only takes 18 inches of water to lift a vehicle. Once a vehicle becomes buoyant, the water will easily push it sideways and could cause it to tip over. If you are trapped in a car on a flooded road, abandon the car immediately and move to higher ground. Use extreme caution when walking through floodwaters. Six inches of swiftly moving floodwater is enough to knock you off your feet.

Avoid natural bodies of water for 24 hours after heavy rains and flooding, because runoff can contaminate the water with toxic substances. Pay particular attention to children. They are curious and lack judgment about flood-related hazards, such as swiftly moving water and contaminated water.

Recreational Water Illnesses

A **recreational water illness (RWI)** is an illness that is spread by swallowing, breathing or contacting contaminated water. A person can contract an RWI from a natural body of water or from the chlorinated water found in pools and waterpark attractions. In fact, pool water is a very common source of RWIs, especially common ones such as diarrhea, earaches and rashes. In rare cases, RWIs can cause pneumonia, neurological damage and even death.

In a swimming pool or waterpark setting, water contaminated by feces is a primary source of RWIs. Vomit and blood are less likely to cause RWIs. Look for clues to water quality before you get in the water—the pool water should be clean and clear with little or no odor. You should be able to clearly see the main drain on the bottom of the pool, and there should not be a strong chemical odor in the air. Visually inspect surfaces. Pool tiles and attractions such as waterslides should not be sticky or slimy. Lastly, ask the facility staff about the facility’s protocols for maintaining water quality, conducting health inspections and training staff members about water quality.

You may also be able to obtain information about water quality in some natural settings, such as at the ocean or lake. Many guarded beaches are tested regularly for pollution and disease causing organisms. In some areas, water quality flags give information about water conditions. For example, blue flags indicate good swimming conditions and red flags indicate a potential water quality problem.

Diarrhea

Diarrhea is the most commonly reported RWI. When a person with diarrhea swims, the water becomes contaminated. A person who swallows the contaminated water could also then become ill. To lower the risk of infection for others, a person who has diarrhea should not enter the water. The Centers for Disease Control and Prevention (CDC) has developed six “PLEAs” to promote safe and healthy swimming in pools and at waterparks (**Box 2-6**).

Box 2-6

Six “PLEAs” for Healthy Swimming: Limiting the Spread of RWIs

1. **PLEASE** do not swim when you have diarrhea. This is especially important for children in diapers.
2. **PLEASE** avoid getting pool water in your mouth, or swallowing it.
3. **PLEASE** practice good hygiene.
 - o Shower with soap before swimming.
 - o Wash your hands after using the toilet or changing diapers.
4. **PLEASE** take your children on bathroom breaks and check diapers often.
5. **PLEASE** change diapers in a bathroom or a diaper-changing area, not at poolside.
6. **PLEASE** wash your children thoroughly (especially the buttocks area) with soap and water before swimming.

Adapted from Centers for Disease Control and Prevention: Six Steps for Healthy Swimming.
(<http://www.cdc.gov/healthyswimming/>)

When a young child who still wears diapers will be in the water, many facilities require that the child wear swim diapers. Swim diapers are specifically designed to be worn in the water. They are water-resistant and fit snugly around the child’s waist and legs. However, if a child has a bowel movement in the diaper, there is still risk for stool escaping and contaminating the water. For this reason, it is important to take frequent breaks to check and change the diaper. A contamination incident involving feces or vomit that contains solid matter or food particles requires staff to implement decontamination procedures. These procedures include evacuating the pool, removing any solid matter, increasing the chlorine level and maintaining the elevated chlorine level for a set period of time before reducing the chlorine level to its normal level and reopening the pool. For an incident that involves vomit or formed stool, the pool must remain closed for 25 minutes. For an incident that involves diarrhea, the pool must remain closed for 13 hours.

Swimmer’s Ear

Swimmer’s ear, an RWI that most often affects children, occurs when water remains in the external ear canal for a prolonged period of time. The water usually is contaminated by organisms found in pools and other water environments. The trapped water allows these organisms to grow in the ear canal, causing irritation and infection. Signals of swimmer’s ear typically begin within a few days of swimming and may go away, on their own & without treatment; however, painful, swollen or full feelings in the ear or even slight hearing loss are reasons to see a health care provider. These signals could indicate a more serious inner ear infection. **Box 2-7** contains tips for prevention.

Box 2-7

Tips for Preventing Swimmer's Ear

- Wear a swim cap or wetsuit hood, especially for activities that involve frequent submersions (such as surfing).
- Use silicone earplugs. Avoid wax earplugs because these can damage the ear canal and make infection more likely. Do not use any earplugs when surface diving.
- Keep the lining of your ear canals healthy. Do not insert objects (such as cotton swabs or a finger) into the ear canal, because doing so can remove protective earwax and scratch the lining of the ear canal, making infection more likely.
- Remove water from the ears after swimming.
 - Tilt your head to one side (so that one ear is facing down) and jump energetically several times to allow water to escape from your ear. Gently pulling the earlobe in different directions while the ear is facing down may also help the water escape.
 - Use a hair dryer on the low setting: gently pull down the ear lobe and blow warm air into the ear from several inches away.
- Use over-the-counter eardrops that contain one or more agents to evaporate any water, kill the organisms and moisturize the ear canal before and after swimming. Ask your health care provider for recommendations.
- Dry ears thoroughly after swimming by using a towel to gently wipe the outer ear. Do not insert anything (such as a cotton swab) into the ear canal in an attempt to dry it.
- Children who have ear tubes should only participate in aquatic activities that have been approved by their health care providers.

Staying Safe in Specific Aquatic Environments

Throughout the course of a lifetime, a person may have the opportunity to engage in and enjoy aquatic activities in a variety of settings. Every aquatic setting poses specific safety challenges. Being aware of these safety challenges can help you stay safe no matter what aquatic setting you are in.

Swimming Pools and Hot Tubs

Swimming pools and hot tubs may be open to the public or privately owned by homeowners. Public pools and hot tubs include those found in recreation and fitness centers, hotels and motels, and multi-unit housing complexes. Some public pools and hot tubs are supervised by lifeguards and others are not. **Box 2-8** summarizes important tips for staying safe for anyone visiting a public pool or hot tub.

Home (residential) swimming pools and hot tubs are an attractive feature for many homeowners (**Fig. 2-10**). They create a beautiful environment that offers years of fun and activity for families. However, pool or hot tub ownership carries with it the responsibility for ensuring that the pool or hot tub is safe and well maintained.



Fig. 2-10 A pool can be a lovely addition to the landscape and a great place for relaxing and entertaining, but it can also be a safety hazard if the proper precautions are not taken.
Photo: Life Saver Pool Fence Systems, Inc.

Box 2-8

Safety Tips for Patrons of Public Pools and Hot Tubs



- Read and obey all rules and posted signs. Pay special attention to water-depth markings and “no diving” signs.
- Obey the lifeguard’s instructions at all times.
- Supervise members of your own party while they are in the water, especially children, even when a lifeguard is on duty.
- Take breaks from water activities to give both the swimmers and those supervising them an opportunity to rest.
- Note the location of safety equipment (such as a reaching pole and ring buoy). Remind children not to play with the safety equipment.
- Do not swim in a pool that is overly crowded or with swimmers who are not following the rules.
- Check to see that the pool or hot tub and facility are well-maintained. Reconsider patronizing the facility if there are obvious hazards (such as cracks in the deck, malfunctioning equipment or cloudy water).

Preventing Unsupervised Access to the Pool or Hot Tub Area

Home swimming pools (including inground pools, aboveground pools and “easy-set” inflatable pools) and hot tubs pose a significant threat to young children living in the home, as well to other children in the neighborhood. Most drowning incidents involving children between the ages of 1 and 4 years take place in home swimming pools. Many of these incidents happen very suddenly—about 5 minutes or less after the child goes missing—and while the parents are at home. Homeowners with pools or hot tubs need to take a multi-tiered approach to securing the pool area and minimizing the likelihood that a child will gain unsupervised entry:

- Enclose the pool area on all four sides using an appropriate barrier system (**Box 2-9**), and then make sure the barrier remains secure. Always make sure gates are latched and keep items away from the barrier (such as lawn furniture) that a child could use to climb up and over into the pool area.
- Install pool alarms. These alarms use sensors to detect motion in the water. Underwater pool alarms generally perform better and can be used in conjunction with pool covers. Use remote alarm receivers so that the alarm can be heard inside the house or in other places away from the pool area.
- *Safety Barrier Guidelines for Home Pools* (Pub. No. 362), a resource containing guidelines
- for choosing and installing fences, gates, covers and audible alarms to prevent unsupervised
- access to residential swimming pools and hot tubs, is available at no charge from the
- Consumer Product Safety Commission (CPSC) website (www.cpsc.gov). It is a good idea to check the CPSC site periodically for updated recommendations. Also, be aware that local building codes, regulations and statutes for pools and hot tubs differ from state to state. Many states have pool fence laws. Check with local authorities to find out specific building codes and owner responsibilities.

Box 2-9

Guidelines for Securing the Pool Area

- Pool fence gates should be self-closing and self-latching and open outward, away from the pool. The latch should be out of a small child's reach.
- Pool barriers should be at least 4 feet high and enclose the entire pool area. They should not have any features that could be used as a hand- or foothold. Solid barriers should not have any features other than normal construction joinery.
- For most fence designs, spacing between vertical members should not exceed 1¾ inches. The opening on chain link fences should not exceed 1¼ inches.
- Horizontal fence support structures that are less than 45 inches apart should be on the pool side of the fence. On fences with horizontal support structures that are greater than 45 inches apart, the horizontal support structures can be on either side of the fence.
- The space under a pool barrier should not exceed 4 inches.
- Any openings in the barrier should not allow a 4-inch sphere to pass through.
- Aboveground pools (including inflatable "easy-set"-type pools) should have a barrier mounted on top of the pool structure that encloses the entire pool. Steps or ladders to the pool should be removable or enclosed by a locked barrier, so that the pool surface is inaccessible.
- Hot tubs should have a lockable structural barrier that completely encloses the top of the hot tub and will not collapse under the weight of a child.
- It is preferable that the house should not form any side of the barrier.
 - In situations where a house does form one side of the barrier, the doors leading from the house to the pool should be locked and protected with alarms that produce a sound when a door is unexpectedly opened.
 - Alarms should continuously sound for 30 seconds and begin within 7 seconds of opening the door.



Adapted from Consumer Product Safety Commission: Safety Barrier Guidelines for Home Pools.
(www.cpsc.gov)

Preventing Drain Entrapment

Drain entrapment can occur when a pool or hot tub drain is uncovered, or the drain cover is broken or not secured properly. Suction pulls hair, clothing, jewelry, or a body part into or against the pool drain, leading to entrapment. The suction may be so strong that the person cannot pull away. Drowning can occur if the person's head is underwater and he or she is not able to break free of the drain. Disembowelment can also occur. Beginning in 2008, all public pools and hot tubs were required by law to have anti-entrapment drain covers installed. However, privately owned pools and hot tubs are not subject to the same law, so in many cases, home pool or hot tub drains may not be up to standard.

To protect against drain entrapment, remind people using the pool or hot tub to stay away from the drains and other openings that create suction. Install anti-entrapment drain covers and safety release systems, which offer protection from dangerous drain suction. Consider installing an automatic shutoff system for added protection. Clearly identify the location of the electrical cutoff switch for the pump, know where the pump switch is and know how to turn it off.

Making, Posting and Enforcing Pool and Hot Tub Rules

Develop a list of pool and hot tub rules, post them prominently and enforce them without exception. Examples of rules you may establish include:

- Children permitted in the pool area only with adult supervision.
- Weak, inexperienced or nonswimmers must wear a life jacket.
- Always swim with a buddy. Please do not bring glass bottles or containers into the pool area. No running, pushing or rough horseplay.
- No diving (**Box 2-10**).
- Please do not sit or play near the drain.
- Please do not play breath-holding games.

Box 2-10

Minimizing Risk for Diving Injuries in Home Pool Settings

Most head, neck and spinal injuries in home pools result from diving into shallow water.

- Prohibit diving in aboveground pools, including inflatable “easy-set”-type pools. These pools are never safe for diving.
- Consult the Association of Pool and Spa Professionals (APSP), state law and local building codes for pool dimension guidelines to help you establish pool rules related to diving in an inground pool. For example:
 - Prohibit all dives into shallow water.
 - Only allow shallow-angle dives from the edge of the pool into deep water.
- Clearly mark the location of the breakpoint between shallow and deep water with a buoyed line and a contrasting stripe on the bottom 12 inches before the breakpoint. Mark the deck with signs that indicate the depth.
- Place “No Diving” signs on the deck near shallow water and on the fence or wall around the swimming pool or on a stand at the entry to the swimming pool area. Signs should be visible to anyone entering the pool or approaching shallow water.
- Prohibit elevated entry from any object not specifically designed for diving, such as chairs, fences or balconies.
- Install a diving board only if there is a safe diving envelope (the area of water in front of, below and to the sides of a diving board that is deep enough to prevent a diver from striking the bottom, regardless of the depth of the water or the design of the pool). The average home pool is not long enough or deep enough for safe springboard diving. It is the diving board manufacturer’s responsibility to determine the necessary water envelope for safe diving.

Post depth markers and “No Diving” signs, as appropriate (**Fig. 2-11**). Use a buoyed line to show where the depth changes from shallow to deep, and make sure that weak or inexperienced swimmers stay in the shallow water. Keep extra US Coast Guard approved life jackets in a variety of sizes on hand for guests who may need them.



Fig. 2-11 Post “No Diving” signs on the fence surrounding the pool area or at the entry to the pool area.

Box 2-11

How to Make a Safety Post

A safety post can be used to keep basic water rescue equipment organized and easily accessible poolside. To make a safety post, you will need:

- 4 inch × 4 inch post, 6 feet long
 - Screw-in hanging hook large enough to hold the throwing equipment
 - Throwing equipment, such as a ring buoy or a heaving jug*
 - Reaching equipment, such as a 10- to 12-foot reaching pole
 - Clips to secure the reaching equipment OR two 6-ounce cans with both ends removed and nails
 - Plastic zipper bag
 - First aid kit
 - Emergency contact information, including phone numbers for summoning help and information that will help responders find your location (i.e., the street address and the names of the nearest cross streets)
 - Safety poster or first aid booklet (optional)
1. On one side of the post, screw in the hanging hook about 1 foot from the top of the post.
 2. On the other side of the post, secure the clips or nail the two open-ended cans, one about 1 foot above the other, no lower than 2 ½ feet from the bottom of the post.
 3. Set the post 2 feet in the ground.
 4. To make a heaving jug, put ½ inch of water or sand in the 1-gallon plastic jug and screw the top on tightly. (If the jug has a snap-on top, secure it with very strong glue.) Tie the rope to the handle of the jug.
 5. Hang the ring buoy or heaving jug and line on the hanging hook.
 6. Secure the reaching pole with the clips or put the reaching pole through the cans.
 7. Put emergency contact information, the first aid kit and the first aid booklet or poster (if you are including one) in the plastic zipper bag and attach it to the top of the post.

*To make a heaving jug, you will also need a 1-gallon plastic jug with a top and 40–50 feet of lightweight rope.



Preparing for Emergencies

As a pool or hot tub owner, you need to be prepared to respond should an emergency arise. There are three simple things you can do to prepare for an emergency.

1. Learn American Red Cross first aid and CPR.
2. Stock your pool area with a telephone, emergency contact information and basic water rescue equipment, including:
 - Reaching equipment (such as a reaching pole or shepherd's crook) that can be used to pull a person to safety.
 - Throwing equipment (such as a ring buoy, heaving jug or throw bag) that can be thrown to a person who is in trouble so that he or she can be pulled to safety.
 - One way to keep basic water rescue equipment organized and accessible is to make a safety post (**Box 2-11**).
3. Make an emergency action plan (**Box 2-12**). An **emergency action plan** consists of written procedures for dealing with specific potential accidents or emergency situations. Emergencies that should be addressed include injuries, illness, weather events, and

situations such as power failures or drain entrapment. The emergency action plan details information that is needed to get control of the situation, such as:

- What signal will be used to indicate that there is an emergency.
- What equipment is available and where it is located (including the location of cutoff switches for pumps and hot tubs).
- Procedures for summoning emergency medical services (EMS) personnel (including the necessary phone numbers) and directing EMS personnel to the location
- Procedures for providing aid and getting the situation under control, including what should be done and who should do it.

Review the emergency action plan with family members, guests and neighbors so that they are prepared to help implement the plan should the need arise

Box 2-12

Emergency Action Plans

Having an emergency action plan in place and being familiar with the procedures it contains can save precious minutes when every minute counts.

To create an emergency action plan:

1. Identify the types of emergencies that could occur. Think about potential accidents, injuries, illnesses, weather events and other situations (such as power failures) that are likely to occur in your specific setting.
2. Develop and write down the procedure that is to be followed in the event of each emergency. Include:
 - The signal that will be used to indicate that the emergency action plan should be activated (such as a whistle blast, hand signals or both).
 - The steps for responding to the emergency, and who is responsible for each step.
 - The procedure for calling 9-1-1 or the local emergency number and directing emergency medical services (EMS) personnel to the scene.
 - What follow-up actions should be taken, if any.
3. Identify equipment that is needed to respond to the potential emergencies you have identified and stock it close by, in the pool area.

Maintaining the Pool Area

Maintaining the pool area properly is a key safety measure.

- Keep the pool or hot tub water clean and clear. Chemically treat and test the water regularly.
- Follow the manufacturer's directions and safety instructions for chemical use. Clearly label chemicals and store them in childproof containers in a secured area.
- Keep the pool area properly illuminated.
- Completely secure covers in place immediately after using

Hosting Safe Pool Parties

One of the joys of owning a pool or hot tub is inviting others to enjoy it with you. Good planning can help to ensure that everyone has a good, and safe, time at your party. Be familiar with your homeowner's insurance policy. Additional coverage for the event may be required. Make sure that your guests (and their parents or guardians, if the guests are children) know that the party is a pool

party. Finally, make arrangements to ensure appropriate supervision during the party. Consider hiring one or more certified lifeguards to be on duty for the duration of the party. The number of guests to Lifeguards should be less than 25:1. Contact the local parks and recreation department or local swimming pools to get names of Red Cross-certified lifeguards who are willing to lifeguard at private parties. As the host, you are responsible for checking to verify that the certifications of the lifeguards you have hired are current and providing all appropriate rescue equipment.

Even when lifeguards are on duty, and especially if lifeguards are *not* on duty, children should be actively supervised by parents or other responsible adults. Before the gathering, identify responsible adults to serve as water watchers. The water watcher's job is to supervise the pool when it is in use. Each water watcher must understand and accept responsibility for monitoring the activity in and around the pool and should be trained in first aid, CPR/AED and water safety. Also, remember to review your emergency action plan with your water watchers. Water watchers must agree to avoid distractions while they are on duty (for example using cell phones, socializing or engaging in other activities), and they should refrain from drinking alcohol before and while supervising water activities.

If the swimming portion of the party will go on for more than 1 hour, plan for rest breaks during which everyone is out of the water. Rest breaks are important for the lifeguards and water watchers, and they give the guests who are enjoying the water an opportunity to rest and warm up.

Also remember the importance of establishing and enforcing safety rules. Alcoholic beverages should be strictly prohibited for anyone who is, or will be, supervising or participating in water activities.

Using Hot Tubs Responsibly

In addition to all of the safety considerations detailed previously, hot tubs necessitate some special safety considerations. Although the hot water is relaxing and soothing and can improve circulation, it can also lead to problems if not enjoyed responsibly. Research has shown that high water temperatures can lead to drowsiness or even loss of consciousness, which can lead to drowning. In addition, the hot water can raise body temperature and blood pressure, placing the person at risk for heat-related emergencies. To safely enjoy a hot tub:

- Never use a hot tub when drinking alcohol or using other drugs.
- Never use a hot tub when you are alone.
- Do not increase the water temperature beyond 104°F (40°C).
- Limit your time in the hot tub to no more than 15 minutes.
- Do not use a hot tub if you are pregnant, take medications or have a chronic medical condition (such as high or low blood pressure, heart disease, epilepsy or diabetes) unless you have cleared this activity with your health care provider.
- Do not allow children younger than 5 years to use a hot tub. Children have difficulty adjusting to the extreme water temperature and are at risk for overheating.

The high water temperature in a hot tub provides a good environment for bacterial and parasite growth. If you own a hot tub, be sure to chemically treat and test the water regularly.

Shower before entering the hot tub, because substances on the skin (such as dirt, lotion and perspiration) "use up" the chemicals used to treat the water, lowering their levels and increasing the risk for microbial growth in the hot tub. Also, abide by maximum capacity guidelines, because overcrowding of the hot tub reduces the effectiveness of the chemicals used to treat the water.

Waterparks

Waterparks (aquatic amusement parks) are a favorite source of recreation for many families. Waterparks feature a wide range of attractions, including high-speed water slides, wave pools, lazy rivers, and water playgrounds or spray pads. Each of these features presents unique risks. While most waterparks go to great lengths to maintain safety, accidents can still happen, ranging from slips and falls on hard surfaces to head, neck or spinal injuries following a collision with another patron or the bottom of the pool.



For a safe and enjoyable experience at the waterpark:

- Visit the waterpark's website in advance to get information about the attractions and safety rules.

- Dress appropriately. In some cases, this may mean wearing water shoes.
- Follow all posted rules, especially those related to height and weight restrictions and life jacket use. Speak with waterpark staff if you are unsure about any rules or procedures.
- Listen and follow all instructions given by the lifeguards at each attraction.
- Recognize that each attraction may have specific rules that must be followed, in addition to the standard rules. For example, on some attractions (such as certain water slides), life jackets are not permitted, while on other attractions (such as fast-moving winding rivers), life jackets are required.
- Get into the correct position before starting down a water slide: face-up and feet-first. Follow any additional instructions that you may be given to lower your risk for injury. For example, on speed slides, you may be instructed to cross your ankles and fold your arms over your chest to help prevent injuries.
- Do not let children hold onto, or be held by, others when using water slides

Natural Bodies of Water

Natural aquatic environments offer great beauty and variety, so it is no wonder that people seek these environments out and have found so many different ways to enjoy them. However, nature is unpredictable! To safely enjoy recreational activities in and around natural bodies of water, knowledge of the unique hazards these environments present and respect for the unpredictable ways of nature are necessary.

Rivers, Streams and Creeks

Rivers, streams and creeks offer plenty of choices for recreational activities, such as boating, fishing, rafting and tubing. But the feature of rivers, streams and creeks that makes them so great for these activities—moving water—can also make them dangerous. Knowing how to anticipate and respond to the dangers posed by moving water can help you stay safe when you are enjoying time on or near a river, stream or creek.

Currents

Currents in rivers, streams and creeks are often unpredictable and fast moving. Changes below the surface of the water can cause abrupt changes in the direction and intensity of the current. In addition, the current may not be visible on the surface, even though it may be strong below the surface. Currents can be extremely powerful. Their power increases exponentially with the speed of

the water. For example, a current flowing at a rate of 2 miles per hour can exert pressure of up to 33 pounds per square inch, while a current flowing at a rate of 8 miles per hour can exert pressure of up to 538 pounds per square inch! Always respect the power of the water. Avoid wading in water where there is a strong current that could knock you off your feet, and wear a U.S. Coast Guard-approved life jacket when you are fishing, hunting, boating, rafting or tubing. If your boat, raft or tube overturns and you find yourself in a current, float on your back downstream, feet-first. Back-paddle with your arms to steer out of the current, and then swim or wade toward shore

Entrapments

The bottom of many rivers, streams and creeks is covered with rocks and other submerged objects. The powerful force of the moving water can trap your foot or leg against one of these submerged objects, causing you to fall and get pinned against the object under the surface of the water.

Entrapments are a risk even in shallow moving water. Never try to stand up in moving water. If your boat, raft or tube overturns and you find yourself in the water, float on your back with your feet up and pointed downstream to avoid possible entanglement of your feet or legs.

Strainers

A strainer (such as a snarl of tree limbs) is an obstacle in a current that acts like a kitchen colander. If you are upstream of a strainer, you could become trapped in it as the force of the current carries you toward it. If you find yourself approaching a strainer, swim toward the object headfirst, grab any part of the strainer at the surface of the water and try to kick and climb up and over the top.

Hydraulics

Hydraulics are the vertical whirlpools that occur as water flows over an object, such as a low-head dam or waterfall, causing a strong downward force (Fig. 2-15). Whitewater rapids are often filled with dangerous hydraulics. Even if the hydraulic appears small, the reverse flow of the water can trap and hold a person underwater. It is difficult and sometimes impossible to escape from a hydraulic. If you are caught in a hydraulic, resist fighting the current. Instead, try to swim to the bottom, get into the downstream current and then reach the surface.

Dams

No dam is ever safe. When you are in, on or around the water, stay away from dams. A fixed-crest/low-head dam is a barrier built across a river, stream or creek to control the flow of water (Fig. 2-16). Some of the most harmless-looking low-head dams are often the most dangerous. Low-head dams with a thin line of whitewater across the surface can contain powerful hydraulic forces.

The opening of a dam can also create dangerous conditions. When the dam floodgates open, the water level can rise quickly below the dam, creating a wall of water. If the dam is part of a hydroelectric power plant, the current created on opening the dam can pull anyone or anything (including boats) above the dam into danger.

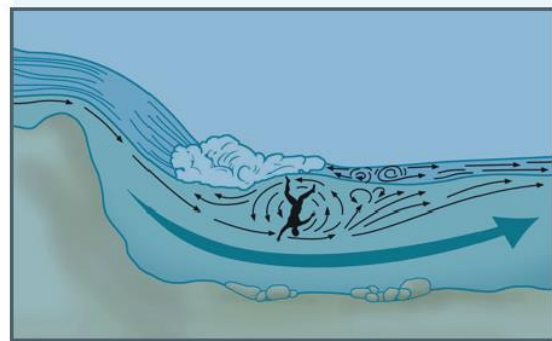


Fig. 2-15 A hydraulic is a powerful rotating force that develops as water flows over an object.

The area downstream of dams is also dangerous.

Recirculating water currents caused by the movement of water over or through the dam can draw objects back toward the dam.



Fig. 2-16 Stay away from dams. The chances of surviving an aquatic emergency involving a dam are slim.

Lakes and Ponds

Lake and pond water is usually murky, making it difficult to see below the surface. In addition, the bottoms of lakes and ponds often contain hidden hazards (such as rocks, sunken logs or debris, plants and broken glass). Because it is difficult to evaluate the depth of the water or to see underwater hazards, lakes and ponds are generally not safe for diving. The murkiness of the water can also make it difficult to notice a swimmer who is in trouble, especially if the swimmer is submerged. When enjoying recreational activities in, on or near a lake or pond, enter the water with caution, and always enter feet-first. Wear a U.S. Coast Guard-approved life jacket (if you are boating or if you are a weak or inexperienced swimmer) and protective water shoes. Many lakes have designated swimming areas that may or may not be guarded. If the lakefront has designated swimming areas or lifeguards on duty, swim only in these areas (Fig. 2-17). Be aware that many forms of wildlife also call the lake or pond home and avoid lakes or ponds that are inhabited by animals that can cause injury to humans, such as snapping turtles and alligators (Box 2-13). Swimming and other aquatic activities should occur only in areas with good water quality.

Conditions in these bodies of water change constantly. Many communities test lakes and ponds regularly for pollution and disease-causing organisms. Obey posted signs and avoid going in the water if the water quality is poor.



Fig. 2-16 Stay away from dams. The chances of surviving an aquatic emergency involving a dam are slim.



Fig. 2-17 Some lakes have designated areas for swimming and lifeguard supervision.

Box 2-13

Freshwater Aquatic Wildlife

Many different forms of wildlife live in or near freshwater areas, including rivers, streams, creeks, lakes and ponds.

- Alligators can be found in freshwater in some southern states, such as Florida, Louisiana, Georgia and Texas. They are very dangerous, especially to small children.
- Snapping turtles are large freshwater turtles that often live in and around shallow ponds, lakes and streams. They have powerful jaws and their bites can cause severe injury. Avoid approaching or provoking a snapping turtle.
- Snakes are found in a variety of freshwater habitats, including streams, rivers, lakes and ponds. Snakes rarely pose a threat. Leave them alone and swim away slowly.
- Leeches are usually found in shallow, slow-moving freshwater. You may not see a leech in the water; it is more likely that you will find one on your skin when you come out of the water. Leeches are not harmful. To remove a leech from your skin, gently and slowly pull it off.



Alligator. © iStockphoto.com/Don Fink



Snapping turtle. Image © Ryan M. Bolten, 2014. Used under license from Shutterstock.com

Oceans

For many people, a trip to the beach ranks high on their list of favorite things to do. After all, many people plan vacations around visiting a beach or engaging in other activities that take place in or on the ocean, such as boating, fishing, snorkeling, diving or surfing. As with all aquatic environments, however, knowledge of potential dangers is key to staying safe.

Waves

If you plan to swim in the ocean, stick to areas designated for swimming and pay attention to posted signs. These beaches often have lifeguards on duty, but some may not. Even in designated swimming areas, waves at ocean beaches can become quite large. Breaking waves are tremendously powerful, capable of moving large objects and knocking a person over (Fig. 2-18). The weight of a wave and the power of the crashing water can hold a person underwater—1 cubic foot of water weighs 62 pounds! Breaking waves near rocky shores are especially dangerous and can cause severe injuries or even death. Avoid swimming along rocky shorelines. When you are walking or playing along any shoreline, pay attention to the waves, and never turn your back on the ocean.

Currents

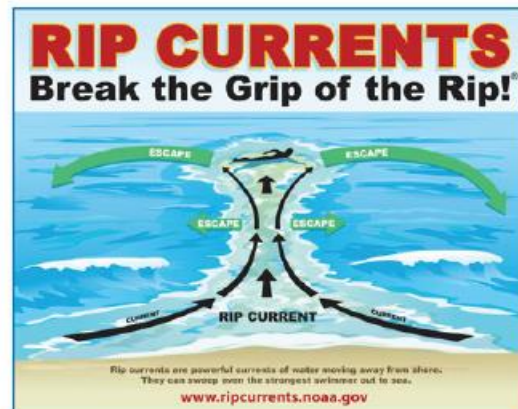
The action of breaking waves against the beach or coastline creates currents.

Longshore currents run parallel to the shore. A longshore current can quickly carry you away from your original point of entry. If you find yourself caught in a longshore current, try to swim toward shore while moving along with the current.

Rip currents move water away from the shore or beach and out to sea beyond the breaking waves (Fig. 2-19). A visual cue to a rip current is a narrow strip of choppy, turbulent water that moves differently from the water on either side of it. Rip currents typically break apart just past the line of breaking waves and are usually no more than 80 feet wide. Under gentle surf conditions, rip currents may be more frequent, but less intense. With periods of high-wave activity, however, rip currents tend to form less often but are much stronger.

Rip currents are dangerous because they are very fast, often faster than a person can swim, and they carry a person away from shore. Even though most rip currents break apart near the shore, they can still take a person into deep water or a frightening distance from the shore. In rare cases, rip currents can sometimes push a person hundreds of feet beyond the surf zone. Rip currents account for more than 80 percent of rescues performed by surf beach lifeguards, and it is estimated that each year more than 100 people die due to rip currents on our nation's beaches.

Rip currents can be a challenge to even the strongest and most experienced swimmers. If caught in a rip current, do not panic! Swim parallel to the shore until free of the current. Once free, turn and swim toward shore. Alternatively, you can just let the rip current take you out to sea, and then swim back after the current breaks apart. If you are too exhausted to swim to shore, signal a lifeguard by calling and waving for help.



IF CAUGHT IN A RIP CURRENT

- ◆ Don't fight the current
- ◆ Swim out of the current, then to shore
- ◆ If you can't escape, float or tread water
- ◆ If you need help, call or wave for assistance

SAFETY

- ◆ Know how to swim
- ◆ Never Swim alone
- ◆ If in doubt, don't go out

More information about rip currents can be found at the following web sites:

www.ripcurrents.noaa.gov
www.usia.org



Fig. 2-19 Rip currents are powerful currents of water moving away from the shore. If you are caught in a rip current, swim parallel to the shore until you are free, or let the current take you out and then swim back after the current breaks apart.

Tidal currents

Tidal currents are generated by tides. The change in the water level that occurs as the tide comes in and goes out creates a horizontal current called the tidal current. Tidal currents are somewhat inconsequential in wide areas, such as along an ocean shoreline, but in narrow areas, such as inlets, estuaries and bays, tidal currents can be very strong and fast, and should be avoided.

Because tidal currents are associated with the tides, they are predictable. Tides (and thus, tidal currents) are caused by the gravitational forces of the sun, the moon and the Earth's rotation.

The movement of the moon has the strongest influence on tidal currents, which are strongest during a new or full moon (spring tides) and weakest when the moon is in its first or third phases (neap tides).

Aquatic plants

Weeds, grass and kelp often grow thickly in open water, posing a potential source of entanglement for a swimmer. Always stay clear of any patch of plants near the surface. If you find yourself caught up in any aquatic plant life, avoid quick movements, which may worsen the situation. Try to stay horizontal at the surface, swimming slowly and gently out of the plants, preferably along with a current.

Marine life

Before going into any ocean, be knowledgeable about the local marine life. Know which forms of marine life may be dangerous, how to avoid them and how to care for any injuries. On supervised beaches, look for signs alerting you to the presence of hazardous marine life. Shuffle your feet as you enter the ocean to create a disturbance and stir up any marine life that may be resting on the bottom so that you do not accidentally step on it.

Many forms of marine life (such as jellyfish, sea urchins, stinging coral and stingrays) cause stinging wounds. Stings from marine life can have effects that range from merely painful to very serious (such as allergic reactions that can cause breathing and heart problems, paralysis or even death). If the sting occurs in water, move the person to dry land as soon as possible and provide basic first aid to neutralize the toxin and reduce pain (**Box 2-14**). Call 9-1-1 or the local emergency number if the person has been stung by a lethal jellyfish, does not know what caused the sting, has a history of allergic reactions to stings from aquatic life, has been stung on the face or neck or starts to have difficulty breathing.

Box 2-14

Care for a Jellyfish Sting



Bluebottle jellyfish.

Move the person to dry land as soon as possible.

Offset the toxin by flushing the area as soon as possible. Do not rub the wound or apply fresh water, ammonia or rubbing alcohol because these substances may increase pain.

- For most types of jellyfish typically found along the east and west coasts of the
- United States flush the injured area with vinegar for at least 30 seconds to offset the toxin. You can also apply baking soda slurry if vinegar is not available.
- For bluebottle jellyfish (Portuguese man-of-war), which are found in tropical waters, flush with ocean water instead of vinegar.
- Carefully remove any stingers or tentacles with gloved hands or a towel.
- After deactivating or removing the stingers or tentacles, immerse the affected area in water as hot as can be tolerated for at least 20 minutes or until the pain is relieved. If hot water is not available, use dry hot packs or, as a second choice, dry cold packs to help decrease the pain. Do not apply a pressure immobilization bandage.

Note: Call 9-1-1 or the local emergency number if the person has been stung by a lethal jellyfish, does not know what caused the sting, has a history of allergic reactions to stings from aquatic life, has been stung on the face or neck or starts to have difficulty breathing.

Many people also worry about being attacked by a shark while in the ocean. The chance of a shark attack is relatively small, but because the consequences are severe, it is smart to take steps to minimize your risk (**Box 2-15**).

Box 2-15

Staying Away from Sharks

- Stay in a group. Sharks are more likely to attack a solitary person than a group.
- Avoid being in the water at night, dawn or dusk, when sharks are most active and not easily seen.
- Do not enter the water if bleeding from an open wound or if menstruating—sharks are attracted to blood and their ability to detect blood is very keen.
- Do not wear shiny jewelry, because the reflected light resembles fish scales.
- Do not enter the water in areas where there are signs of baitfish, especially those used by sport or commercial fishermen. Feeding areas or areas where sewage, runoff or rivers flow into the sea are also dangerous. Diving sea birds are good indicators of these areas.
- Use extra caution when waters are murky and avoid brightly colored clothing—sharks see contrast particularly well.
- Avoid excess splashing and do not allow pets in the water because their erratic movements may attract shark attention.
- Exercise caution when occupying the area between sandbars or near steep drop-offs—these are favorite hangouts for sharks.
- Do not enter the water if sharks are known to be present and evacuate the water swiftly but calmly if sharks are sighted.
- It goes without saying, but do not harass or provoke a shark if you do encounter one!

Staying Safe While Engaging in Water Activities

Specific activities that are enjoyed in, on or around the water have specific safety considerations.

Swimming

To stay safe while swimming, never swim alone and always swim in a supervised area. In addition, be aware of situations and behaviors that could threaten your safety while swimming.

Exhaustion

One of the dangerous “too’s”—tootired—is particularly likely to affect swimmers; becoming too tired while swimming can put a person at risk for drowning. Exhaustion (also referred to as fatigue) simply means that the person no longer has the energy to keep swimming or floating. Exhaustion can occur as a reaction to cold water, after being in the sun for too long, as a result of being dehydrated, as a result of swimming too long or too hard, or from any combination of these factors. It is more likely to occur in swimmers who:

- Swim early in the season when the water is cold. Swim too much before they are really in shape.
- Do not know which strokes to use to conserve energy (for example, the elementary backstroke takes relatively little energy compared to a front crawl).
- Are young, inexperienced or both.

To prevent exhaustion, take breaks and rest often while swimming or doing other water activities. Be aware of your abilities and environment, and listen to your body.

Hyperventilation and Extended Breath-holding

Some swimmers believe that **hyperventilation** (rapid, deep breathing) before prolonged swimming under water increases the amount of oxygen in the body, allowing the swimmer to hold the breath longer. In fact, hyperventilation is a dangerous practice that may result in drowning.

Rather than increasing oxygen levels in the blood, hyperventilation lowers carbon dioxide levels. This is risky because the drive to breathe is controlled by the amount of carbon dioxide in the blood. When a person hyperventilates and then swims underwater, the blood oxygen level can drop to a point that is so low that the swimmer passes out before the brain signals that it is time to breathe. When the person finally does take a breath instinctively, water rushes in and the drowning process begins.

Hyperventilation prior to submerging is an extremely dangerous practice that no swimmer should ever engage in. Also be aware that children who play competitive underwater games (such as trying to see who can hold his or her breath under the water the longest or who can swim the farthest distance underwater before coming up for air) are also at risk for hyperventilation. Teach children that competitive or repetitive underwater games can be extremely dangerous and stop this behavior if you see it occurring.

Diving

Injuries occurring from diving can be very severe or even fatal. For example, head, neck or spinal injuries can result in paraplegia (paralysis from the waist down), quadriplegia (paralysis from the neck down) or drowning. Most diving injuries take place in water 5 feet deep or less.

Many involve the use of alcohol or other drugs. Diving into open water that is shallow, diving into the shallow end of a pool, diving into aboveground pools and unsupervised diving from starting blocks cause most diving accidents.

Areas that are *never* safe for diving include aboveground pools (including inflatable “easy-set”-type pools) and unfamiliar bodies of water, especially if the water is murky and you cannot evaluate the depth of the water or see hazards under the water. The deep ends of some inground pools are appropriate for diving, but you need to evaluate each pool carefully and obey any posted signs related to whether diving is permitted, and if so, in what areas of the pool. Typical locations of “No Diving” signs are on the deck near the edge of the pool and on walls or fences near shallow water.

Many kinds of warnings signs are used, such as the following:

- “No Diving” painted on the deck in contrasting colors
- Tiled lettering embedded into the deck in contrasting colors
- Universal “No Diving” tiles embedded into the deck
- “No Diving” signs mounted on walls, fences or stands

Two common home pool designs are the hopper-bottom pool and spoon-shaped pool (**Fig. 2-22**). A hopper-bottom pool has a bottom that angles sharply up on all four sides from the deepest point.

Thus, the diving envelope (the area that is safe to dive into) is much smaller than it appears (**see Fig. 2-22A**). Diving into a hopper-bottom pool can be like diving into a funnel. A spoon-shaped pool also may present risks to safe diving because the distance from the end of the diving board or the side of the pool to the slope of the bottom is greatly reduced (**see Fig. 2-22B**). The bottom contour of the spoon-shaped pool may give a false sense of depth and bottom area throughout the deep end. Guidelines for lowering the risk for diving injuries are given in **Box 2-16**.

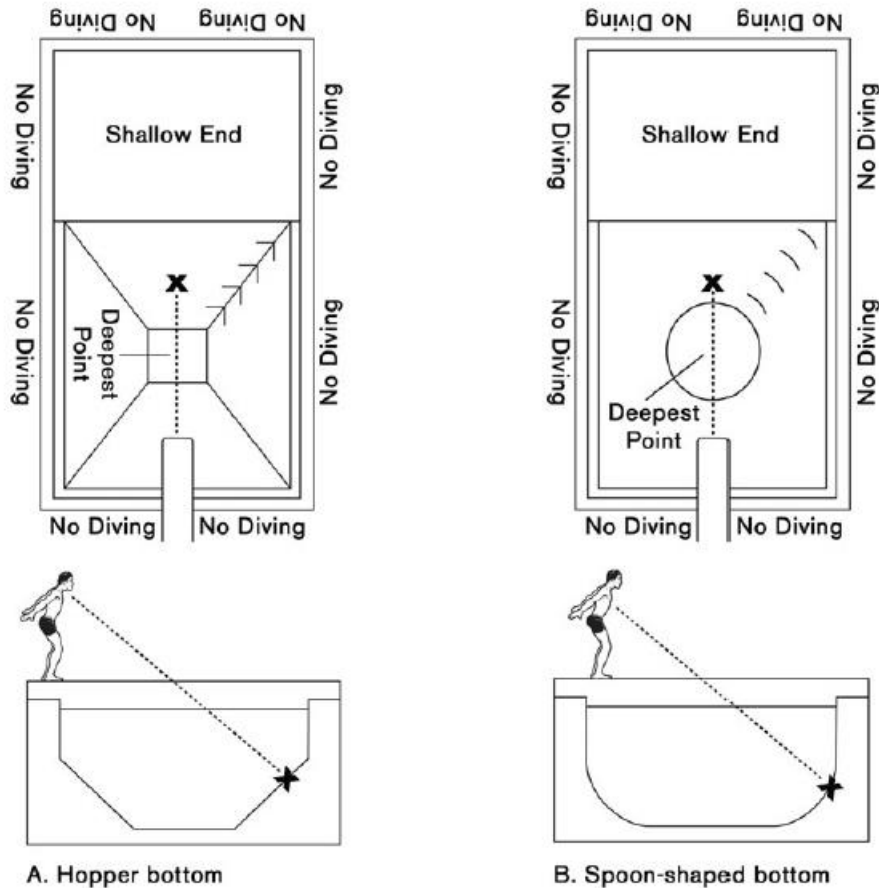


Fig. 2-22 Home pools often feature hopper bottoms or spoon-shaped bottoms, making them unsafe for diving. (A) Hopper-bottom pool. (B) Spoon-shaped pool.

Box 2-16

Guidelines for Lowering the Risk for Diving-Related Injuries

- Never drink and dive.
- Do not dive alone.
- Do not dive into unfamiliar bodies of water.
- Know the depth of the water (it should be at least 9 feet deep) and the shape of the pool bottom before you dive.
- Dive straight ahead, never off to the side.
- Make sure the area you are diving into is clear of swimmers or other obstacles before you dive.
- Do not dive from a running start.
- Do not dive from any structure that is not specifically designed for diving.
- Do not try to dive headfirst through something (such as an inner tube) or over something.



Derived from the National Pool and Spa Institute: American National Standard for Residential Inground Swimming Pools ANSI/NSPI-5 2003. Alexandria, Virginia: National Pool and Spa Institute, 2003.

Box 2-17

Personal Watercraft Safety

When operating a personal watercraft, wear a U.S. Coast Guard-approved life jacket and develop a float plan before leaving the shore.

In addition:

- Know the local laws and regulations. Some states have special laws governing the use of personal watercraft that address operation, life jacket use, registration and licensing requirements, minimum age requirements, education, environmental restrictions and required safety equipment.
- Operate personal watercraft with courtesy and common sense. Pay attention to surroundings and follow the traffic pattern of the waterway. Obey no-wake and speed zones.
- Use extreme caution around swimmers, surfers and other boaters. Run personal watercraft at a slow speed until the craft is away from the shore, swimming areas and docks. Avoid passing close to other boats and jumping wakes. This behavior is dangerous and often illegal.
- Ride with a buddy. Always ride in groups of two or three. You never know when an emergency might occur.
- Always attach the engine cutoff lanyard to yourself and the personal watercraft during operation.



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Boating

Recreational boating is a term used to describe the operation of open motorboats, cabin motorboats, sailboats, canoes, kayaks, personal watercraft (such as Jet Skis and wave runners; **Box 2-17**) and other types of watercraft. Boating can be a safe and enjoyable pastime, but it is important to know the dangers. In 2012, the Coast Guard counted 4515 recreational boating accidents, which resulted in 651 deaths and 3000 injuries. Of the deaths, approximately 71 percent were caused by drowning.

Alcohol is a leading contributor to recreational boating accidents, especially those resulting in fatalities. Other contributing factors include operator inattention, operator inexperience, improper lookout, machinery failure and excessive speed.

Preparation and education can go a long way toward preventing recreational boating accidents, and surviving an accident if one should occur. First, check with your state for local laws and regulations related to boating. Second, obtain the proper training before operating a watercraft and stay up-to-date. Training is not just recommended for people operating large boats—motorboats (both open and cabin type) and personal watercraft are the most common types of vessels involved in reported accidents. Boating safety courses can teach you the fundamentals of safely operating and navigating your vessel, as well as provide information about local water conditions and hazards. Boating safety courses are offered through the U.S. Coast Guard Auxiliary (www.cgaux.org), United States Power Squadrons (www.usps.org) and local state boating authorities. Information about safe boat handling for canoes, kayaks and sailboats can be obtained from the American Canoe Association (www.americancanoe.org) or U.S. Sailing (www.ussailing.org), respectively. The

National Association of State Boating Law Administrators (NASBLA; www.nasbla.org), a national nonprofit organization that represents the recreational boating authorities of all 50 states and the U.S. territories, works to establish standards for boating safety education and is a valuable source of information about recreational boating safety courses.

In addition to educating yourself about the safe operation of your watercraft, there are additional steps you can take to promote safety while boating, including wearing a U.S. Coast Guard approved life jacket, having appropriate rescue and emergency response equipment on hand, creating a float plan, being knowledgeable about local water conditions and hazards and being prepared for changes in the weather.

Wear a Life Jacket

In 2012, 84 percent of the people who died from drowning as a result of a recreational boating accident were not wearing life jackets. This statistic underscores the importance of always wearing a U.S. Coast Guard-approved life jacket when boating. Most boating emergencies happen suddenly, leaving you little to no time to “put on a life jacket if you need it.” Put your life jacket on at the dock and do not take it off until you return. Even good swimmers should wear a life jacket when boating because the potential always exists for falling or being thrown into cold or dangerous water, or for sustaining a head injury following a collision; In cold water, having a life jacket on can be the single most important factor in surviving the incident. Many states have laws requiring life jacket use for people being towed on water skis, tubes or similar devices, and for people who are operating personal watercraft.

Be Prepared with Rescue and Emergency Response Equipment

Make sure your watercraft is stocked with equipment that can help you in case you run into trouble. In addition to extra life jackets and equipment for throwing and reaching assists, keep equipment for signaling distress on board. Equipment for communicating distress visually (such as flags, flares or lights) and sound-producing devices (such as an air horn or an athletic whistle) is required for some boats per U.S. Coast Guard regulations. Fire extinguishers may also be required on board per U.S. Coast Guard regulations.

It is also important to have a reliable way to communicate with the shore and other boats in case of an emergency. In many boating emergencies, a nearby boat may be able to provide assistance and can respond quickly. A marine very high frequency (VHF) radio is a two-way communication device that allows boaters to contact other boaters, bridge operators and harbor officials. In addition, many of these devices can provide rescue personnel with your exact location. All marine rescue personnel and commercial ships use this type of radio, and in many locations, the U.S. Coast Guard monitors VHF channel 16 at all times, 24 hours a day, 7 days a week. Also consider installing marine cell phone signal boosters to extend the range of your cell phone signal while you are on the water. Finally, make sure the boat has the proper equipment to assist with re-boarding, should that become necessary. Larger boats may have a rope ladder or dock line available. Canoes and kayaks may have short lengths of rope attached to the ends of the canoe or kayak (called “painters”) and end loops that look like handles that may be helpful for righting and reentering the craft.

Create a Float Plan

A float plan is a written document that provides the details of a boating trip. It contains information about the vessel, the people on board and the planned itinerary. Before you leave shore, create a float plan and leave it with a responsible person on land who can initiate rescue efforts if you fail to return or check in on time.

Be Knowledgeable about Local Water Conditions and Hazards

It is important to understand local water conditions and hazards. Changing tides can cause significant changes in water depth. Sandbars, currents, aquatic life and bottom conditions are constantly changing and creating new hazards. Certain areas may become crowded with commercial traffic. In some aquatic environments, it may be necessary to pass under a drawbridge or go through a lock. The U.S. Coast Guard, U.S. Army Corps of Engineers, marina staff and local authorities can provide helpful information about local water conditions and hazards.

Be Prepared for Changes in the Weather

In many open-water environments, the weather and water conditions can change rapidly and dramatically. Bad weather is always dangerous, but it can be deadly for boaters far away from the shore. Large waves, high winds and changing currents can make travel difficult and may lead to capsizing.

Remember the adage, “*Know before you go.*” Always check the weather before leaving and then keep an eye on the weather throughout the day. Boats equipped with marine VHF radios can monitor local forecasts. In addition, be alert to environmental cues to incoming weather changes, such as changes in cloud cover or sky color, a sudden drop in temperature, abrupt changes in wind speed or direction or a falling barometer. **Box 2-18** summarizes actions to take if severe weather develops.

Box 2-18

Boating Safety: If Severe Weather Develops

- Slow down and maintain enough boat speed to steadily move forward but still stay in control.
- Check to make sure that everyone on board is adequately dressed and wearing a properly fitting life jacket.
- Turn on the boat's navigation lights.
- Head into waves at a 45° angle; if on a personal watercraft, approach waves at a 90° angle.
- Have passengers sit low in the boat or on the floor near the centerline. Keep your shoulders between the gunwales on small boats. Do not sit on the gunwales, bow, seatbacks or any other area not designed for seating.
- Remain still and do not move about the boat.
 - If you must move, maintain three points of contact.
 - Do not stand up in small boats.
- Anchor the boat, if necessary and safe to do so.



Fig. 2-24 Whitewater rafting tours are popular with those seeking a thrill.
Image © VLLevi, 2014. Used under license from Shutterstock.com

Tubing and Rafting

Tubing and rafting are popular river sports. Depending on the river and the time of year, the experience may range from leisurely drifting downstream on calm waters to an adrenaline-packed thrill ride over whitewater rapids (**Fig. 2-24**). If you are planning to tube or raft with a tour company, check to make sure that the tour guide is qualified and well-trained. The local chamber of commerce can provide information about accredited tour guides and companies.

In addition following these guidelines can help you have a safe and enjoyable rafting or tubing trip:

- Never go tubing or rafting after a heavy rain or if flood or flash flood warnings are posted
- Wear a U.S. Coast Guard approved life jacket, a helmet (if required) and water shoes.
- Do not consume alcohol while tubing or rafting.
- Always abide by the specifications regarding the number of people the raft or tube can accommodate. Never overload your raft or tube.
- Create a float plan and leave it with a responsible person on shore if you are setting out on your own.

Fishing and Hunting

In most fishing- and hunting-related accidents involving the water, the person never intended to get in the water. To lower your risk of drowning as result of a water-related accident while hunting or fishing:

- Take a boating safety course if you plan to use a boat to fish or hunt.
- Always wear a U.S. Coast Guard-approved life jacket if you intend to be in a boat or near the water.
- Do not consume alcohol while hunting or fishing.
- Always hunt or fish with a friend.
- When you are in a boat, keep a wide base of support and a low center of gravity and use your hands to maintain your balance.
- Be especially careful of your footing when walking near water.
- Dress properly for the weather.
- Have a reaching or throwing device on hand.

Outdoor Ice Sports and Activities

In parts of the country when natural bodies of water freeze during the winter months, people often enjoy outdoor ice sports and activities, such as skating, ice fishing and snowmobiling (**Fig. 2-25**).



Fig. 2-25 Even in cold parts of the country, people find ways to enjoy outdoor aquatic activities all year long. *Image © Stephen McSweeney, 2014. Used under license from Shutterstock.com*

There is no such thing as 100 percent safe ice. Ice on smaller, shallower and slower-moving bodies of water tends to be more solid than ice on larger, deeper and fast-moving bodies of water.

Ice that forms over open water may be unsafe if the following are present:

- Springs or fast-moving water
- Wind and wave action
- Waterfowl and schooling fish
- Decomposing material in the water
- Water bubblers (devices designed to keep the water near boat docks from freezing thick)
- Discharge from an industrial site or power production facility
- Objects protruding through the ice, such as tree stumps

Do not go out on ice that has recently frozen, thawed and then frozen again. This happens in the spring and early winter as temperatures

change often. Wait until the outside temperature has been below freezing long enough that at least 4 inches of solid ice forms over the entire area. Always check the ice thickness before going out using a chisel, cordless drill or ice auger. Ice should be solid and at least 4 inches thick if you are planning to walk on it. However, this thickness is not enough for snowmobiles, all-terrain vehicles or other vehicles, or if more than one person will be on the ice. Be aware that the thickness may not be the same over the entire area, so always use caution, even if the ice is thick enough in the place where you took your measurement.

Dress in several loose-fitting, lightweight layers, instead of one heavy layer. Wear a hat, boots and a water-resistant outer layer. Wear a life jacket under your outer layer, unless you will be driving onto the ice in an enclosed vehicle, such as a truck or car. If the truck or car were to fall through the ice, a life jacket worn under your clothes could hinder your ability to escape from the vehicle quickly. Whenever you are planning on going out on the ice, always go with a friend and let someone on shore know where you are and when you will return. Look for objects sticking up through the ice and mark them as hazards. Be prepared in case the ice breaks. Have something at hand to throw or extend to a person who needs help, such as a rope with a weighted end, a long tree branch, a wooden pole or a plastic jug with a line attached.

When ice breaks, it usually occurs suddenly and without warning. The sudden surprise of falling through the ice coupled with the shock of the cold water often causes the person to panic. Almost immediately, the exposure to the cold water reduces the ability to move the arms and legs, which can further increase panic as any effort to get out of the water becomes even more difficult. Ice rescue picks (ice claws), which are handles with sharp metal spikes that a person can use to climb back onto the ice after falling through, can be invaluable in this situation and are a wise investment if you plan on going out on the ice.

If you fall through the ice, try to stay calm. Turn toward the direction you came from, since the ice is likely to be strongest there, and quickly get into a floating position on your stomach. Bend your knees to help trap air in your pant legs and boots. Reach forward onto the broken ice, but do not push down on it. (If you have ice rescue picks, dig the points of the picks into the ice.) Use a breaststroke or other kick to push your body farther onto the ice. Once you are on the ice, roll away from the break area. If a companion falls through the ice, encourage the person to remain calm and use a reaching or throwing assist to help pull the person to safety.

Recognizing and Responding to Aquatic Emergencies



Many Americans live, work and play in or near water. In fact, nearly 40 percent of our nation's population lives in counties directly on a shoreline, and this number is getting bigger each year. That's not even counting our access to lakes, rivers, pools and other aquatic environments.

Now, more than ever, knowing how to recognize and respond to an aquatic emergency is as important as knowing how to prevent one.

Recognizing an Emergency

An emergency can happen to anyone in or around the water, regardless of swimming ability. For example, a strong swimmer can get into trouble in the water because of sudden illness or injury. Or, a nonswimmers playing in shallow water can be knocked down by a wave or pulled into deeper water by a rip current. The key to recognizing an emergency is staying alert and being able to recognize when a person is having trouble in the water.

Staying Alert

Staying alert means using all your senses when observing others in and around the water. For example, you may see a swimmer acting oddly. Or, you may hear a scream or sudden splash. Keep in mind that the signals of an emergency might be what you *do not* see or hear. For instance, it may surprise you to learn that most people who are in trouble in the water cannot or do not call for help. They spend their energy just trying to keep their heads above water to get a breath. Likewise, a person who is experiencing a medical emergency might slip underwater quickly and never resurface. The more alert you are, the faster you can respond to an emergency and potentially save a life.




Identifying When a Person Needs Help

A person who needs help may be drowning, or he may be swimming but in distress. It is essential to identify what is going on so you can respond appropriately. **Table 3-1** compares and summarizes the typical behaviors and appearances of distressed swimmers, drowning victims who are active and drowning victims who are passive. Early recognition and response greatly increases the chances of survival for a person who is drowning (**Fig. 3-1**).



Fig. 3-1 Following the steps outlined in *Chain of Drowning Survival* from the American Red Cross can increase a person's chances of surviving a drowning incident.

Table 3-1 Recognizing When a Person Needs Help

	Distressed Swimmer	Drowning Victim—Active	Drowning Victim—Passive
			
Head position	Above water	Tilted back with face looking up	<ul style="list-style-type: none"> • Face-up or face-down in the water • Submerged
Appearance	<ul style="list-style-type: none"> • Trying to support self by holding or clinging to a lane line or safety line • Concerned facial expression 	<ul style="list-style-type: none"> • Struggling to keep or get the head above the surface of the water • Struggling to reach the surface, if underwater • Panicked or wide-eyed facial expression 	<ul style="list-style-type: none"> • Limp or convulsion-like movements • Floating or submerged • Eyes may be closed • If submerged, may look like a shadow
Breathing	Breathing	Struggling to breathe	Not breathing
Arm and leg action	<ul style="list-style-type: none"> • Floating, sculling or treading water • May wave for help 	Arms at sides or in front alternately moving up and pressing down	None
Body position	Horizontal, vertical or diagonal, depending on means of support	Vertical, leaning slightly back	Horizontal or vertical
Locomotion	<ul style="list-style-type: none"> • Little or no forward progress • Increasingly less able to support self 	None	None
Sounds	Able to call for help but may not do so	Cannot call for help	None
Location in water	At the surface	At the surface, underwater or sinking	Floating at the surface, sinking or submerged on the bottom

Drowning Victim—Active

A drowning victim who is struggling to remain at the surface of the water has distinctive arm and body positions. These are efforts to try to keep the mouth above the water's surface in order to breathe. This universal behavior is called the *instinctive drowning response*. A drowning victim who is struggling to remain at the surface of the water cannot call out for help because his efforts are focused on getting a breath (Fig. 3-2).



Fig. 3-2 A drowning victim who is struggling to stay at the surface of the water and to breathe has no energy left to call out for help.

In fact, a drowning in progress is often silent. The person works to maintain a vertical position and keep his face above the water by pressing down with his arms at his sides or in front. However, the person's mouth may slip underwater, often repeatedly. Young children may tip forward into a horizontal face-down position and be unable to keep the mouth above the surface of the water at all. The person will not make any forward progress in the water, and may only be able to stay at the surface for 20–60 seconds, if at all. The person may continue to struggle underwater but eventually will lose consciousness and stop moving.

Drowning Victim—Passive

Some people who are drowning do not struggle. They suddenly slip underwater (for example, as a result of a sudden illness or injury or a dangerous behavior such as hyperventilation and prolonged underwater breath-holding). The use of alcohol or other drugs is also frequently a contributor to this type of drowning incident. A person who is drowning but not struggling may be floating face-down at the surface of the water, or she may be underwater in a face-down or face-up position, or on her side. The person may be limp or have slight convulsive movements. The person is not moving or breathing. It can be difficult to see a drowning victim who is underwater, especially if the person is at the bottom of the pool or in a natural body of water where the water is murky. In a pool, the person may look like a shadow or an object like a towel on the bottom (Fig. 3-3).



Fig. 3-3 A drowning victim who is underwater can be difficult to see. The person may look like a shadow, a smudge or an object like a towel.

Distressed Swimmer

A distressed swimmer is someone who is not drowning, but needs help. A swimmer can become distressed for several reasons, including exhaustion, cramping or a sudden illness. A swimmer who is distressed may be afloat and able to breathe and call for help. However, you will notice that she is making little or no forward progress. She may be treading water or clinging to a line for support. A distressed swimmer may be unable to reach safety without assistance. Without help, a swimmer in distress may soon become a drowning victim.

Responding to an Emergency

In an emergency, your role is to recognize the emergency, decide to act, call emergency medical services (EMS) personnel for help and give assistance consistent with your knowledge and training until EMS personnel arrive and take over (**Box 3-1**). If you work at an aquatic facility, you are a member of the safety team, which works to prepare for, prevent and respond to emergencies. As such, you are responsible for being familiar with the facility's emergency action plan, as well as your role in implementing it should an emergency occur.

Box 3-1

The Emergency Medical Services (EMS) System

The emergency medical services (EMS) system is a network of professionals linked together to provide the best care for people in all emergencies, both in and out of the water.



The system begins when someone sees an emergency and decides to take action by calling 9-1-1 or the local emergency number.



This action allows the EMS dispatcher to take down information about the emergency and provide it to the trained EMS professionals who will respond to the scene.



EMS professionals may include paramedics (trained to give advanced-level medical care at the scene of an emergency); emergency medical technicians (EMTs; trained to give mid-level medical care at the scene of an emergency); emergency medical responders (EMRs; trained to give basic-level care at the scene of an emergency); police officers; firefighters and other professional rescuers (for example, ski patrollers, park rangers).



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Once on the scene, these professionals will take over the care of the person, including transportation to a hospital or other facility for the best medical care if needed.

Deciding to Act

In an emergency, deciding to act is not always as simple as it sounds. People are often slow to act in an emergency because they are not exactly sure what to do or they think someone else will take action. In an emergency situation, your decision to act could make the difference between life or death for the person who needs help. In the excitement of an emergency, it is easy to become frightened or confused about what to do.

Remember to stay calm; you can help. In any emergency situation, follow the three action steps,

CHECK—CALL—CARE:

- **CHECK** the scene and the person.
- **CALL** 9-1-1 or the local emergency number.
- **CARE** for the person. Give care according to the conditions that you find and your level of knowledge and training.

Let's take a look at the first step: check. First, check the scene. Be on the lookout for other victims, and for signals that the scene is unsafe. Look for clues as to what happened. Also check for bystanders who may be able to help you. *Never* rush into a dangerous situation, or you risk becoming a victim yourself. After you check the scene, check the person.

An aquatic emergency can take place on land or in the water. If the person is in the water, you must decide whether he or she needs help getting out of the water. Only help the person get out of the water if you can do it safely (for example, by using a reaching or throwing assist, which you will learn about later in this chapter). Do not enter the water to help the person unless you are specifically trained to perform in-water rescues. Your safety must be your top priority. If you cannot safely help the person out of the water, get help from a trained responder, such as a lifeguard, or call 9-1-1 or the local emergency number and wait for help.

Calling for Help

Once you have checked the scene and the person, take the second emergency action step: call 9-1-1 or the local emergency number to activate the EMS system. Whenever possible, send another person to make the call while you continue to stay with the person. Whether you make the call yourself or send someone else to call, be prepared to give the dispatcher the following information:

- Your name (or the name of the person making the call)
- The telephone number of the phone being used
- The location of the emergency (the exact address, city or town; nearby intersections or landmarks; the name of the facility)
- A description of what happened
- A description of the number of victims
- A description of what help has been given so far. Stay on the phone with the dispatcher until the dispatcher tells you it is all right to hang up. The dispatcher may need additional information from you, or he or she may be able to help by giving you first aid instructions over the phone.

The following conditions and situations are serious and require a call to 9-1-1 or the local emergency number to activate the EMS system:

- Fatal or nonfatal drowning
- Injury or suspected injury to the head, neck or spine
- Trouble breathing

- Persistent chest or abdominal pain or pressure
- Unconsciousness
- Severe bleeding, vomiting blood or passing blood
- Seizures that occur in the water or last more than 5 minutes
- Severe headache or slurred speech
- Poisoning
- Possible broken bones
- Multiple injuries

If you are unsure about whether professional help is needed, act on the side of caution and activate the EMS system.

Giving Assistance

The final emergency action step is to give care according to the conditions that you find and your level of knowledge and training (**Box 3-2**). Make the person comfortable until EMS personnel

Box 3-2

Learn Lifesaving Skills!

Many different types of first aid emergencies can occur in aquatic settings, ranging from the relatively minor (such as an abrasion or jellyfish sting) to the life-threatening (such as sudden cardiac arrest or anaphylaxis). People who experience sudden cardiac arrest or other serious first aid emergencies have a better chance of surviving when those around them know how to respond and give care until trained personnel arrive to take over. Unfortunately, many people do not know how to provide basic first aid and emergency cardiovascular care or are uncomfortable providing this care.

Red Cross first aid, CPR and AED (automated external defibrillator) training programs are designed to give you the confidence to respond in an emergency situation with skills that can save a life. By taking a Red Cross course, you learn from the best. Red Cross materials are developed in collaboration with leading educational and medical authorities and incorporate the latest science in first aid and emergency cardiovascular care. Courses are taught by certified instructors and, upon successful completion, participants earn nationally recognized certificates. Spanish-language courses are also available. To enroll in a Red Cross first aid, CPR and AED class visit www.redcross.org.

In an aquatic emergency such as drowning, knowing how to do full CPR (cycles of chest compressions and rescue breaths) is critical.

Basic Water Rescue: Helping Others in an Aquatic Emergency

Learning basic water rescue skills is important for anyone who lives, works or plays near water. There are many different ways to help a person who is in trouble in the water to safety. The method you will use depends on your level of training and the situation. Always take care to choose an assist that helps the person, while keeping you as safe as possible as you respond.

Reaching and Throwing Assists

Reaching and throwing assists allow you to help a conscious person who is in trouble without entering the water yourself. These types of assists are the safest assists for responders who are not

professionally trained lifeguards to perform during an aquatic emergency. They are also the best type of assist to use when someone has fallen through ice (**Box 3-3**). To keep yourself safe, always remember “*Reach or throw, don’t go!*”

When doing a reaching or throwing assist:

- Start the rescue by talking to the person, if possible. Let the person know help is coming.
- Use gestures to communicate with the person if it is too noisy or if the person is too far away to hear.
- Tell the person what he or she can do to help with the rescue, such as grasping a line, rescue buoy or other floating device.
- Encourage the person to move toward safety by kicking or stroking. Some people are able to reach safety by themselves with calm encouragement from a person on the deck or shore.

Box 3-3

Using a Reaching or Throwing Assist to Help a Person Who Has Fallen Through Ice

Never go out onto the ice in an attempt to rescue a person who has fallen through the ice. Because a person has just fallen through it, the ice is unsafe. A responder who rushes out onto the ice is likely to become a victim as well. Instead, follow these guidelines:

1. Send someone to call EMS personnel immediately. Trained responders may be needed to get the person out of the ice. Even if you are successful in rescuing the person from the ice without the help of EMS personnel, the person will still need medical care.
2. From a secure place on land, try a reaching or throwing assist. Use anything at hand that the person can grasp for support, such as a tree branch, pole, life jacket or weighted rope. Act quickly. Within 1 minute, the person’s hands may be too numb to grasp the object.
3. Pull the person to shore and give first aid for hypothermia. If it is not possible to safely pull the person to shore, reassure the person and make sure he or she is as secure as possible until help arrives.



Reaching Assists

If the person is close enough, use a reaching assist to help him or her out of the water. To do a reaching assist, use any available object that will extend your reach and give something for the person to grab so you can pull the person in. Items that work well for reaching assists include a pole, an oar or paddle, a tree branch, a shirt, a belt or a towel. Community or hotel pools and recreational areas often have reaching equipment, such as a shepherd’s crook (an aluminum or fiberglass pole with a large hook on one end), located close to the water.

You can perform a reaching assist from the pool deck, pier surface or shoreline. If no equipment is available and you are close enough, you may be able to perform a reaching assist by extending your arm to the person. You can also perform a reaching assist from a position within the water by extending an arm or a leg to the person, if you are already in the water and you have something secure to hold onto. **Water Rescue Skill Sheet 3-1** describes how to perform a step-by-step reaching assist.

Throwing Assists

A throwing assist involves throwing an object that the person can grasp so you can pull him or her to safety. A floating object with a line attached is ideal for a throwing assist; however, lines and floats can also be used alone. Rescue devices that are meant for throwing assists include a heaving line,

ring buoy; throw bag or heaving jug (Fig. 3-4). In some situations, you may have to improvise with an object that floats but is not specifically meant for throwing assists, such as a rescue tube (a vinyl, foam-filled tube with an attached tow line that is standard equipment for lifeguards), life jacket or cooler. If possible, keep a throwing object with a coiled line in a prominent location that is accessible to the water, so that anyone can quickly access it to throw to someone in trouble. All boats should have rescue equipment for throwing assists onboard. **Water Rescue Skill Sheet 3-2** describes how to perform a step-by-step throwing assist.



Fig. 3-4 A variety of items can be used for a throwing assist.

Wading Assists

If a throwing assist does not work and the water is shallow enough for wading (that is, less than chest deep), you can try a wading assist (Fig. 3-5).

A wading assist involves wading into the water and using a reaching assist to help pull the person to safety.

Objects that may help extend your reach and give the person something to grab on to include rescue equipment (such as a rescue tube or ring buoy), kickboard, life jacket, tree branch, pole, air mattress or paddle. You can also use a wading assist to rescue an unconscious or submerged person who is in water that is less than chest deep. When the person is unconscious or submerged, instead of using a reaching assist to pull the person to safety, use a flotation device to keep the person at the surface of the water and support him while you tow him to safety.

For your own safety, wear a life jacket if one is available when attempting a wading assist. Only perform a wading assist in water that is less than chest deep. If a current or soft bottom makes wading dangerous, do not enter the water. **Water Rescue Skill Sheet 3-3** describes how to perform a step-by-step wading assist.



Fig. 3-5 A wading assist can be used when the water is less than chest deep and there are no conditions that make wading dangerous. For your own safety, wear a life jacket when performing a wading assist. Take an object to extend to the person to hold on to so that the person does not have to hold on to you.

Sloped Entry Assists

A walking assist or a beach drag may be used to remove a person from shallow water along a sloping beach, shore or pool entry. A walking assist can also be used to help a person out of the water using the steps of a pool. Use a walking assist when the person is conscious and able to support some or all of his weight. Use a beach drag when the person is unconscious or otherwise unable to bear weight. **Water Rescue Skill Sheet 3-4** describes how to perform these step-by-step assists.

Two-person Removal from the Water Using a Backboard

A backboard is the standard piece of equipment used by lifeguards to remove a person from the water when the person is unable to exit the water on his or her own or when the person has a possible injury to the head, neck or spine. Usually this type of rescue is performed by two lifeguards, but if a second lifeguard is not available, a bystander may be required to assist.

Water Rescue Skill Sheet 3-5 describes how to assist a lifeguard in removing a person from the water using a backboard.

Manual In-line Stabilization

Manual in-line stabilization is a technique used to minimize movement of a person's head, neck and spine when a head, neck or spinal injury is present or suspected (**Box 3-4**). Injuries to the head, neck or spine can be serious because they may result in lifelong disability (e.g., paralysis) or death. If possible, let a lifeguard or a person with more advanced training respond first. However, if such a person is not around, you will need to act. If you suspect a head, neck or spinal injury, follow these general guidelines:

- Have someone call 9-1-1 or the local emergency number immediately.
- If the person is in the water and breathing, use an in-line stabilization technique to minimize movement of the head, neck and spine and keep the person's face out of the water. If the person is on land, place your hands on both sides of the person's head and support it in the position in which you found it. Continue to immobilize the person's head until EMS personnel arrive and take over.
- If the person is in the water and not breathing, immediately remove the person from the water and give care according to the conditions you find and your level of knowledge and training.

Manual in-line stabilization techniques that are used to minimize movement of the person's head, neck or spine when the person is in water include the hip and shoulder support and the head splint. The hip and shoulder support (**Water Rescue Skill Sheet 3-6**) is used for a person who is face-up. The head splint (**Water Rescue Skill Sheet 3-7**) provides better stabilization than the hip and shoulder support and can be used for a person who is face-up or face-down.

Box 3-4

Recognizing Head, Neck and Spinal Injuries

If you are unsure whether a person has a head, neck or spinal injury, think about what the person was doing and what happened to cause the injury when checking the scene. In aquatic settings, head, neck or spinal injuries are usually caused by high-impact, high-risk activities, such as:

- Entering head-first into shallow water
- Falling from greater than standing height
- Entering the water from a height, such as a diving board, waterslide, embankment, cliff or tower
- Striking a submerged or floating object
- Receiving a blow to the head
- Colliding with another swimmer
- Striking the water with high impact, such as falling while water skiing or surfing

In addition to noting the circumstances of the injury, observe the person for signals of a possible head, neck or spinal injury. These include:

- Changes in level of consciousness
- Severe pain or pressure in the head, neck or spine
- Loss of balance
- Partial or complete loss of movement of any body part
- Back pain, weakness, tingling or loss of sensation in the hands, fingers, feet or toes
- Persistent headache
- Unusual bumps, bruises or a depression on the head, neck or spine
- Impaired breathing or vision
- Nausea or vomiting
- Bruising of the head, especially around the eyes and behind the ears
- The person is holding his head, neck or back
- Behavior resembling intoxication

Basic Water Rescue: Helping Yourself in an Aquatic Emergency

An aquatic emergency can happen to anyone, even someone who has a great deal of experience being in and around the water. A swimmer can develop a physical condition, such as cramping or fatigue, which hinders his or her ability to keep swimming. A boating accident, mechanical malfunction or rough water can cause the craft to capsize, tossing its occupants into the water. In fact, many people who find themselves involved in an aquatic emergency never intended to go into the water in the first place. A car may go off the road into a body of water, or ice may crack, causing an ice skater to fall through. If you find yourself in trouble in the water, knowing what you can do to help yourself is imperative.

Relieving Muscle Cramp

Muscle cramps can occur when muscles become tired or cold from swimming or other activity. A cramp is an involuntary muscle contraction, usually in the arm, foot or calf. A muscle cramp can occur at any time, in any depth of water. If you develop a muscle cramp in shallow water, try to relax the muscle by stopping or changing the activity. Get out of the water, begin floating or change to a different swimming stroke. Changing the position of the affected limb to stretch the cramped muscle and massaging the area may also help to relieve the cramp. If you develop a muscle cramp in deep water, take a deep breath, roll forward so that you are face-down and float. Extend your leg and flex the ankle or toes while massaging the cramped muscle (**Fig. 3-6**). Abdominal cramps are rare, but can happen. If you experience an abdominal cramp, try to relax and maintain your position in the water until the cramp passes



Fig. 3-6 If you experience a muscle cramp in deep water, position yourself face-down, extend the affected leg, flex the ankle or toes and massage the area.



Fig. 3-7 Articles of clothing inflated with air can aid floating.

Using Clothing as a Flotation Aid

If you find yourself in the water fully clothed and without a life jacket, you may be able to use an article of clothing that you are wearing as a makeshift flotation device (**Fig. 3-7**). Once filled with air, articles of clothing such as a shirt, jacket or pants can aid floating, as well as provide protection against cold water, marine life, sun exposure and fuel spills. If shoes are light enough to allow swimming comfortably, leave them on. But if your shoes are too heavy or if you intend to use your pants as a flotation device, assume a jellyfish float position and remove them. **Water Rescue Skill Sheet 3-8** describes step-by-step how to use articles of clothing to aid flotation.

Self-Rescue in Warm Water

In warm water, you may decide to try to swim to safety, or to float in place until help arrives. Remember that swimming long distances to safety should only be used as a last resort.

If you decide to swim, use the survival swimming stroke, which will allow you to cover a considerable distance while using a minimal amount of energy, whether you are buoyant or not. Use survival floating to rest while you are making your way to safety. If it is not possible to reach safety and you must wait for help, use survival floating alone. **Water Rescue Skill Sheet 3-9** describes the survival float step-by-step, and **Water Rescue Skill Sheet 3-10** describes the survival swimming stroke.

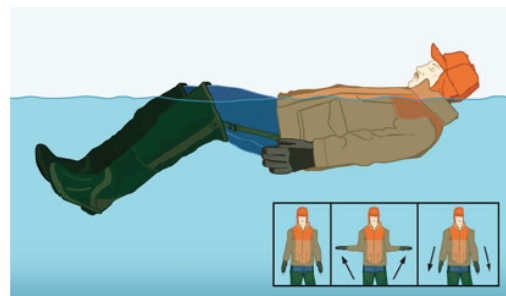
Self-Rescue in Cold Water

Cold water presents several challenges. It is not possible to swim as far in cold water as it is in warm water. If you are in open water or a great distance from the shore, floating in place until help arrives is the best way to survive a cold water emergency. If you do decide to attempt to swim, consider your swimming ability, the amount of insulation you have and the water conditions. When the water is 50° F (10° C) or colder, even a good swimmer may have difficulty reaching shore, so only attempt to swim if you can reach the shore in a few strokes. Keep in mind that in emergencies it is often hard to judge distance, so be careful not to underestimate the distance to shore. If you do attempt to swim to safety, use a stroke with an underwater arm recovery (such as the breaststroke or elementary backstroke) to help maintain heat.

Box 3-5

Falling Into the Water Fully Clothed

People who fall into the water wearing winter clothes, especially heavy boots or waders, usually panic because they think they will sink immediately. But winter clothes and outdoor gear (such as a snowmobile suit, hip boots or waders) can actually trap air and aid floating, in addition to helping to delay hypothermia. If you fall into the water wearing hip boots, waders or rubber boots, relax and bend your knees—the trapped air in the boots will bring you back to the surface quickly. Then lie back, spread your arms and legs and perform a “winging” motion with your arms to move toward safety.



In cold water, keep all of your clothes on, including a hat if you are wearing one (**Box 3-5**).

Tight-fitting foam vests and flotation jackets with foam insulation help to retain heat and can double survival time. Even wet clothes help retain body heat, and if you are not wearing a lifejacket, you can try inflating your clothing with air for flotation. Avoid splashing in an attempt to warm up. Splashing increases blood circulation in the arms and legs and will drain energy, resulting in heat loss.

Similarly, treading water chills the body faster than staying still. In cold water, tread water only if it is necessary. Keep your face and head above the water, and turn your back toward waves to help keep water off of your face. Look around for a log or anything floating for support. In the event of a boating accident, try to right the boat and reenter. If that is not possible, climb up onto the capsized boat to keep more of your body out of the water.

If you are not in immediate danger but you are far from shore, stay still and let your life jacket provide support until help arrives. When you are wearing a life jacket, you can use the heat escape lessening posture (HELP) (if you are alone) or the huddle position (if you are in a group of two or more people) to stay warmer. The HELP and the huddle positions can increase the chances of survival when floating in cold water by reducing the amount of body surface area that is directly exposed (Fig. 3-8).

To get into the HELP position, draw your knees up to your chest, keeping your face forward and out of the water. Hold your upper arms at your sides and fold your lower arms against or across your chest (see Fig. 3-8A).

To get into the huddle position, put your arms around the other person so that your chests are together. If you have a group of three or more people, put your arms over one another's shoulders so that the sides of your chests are together (see Fig. 3-8B). If there is a child or older adult in the group, put the child or older adult in the middle.



Fig. 3-8 The HELP and the huddle positions can be used to reduce exposure to cold water. (A) HELP position. (B) Huddle position.

The HELP and huddle positions should not be used in swift river currents or white water. If you are wearing a life jacket and you are caught in a current, remain calm and try to swim to safety if the current is carrying you toward some danger. Float on your back and go downstream feet first until your breathing slows (sudden immersion in cold water can cause the breathing rate to increase). Breathe normally for a few seconds before starting to swim to shore.

Self-Rescue: Falling Through Ice

If you fall through ice, try to stay calm and resist the urge to climb out onto the ice. It is likely to be weak in the area where the fall took place. Instead, turn toward the direction you came from, since the ice is likely to be strongest there. Quickly get into a floating position on your stomach. Bend your knees to help trap air in your pant legs and boots. Reach forward onto the broken ice, but do not push down on it. Use a breaststroke or other kick to push your body farther onto the ice. Once you are on the ice, do not stand up! Roll away from the break area until a rescuer on shore is able to

perform a reaching or throwing assist to help you the rest of the way, or until you are well clear of the broken area. Because of the risk for hypothermia, call 9-1-1 or the local emergency number if this has not been done already.

Self-Rescue: Falling Into Moving Water

If you fall into moving water, do not stand up—the force of the water can entrap your feet or legs and hold you in place. A modest amount of water volume and velocity can exert significant force. Instead, float downstream on your back feet first to fend off obstacles and avoid entrapment of your feet and legs. Use your arms to back-paddle to slow down and steer out of the main current. Swim or wade toward the shore when you are out of the main current, or as soon as it is safe to do so. Because of the force of the current, this will result in a slightly downstream path (**Fig. 3-9**). If you fell into the water because the boat you were in capsized, try to hold onto the boat, staying upstream of it, and swim with the boat to shore (**Fig. 3-10**). However, if it is unsafe to continue holding onto the boat, let it go.

Self-Rescue: Capsized Boat

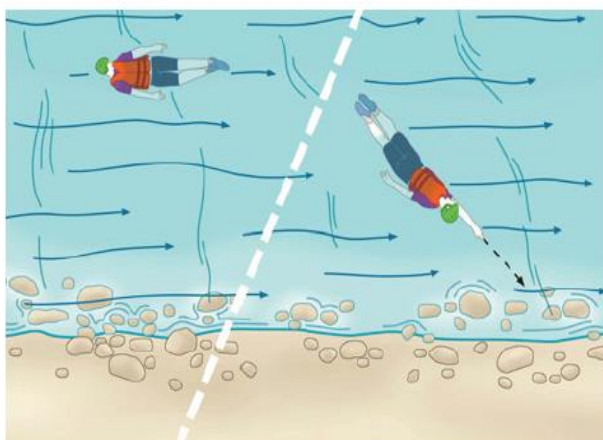


Fig. 3-9 If you are caught in a current, float downstream on your back, feet first. Back-paddle with your arms to break free of the main current. Once free of the main current, swim or wade toward the shore. This will result in a slightly downstream path because of the force of the current.



Fig. 3-10 If your boat capsizes in moving water, try to hold onto the boat, staying upstream of it. Image © Steve Heap, 2014. Used under license from Shutterstock.com

It is important to stay calm if your boat capsizes. If you are not wearing a life jacket, put one on immediately. If you can right the boat, do so. Once you right the boat, try to re-board:

- On larger boats, use the ladder or swim platform to re-board. If the weight in the boat is distributed correctly, climb up over the transom (i.e., the wide, flat area at the back of the boat). Be careful not to injure yourself on the boat's propeller or outboard engine.
- For smaller boats (like canoes, kayaks and rowboats), pull yourself over the middle of the boat and lie across it. Once the boat is stabilized, roll your legs into the boat. Canoes, kayaks and rowboats can often be rowed to shore even when filled with water.

If you cannot right the boat or re-board, stay with the boat and wait for rescue. If the water is cold, try to climb on top of the overturned boat to keep as much of your body out of the water as possible. Staying with your boat will help you conserve energy (because the boat will help you float) and make you more visible to rescue personnel. If you filed a float plan at your launch site and do not return on time, someone should notice when you are missing and look for you.

If the boat sinks or floats away, stay where you are if it is safe to do so. Make sure your life jacket is securely fastened, remain calm and wait for help. If you are not wearing a life

jacket, look for another buoyant item, such as a cooler, oar, paddle or decoy, to use as a flotation aid instead, or consider inflating your clothes. If the water is warm, you also may need to use survival floating, survival swimming or both.

Self-Rescue: Sinking Vehicle

If you are in a vehicle that plunges into water, staying calm, knowing what to do and acting quickly can save your life. Do not waste valuable time calling 9-1-1 if you are off the road and into a body of water. A heavy vehicle will float for 30 seconds to 2 minutes before the water reaches the bottom of the side windows. Use that time to do the following:

1. Leave your seatbelt on until the vehicle hits the water. Then immediately unfasten it. If you are traveling with a child, unfasten the child's seatbelt after you have unfastened your own.
2. Open or break the window. A window-break tool kept within reach in the car can make quick work of breaking the window, and requires no strength or force to use. (Never open the doors, because this can cause the vehicle to sink very quickly.)
3. Exit through the window as soon as you have opened or broken it. If you are traveling with a child, push the child through the open window and then follow behind.

If you cannot open a window and escape during the initial floating phase, your chances of survival decrease significantly. When a vehicle starts to sink, it can be difficult or impossible to open the door because of the water pressure pushing on it from the outside. You will need to wait for the water level inside the car to rise so that the pressure equalizes. As the vehicle starts to sink, it will tilt engine-end down until it is in a nearly vertical position. Move to the higher end so that you can continue to breathe for as long as possible. Water pressure will be equal when the vehicle is nearly full of water. When the pressure equalizes, open the door. If you are traveling with a child, push the child through the open door and then follow behind.



Reaching Assist

Reaching Assist with Equipment

1. Brace yourself on the pool deck, pier surface or shoreline.
2. Extend the object to the person:
 - When using a rigid object such as a pole or oar, sweep it toward the person from the side until it makes contact with the person's arm or hand.
 - When using a shirt or towel, lie down and flip it into the person's hands.
3. When the person grasps the object, slowly and carefully pull the person to safety. Keep your body low and lean back to avoid being pulled into the water.



Reaching Assist without Equipment

1. Brace yourself on the pool deck or pier surface.
2. Extend your arm and grasp the person.
3. Pull the person to safety.



Reaching Assist without Equipment from a Position in the Water

1. Hold onto a secure object (such as a pool ladder, gutter or piling) with one hand.
2. Extend a free hand or one leg to the person. Do not let go of the secure object or swim out to the person.
3. Pull the person to safety.





Water Rescue Skill Sheet 3-2

Throwing Assist

1. If the line has a wrist loop, place your nonthrowing hand (the hand that will be holding the line) through it. If there is no wrist loop, step on the nonthrowing end of the line. Hold the coil of the line in the open palm of your nonthrowing hand.
2. Grasp the side of the object with your throwing hand. Holding the object vertically, step back with your leg on the throwing side and then swing the object backward and then forward for an underhand toss.
3. Aim the throw so that the object lands just beyond the person with the line lying on the person's shoulder. If there is a crosswind or current, throw upwind or up current of the person.
4. Tell the person to grab the object. After the person has a firm grasp on the object or line, drop the remaining coil, if any, and slowly pull the person to safety while offering reassurance.
 - o As you pull, keep your body low and lean back to avoid being pulled into the water.
 - o Reach out with one hand and grasp the line with your thumb inward. Pull the line in to your side with that hand while reaching out with the other. Continue the alternate pulling and reaching action until the person is at the side or is able to stand in shallow water.



Step 2



Step 3



Step 4



Wading Assist

Wading Assist: Conscious Person	<p>Wading assists are used in water that is less than chest deep. Do not attempt a wading assist if there is a current or a soft bottom that will make wading dangerous.</p> <ol style="list-style-type: none">1. Put on a life jacket, if one is available. Select an object to use for the reaching assist.2. Wade into the water and extend the object to the person.3. Tell the person to grab the buoyant object and to hold on tightly.4. Pull the person to safety, keeping the object between yourself and the person (this will help to prevent the person from grasping you).
Wading Assist: Unconscious Person	<ol style="list-style-type: none">1. Put on a life jacket, if one is available. Select a buoyant object to assist with moving the person to safety.2. Wade into the water and turn the person face-up.3. Position the buoyant object under the person's shoulders.4. Move the person to the edge of the pool or the shoreline, keeping the person's mouth and nose out of the water.5. Remove the person from the water.6. Give first aid according to the conditions you find and your level of knowledge and training.
Wading Assist: Submerged Person	<ol style="list-style-type: none">1. Put on a life jacket, if one is available. Select a buoyant object to assist with moving the person to safety.2. Wade into the water.3. Reach down, grasp the person and pull her to the surface.4. Turn the person face-up.<ul style="list-style-type: none">o If the person is unconscious, position the buoyant object under her shoulders.o If the person is conscious, tell the person to grab the buoyant object and to hold on tightly.5. Move the person to the edge of the pool or the shoreline, keeping the person's mouth and nose out of the water.6. Remove the person from the water.7. Give first aid according to the conditions you find and your level of knowledge and training.



Sloped Entry Assists

Walking Assist

Sloped entry assists are used to remove a person from the water in areas where there is a gently sloping entry and exit point.

1. Place one of the person's arms around your neck and across your shoulder.
2. Grasp the wrist of the arm that is across your shoulder, and wrap your free arm around the person's back or waist.
3. Maintain a firm grasp, and help the person walk out of the water.



Beach Drag: One Responder

1. Stand behind the person, and grasp him or her under the armpits. Support the person's head with your forearms, if possible.
2. Walk backward slowly, dragging the person out of the water. Use your legs, not your back, to power the movement. If you are not able to move the person completely out of the water, at least make sure the person's head and shoulders are out of the water.



Beach Drag: Two Responders

1. Both responders stand on either side of the person, facing the shoreline.
2. Place one hand under the person's armpit and use the other hand to support the person's head. Have your partner do the same.
3. Lift the person's torso up, using your legs, not your back. Walk forward slowly, dragging the person out of the water.





Two-Person Removal from the Water Using a Backboard

1. Bring a backboard (with the head immobilizer and straps removed, if possible) to the side of the pool.
2. The lifeguard brings the person to the side of the pool and turns the person to face the wall.
3. Cross your hands and grab the person's wrists, pulling the person up slightly to keep the person's head above the water and away from the wall.
4. The lifeguard ensures that the person's face is out of the water, and then climbs out of the pool, removes the rescue tube and gets the backboard.
5. The lifeguard guides the backboard, foot-end first, into the water along the wall next to the person.
6. Immediately turn the person onto the backboard by uncrossing your hands. Allow the backboard to float up beneath the person.
7. Grab one of the person's wrists and one of the handholds on the backboard while the lifeguard does the same on the other side.



Step 3



Step 5



Step 6



Step 7

Continued on next page



Water Rescue Skill Sheet 3-5 *(continued)*

Two-Person Removal from the Water Using a Backboard

8. On the lifeguard's signal and working together, pull the backboard and the person onto land, resting the underside of the board against the edge of the pool. Remember to lift with your legs, not your back.
9. Together, step backward and carefully lower the backboard to the ground.



Step 8



Step 9

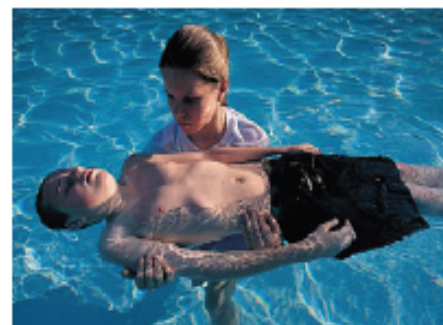


Water Rescue Skill Sheet 3-6

Hip and Shoulder Support

With this manual in-line stabilization technique, support the person at the hips and shoulders to keep the face out of the water and minimize movement of the head, neck and spine. Use it for a person who is face-up.

1. Approach the person from the side and lower yourself to about shoulder depth.
2. Slide one arm under the person's shoulders and the other arm under his hips. Hold the person's body horizontally, keeping the person's face out of the water.
3. Do not lift the person. Hold the person still in the water until help arrives.





Head Splint

Head Splint: Face-Up Victim

This manual in-line stabilization technique provides better stabilization than the hip and shoulder support. Use it for a person who is face-up or face-down.

1. Approach the person from behind. Stand behind the person's head and lower yourself to about shoulder depth.
2. Grasp the person's arms midway between the shoulder and elbow. Grasp the person's right arm with your right hand and the person's left arm with your left hand.
3. Gently move the person's arms up alongside the person's head, so that the person's head is supported in between the person's arms.
4. Position yourself to the person's side with the person's head close to the crook of your arm. Squeeze the person's arms against the person's head to help hold the head in line with the body. Do not move the person any more than is necessary.
5. Check for consciousness and breathing:
 - o If the person is not breathing, immediately remove the person from the water, call 9-1-1 or the local emergency number and provide resuscitative care according to your level of knowledge and training.
 - o If the person is breathing, hold the person still in the water until help arrives.



Step 2



Step 3



Step 4



Head Splint

Head Splint: Face-Down Victim

1. Approach the person from the side.
2. Grasp the person's arms midway between the shoulder and elbow. Grasp the person's right arm with your right hand and the person's left arm with your left hand.
3. Gently move the person's arms up alongside the person's head, so that the person's head is supported in between the person's arms. Squeeze the person's arms against the person's head to help hold the head in line with the body.
4. If you are in shallow water, lower yourself to about shoulder depth. Glide the person slowly forward, turning the person until he or she is face-up. To do this, push the person's arm that is closest to you under the water while pulling the person's other arm across the surface toward you.
5. Position yourself to the person's side with the person's head close to the crook of your arm. Squeeze the person's arms against the person's head to help hold the head in line with the body. Do not move the person any more than is necessary.
6. Check for consciousness and breathing.
 - o If the person is not breathing, immediately remove the person from the water, call 9-1-1 or the local emergency number and provide resuscitative care according to your level of knowledge and training.
 - o If the person is breathing, hold the person still in the water until help arrives.



Step 2



Step 4



Step 5



Self-Rescue with Clothes

Shirt or Jacket: Blowing Air Method

1. Tuck the shirt or jacket in or tie the shirttail ends together around your waist.
2. Unbutton the collar button if you are using a shirt. Take a deep breath, bend your head forward into the water, pull the shirt or jacket up to your face and blow into it.
3. Keep the front of the shirt or jacket under water and hold the collar closed.
4. Repeat steps 1–3 to reinflate the shirt or jacket as necessary.



Step 2

Shirt or Jacket: Striking Air Method

1. Fasten the buttons or close the zipper up to the neck.
2. Hold the bottom of the shirt or jacket out with one hand, keeping it just under the surface of the water, and lean back slightly.
3. From above the surface of the water, strike the water with your cupped free hand, following through so that the air caught by your hand is pulled to a point below the bottom of the shirt or jacket.
4. Keep the front of the shirt or jacket underwater and hold the collar and the bottom of the shirt or jacket closed.
5. Repeat steps 1–4 to reinflate the shirt or jacket as necessary.



Step 3



Step 4



Self-Rescue with Clothes

Pants: Striking Air Method

1. Take a deep breath, lean forward into the water and reach down and remove your shoes.
2. Loosen your waistband and belt.
3. Take another deep breath, lean forward and reach down. Take off your pants one leg at a time without turning them inside out. Lift your face from the water and take a breath whenever necessary.
4. Once you have removed your pants, either tie both legs together at the bottom or tie a knot in each leg as close as possible to the bottom. Then zip or button the pants to the waist.
5. Hold the back of the waistband underwater with one hand. Keeping the pants on the surface of the water, strike the water with your cupped free hand, following through so that the air caught by your hand is forced into the waistband opening below the surface. You can also inflate the pants by submerging them and then blowing air into the open waistband below the surface of the water.
6. Once the pants are inflated, gather the waistband together with your hands or by tightening the belt. Slip your head in between the pant legs where they are tied together or, if they are each tied separately, place one pant leg under each arm for support.
7. Repeat steps 1–6 to reinflate the pants as necessary.



Step 5



Step 6



Water Rescue Skill Sheet 3-9

Survival Float

The survival float is used in warm water while awaiting rescue or to rest while swimming.

1. Take a breath, then place your face down into the water. Allow your arms and legs to hang freely. Rest in this position for a few seconds.
2. When you are ready to breathe again, slowly lift your arms to about shoulder height and separate your legs, moving one leg forward and one leg back (stride position).
3. Gently press down with your arms while bringing your legs together. This movement lifts your mouth above the surface of the water, allowing you to take a breath.
4. Take a breath, and then return to the resting position.



Step 1



Step 2



Step 3



Survival Swimming

If a person is very buoyant, it can take several minutes to complete the following sequence of movements, which helps to conserve energy. A person who is not very buoyant must perform this sequence of movements slightly faster to prevent sinking before the breath.

1. Start in the survival float position. After taking a breath, bend forward at the waist and bring your hands up alongside your head.
2. Separate your legs, moving one leg forward and the other back (stride position). Extend your arms forward, then bring your legs together again to propel yourself diagonally toward the surface.
3. Sweep your arms out and back to your thighs and glide near and almost parallel to the surface.
4. When you need to breathe, bend your legs and draw them toward your torso while bringing your hands up alongside your head. If you do not float well, pull hard with your arms, downward and outward. Take a breath, and then quickly return to the survival float position.
5. Extend your arms forward and separate your legs into the stride position once again. Tilt your head back and prepare to breathe out, as in survival floating.
6. Repeat steps 1–5.



Step 1



Step 2



Step 3



Step 4

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