ELLIS EDUCATION SERVICES

INTERNATIONAL

LIFEGUARD

TRAINING PROGRAM™

Manual

5th Edition, Updated

Meets MAHC, OSHA, and ILCOR ECC Guidelines

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Disclaimer:
The procedures and protocols presented in this manual and the course are based on the most current recommendations of responsible medical and industry sources, including the International Liaison Committee on Resuscitation (ILCOR) Consensus Guidelines for CPR, Emergency Cardiovascular Care (ECC) and First Aid, the Occupational Safety and Health Administration (OSHA) standards 1910.151, 1910.1030, 1910 Subpart I, and the Model Aquatic Health Code (MAHC).

The materials have been reviewed by internal and external field experts and verified to be consistent with the most current guidelines and standards. Ellis & Associates, however, make no guarantee as to, and assume no responsibility for, the correctness, sufficiency, or completeness of such recommendations or information. Additional procedures may be required under particular circumstances. Ellis & Associates disclaims all liability for damages of any kind arising from the use of, reference to, reliance on, or performance based on such information.

ISBN 978-0-9961108-7-7

Library of Congress Cataloging-in-Publication Data Not Available at Time of Printing

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ACKNOWLEDGMENTS

In Memory of Louise Priest

This edition of the International Lifeguard Training Program is dedicated to Louise Priest, a tireless aquatics educator, author, and leader. Louise held leadership positions with the American Red Cross NHQ, Ellis & Associates, and the Council for the National Cooperation in Aquatics. Louise was one of those select few "larger than life" individuals who put others ahead of herself, exemplifying the very best of humankind. While she will be missed, her legacy remains infinitely timeless.

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Many individuals, agencies, and organizations contributed to the tasks of designing, advising, writing, editing, reviewing, piloting, and producing the 5th edition of the International Lifeguard Training Program™ manual.

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WELCOME

Introduction

Congratulations on your decision to become an Ellis & Associates (E&A) lifeguard. Following successful completion of your course, you will join a select group of aquatic professionals who apply proven state-of-the-art aquatic injury prevention practices to reduce the number of emergency incidents, and when necessary, to respond rapidly and effectively to any emergency. As a result of E&A's emphasis on prevention, professionalism, accountability, and proactive risk management, our safety record is unsurpassed in the aquatic industry.

E&A - A History of Leadership and Innovation

In 1983 our program was created to address waterpark safety issues. Due to the great demand for this quality program, it quickly expanded to pools, open-water environments, and resorts. Over a period spanning four decades, E&A has been credited for revolutionizing the safety standards of the aquatic recreational and amusement industry.

Here are but a few E&A industry "firsts":

- Elevated professional lifeguard standards through operational safety audits for lifeguard accountability.
- Developed, implemented, and advocated for industry benchmarks and proactive risk management standards. Some of these include: the 10/20 Protection™ standard, the 10/3 Protection™ standard, Vigilance Awareness Training® Program (VAT®), and Zone Validation® system.
- Developed equipment-based rescues based on the use of the rescue tube that are safer and more effective than body contact rescues - many years later, all other organizations in the United States that train lifeguards adopted this approach.
- Established a database for aquatic injuries and injury prevention with findings being used to forward aquatic safety training and best practices.
- The first to include CPR and First Aid content in a single lifeguard textbook, with this content included in a comprehensive lifeguard course curriculum since the 1990s.
- Incorporated bloodborne pathogens training into lifeguard training classes
- Required components of E&A lifeguard training since the 1990s: Supplemental oxygen support (SOS), resuscitation masks, bag valve masks, manual suction devices, and automated external defibrillators (AEDs) to enhance resuscitation efforts provided by aquatic staff to enhance lifeguard resuscitation efforts.
- The first organization to advocate AED placement at all public pools and waterparks in the wake of PAD laws, with all E&A client facilities having AEDs in place by the early 2000s - many years before it became the norm.
- Introduced the first blended e-learning lifeguarding program in the world.

Our Educational Philosophy

The emphasis of our lifeguarding curriculum is on preventing aquatic emergencies by consistently monitoring guests, enforcing rules, and identifying and correcting potential dangers. Should an emergency occur our lifeguards are prepared to work individually and as members of a team to respond rapidly and professionally. We do not focus on executing textbook-perfect rescues, as such situations seldom occur in real-life. It is more important for lifeguards to think critically, rationally, and overcome adverse rescue situations.

To achieve these learning outcomes E&A lifeguard candidates are immersed in the job of the lifeguard while completing the course. They participate in hands-on lifeguarding activities including proactively scanning zones as apprentice lifeguards. Through the design and delivery of our curriculum lifeguards exit our program with the necessary knowledge, skills, and attitude to conduct themselves professionally and confidently.

CONTINUING EDUCATION

Continuing education is a broad term used to recognize forms of post-secondary school learning activities often associated with job training, maintaining professional certification / licensure, and personal enrichment courses. Ellis & Associates is pleased to be able to provide Continuing Education Units (CEUs) to those who desire such upon successful completion of our courses. Health care specialists, aquatic/recreation leaders, educators, childcare providers, and other professionals can attain CEUs through our approved courses.

As an International Association of Continuing Education (IACET) Accredited Provider, Ellis & Associates offers CEUs for its programs that qualify under the ANSI/IACET Standard. This prestigious accreditation demonstrates our commitment to provide high-quality lifelong learning and high standards for all of our programs. We are proud of our education programs, which reach aquatic safety, supervisory, and healthcare professionals each year, helping to broaden their skills so that they remain on the cutting edge of education.

Chapter 1
INTRODUCTION TO LIFEGUARDING

Learning Outcomes

After reading this chapter and completing the related course work, you should be able to:

- Understand the global problem of drowning
- Explain how lifeguards can help address the drowning problem
- Describe how to be a preventive lifeguard
- List responsibilities of a lifeguard
- Understand legal terms related to lifeguarding
- Relate lifeguard accountability to the standard of care
- Define lifeguard liability

Chapter Overview

→ Why Lifeguards?
→ History of Lifeguarding
→ Drowning: A Global Crisis
→ Ellis and Associates Lifeguards
→ Get the Most From Your E&A Lifeguard Training
→ On-Going Training
→ Primary Responsibilities of Lifeguards
→ Secondary Responsibilities of Lifeguards
→ Being Held Accountable
→ Legal Concepts That Apply to Lifeguards
→ Standard of Care
→ Lifeguard Liability
→ For Your Review

Why Lifeguards?

Around the world, people of all ages happily swim in aquatic facilities, resort and hotel pools, and on beaches without worry knowing that lifeguards are on duty providing pro-active surveillance. Facility guests put their trust and safety in the hands of these well-trained individuals capable of performing water rescues and emergency care including CPR. If a guest becomes fatigued, injured, or at risk for other reasons, the lifeguard enters the water and helps return the guest to safety. This is the responsibility you agree to take on as an Ellis and Associates (E&A) trained lifeguard.

History Of Lifeguarding

Some of the earliest, documented cases of lifeguarding can be traced to the 1700s. These early lifeguarding efforts were primarily designed to aid those serving in battle or traveling the waterways. Comprised of military and coast guard personnel, these early lifeguards were dedicated to eliminating or minimizing loss of life and providing rescue and recovery services.

The first of these organizations was China's Chinkiang Association for the Saving of Life, which offered money and prizes for significant rescues. Towards the mid-1800s, swimming became a popular pastime and recreational activity. In the United States, oceanfront hotels and resorts began to dot the landscape in places like Atlantic City, New Jersey. The emerging railroads would transport thousands of people to Atlantic City during the summer months to enjoy the beaches. This brought an increased risk for drowning and other incidents. Demand for swimmer protection grew. In 1855, a town in New Jersey took the first steps towards providing swimmer protection with the first volunteer lifeguard team for beach patrol called the "Constables of the surf." The Constables were police officers tasked with responding to any beach emergency involving swimmers in the water. In the early 1900s California instituted its first beach lifeguards **(Figure 1.1).**

Through the years, efforts to protect facility guests continued as more and more organizations looked to ensure safety, developing training protocols, innovative rescue operations, and improved teaching materials to better prepare lifeguards for the important task of preventing drownings. Today's professional lifeguard is better trained, and more equipped than ever before to protect lives in and around the water **(Figure 1.2).**

Figure 1.1 The lifeguarding profession has a decorated history.

Figure 1.2 Today's professional lifeguards

Drowning: A Global Crisis

Drowning is the third leading cause of unintentional injury and death worldwide. It is the fifth cause of death globally for children ages 1-14 years old, impacting an estimated 360,000 children annually. Death by drowning occurs in all regions of the world and in all types of economies. Deaths are especially prevalent in lower and middle-income countries, regions of Africa, and in the Western Pacific and Southeast Asia, accounting for half of the world's drownings.

Higher risks for drowning include a number of additional factors:

- Alcohol use near the water
- Medical conditions such as seizure disorders
- Tourists unfamiliar with local features and risks
- Unsupervised and unattended children

The main risk factors for drowning involve:

- Lack of swimming ability
- Lack of barriers to prevent unsupervised access
- Children unsupervised
- Failure to wear life jackets
- No lifeguard on duty or an inattentive lifeguard on duty

U.S. Statistics on Drowning

Drowning is a significant problem in the United States, ranking fifth among the causes of unintentional injury deaths. Everyday about ten people die from unintentional drowning. About 1 in 5 people who die from drowning are children 14 years of age or younger. For every child who dies from drowning, another five receive emergency department care for serious, nonfatal submersion injuries.

Did You Know?

- Worldwide drowning is the third leading cause of unintentional injury death.
- In the U.S. more than 3600 people die from unintentional drowning annually; about 2 in 10 are children 14 years old and younger.

Significant Aquatic Incident Data Analyzed by E&A

- Significant aquatic incidents (requiring outside EMS) happen every month of a typical year, with the majority occurring in the summer months when attendance is highest.
- Shallow water pools and the shallow* end of pools with multiple depths, experience the majority of significant incidents.
- A water depth between 3-4 feet (about 1 meter) has the most significant incidents of any depth range in a typical year.
- Non-teenage children experience the majority of significant incidents in a typical year.

*Shallow water is defined as water less than 5 feet/1.5 meters deep)

Ellis & Associates (E&A) Lifeguards

Having a lifeguard is the only consistently proven means of preventing drownings and other tragic incidents, in and around water. The best lifeguards are those who are highly trained, professional, and most of all, accountable **(Figure 1.3).**

Figure 1.3 Professional lifeguards are highly trained and accountable for their actions.

In 1983, Ellis & Associates was founded to create the best lifeguards in the aquatic industry to meet the needs of an emerging industry - water parks. E&A lifeguards have a mission to prevent submersion incidents and potential loss of life and are held accountable to a high standard of care. As an E&A trained lifeguard, your goal is zero drownings.

E&A's International Lifeguard Training Program (ILTP®) stresses values that include safety, consistency, and integrity.

- **Safety** - Guests and employees of aquatics facilities trust you with their personal safety. You are responsible for providing a safe environment for them and yourself. To accomplish this, you must pro-actively identify and manage risk.
- **Consistency** - When on duty, maintain E&A standards, the standards set by your employer, and effectively meet the skill and knowledge competencies presented in this course, at all times.
- **Integrity** - Being an E&A lifeguard requires a passion for aquatic safety. You will sincerely care about the lives and well-being of those you protect. You will feel a sense of commitment and hold yourself personally accountable to the swimmers you protect, the E&A training program, and your fellow lifeguards.

As a result of our collective emphasis on lifeguard professionalism, prevention, accountability, and proactive risk management, E&A's safety record is unmatched in the aquatic industry. The vigilance of E&A lifeguards along with their commitment to E&A training standards has been proven effective in preventing drownings and providing quality care in the event of an emergency **(Figure 1.4).**

E&A Lifeguards, by the numbers:

- E&A lifeguards protect more than 70 million guests annually at many of the world's most complex aquatic facilities.
- E&A lifeguards make approximately 35,000 rescues each year, in which no further care is necessary.

Figure 1.4 E&A lifeguards are successful because of their vigilance while on duty and commitment to E&A training standards.

Get The Most From Your Lifeguard Training

As an E&A lifeguard candidate participating in this course, you can achieve one of four different certifications as noted below. You will be required to take prerequisite screening tests to assess general swimming skills. **Table 1.1** describes the necessary prerequisite skill requirements for each of the different certifications.

Table 1.1 Course Prerequisite Skills

Certification	Swim Distance	Dive Brick Depth Retrieval	Treading Water
Shallow water	50 yards/meters	5 feet (1.5 m) or less Underwater swim 10 feet (3 m)	No requirement
Pool	100 yards / meters	8 feet (2.4 m) or deepest facility depth designated	Tread without use of arms & hands for 1 minute
Special Facilities	200 yards/meters	8 feet (2.4 m) or deepest facility depth designated	Tread without use of arms & hands for 2 minutes
Open Water	200 yards/meters	8 feet (2.4 m) or deepest facility depth designated	Tread without use of arms & hands for 2 minutes
All certification levels: The ability to exit the pool unassisted			

General Course Rules

Before you arrive:

- Review the course syllabus and any other supportive documentation issued prior to the first scheduled class for specific course prerequisites, course completion evaluation standards and any other general course information. You may be asked to complete pre-course work before the first in-person session.
- Communicate any questions or concerns about your class (or requests for any reasonable accommodations) to your ILTP® Instructor.

During your course:

- Be on time for all sessions.
- Use sun protection such as a hat, sunglasses, and sunscreen when outdoors.
- Enter the water feet first.
- Only enter the pool after someone has been designated as the lifeguard on duty.
- Be professional, have a proper attitude, act maturely, and use good judgment.

If you fail to pass or meet all the course requirements, you will be requested to repeat the course until the learning outcomes are achieved to be eligible for an E&A lifeguard credential.

Course Completion

To successfully complete lifeguard training, you will be required to:

- Attend all scheduled classes.
- Follow all course rules.
- Meet all course requirements.
- Perform skills to test-ready levels. This includes all water rescue lifesaving technique skills, cardiopulmonary resuscitation (CPR), AED, first aid, and supplemental oxygen support (SOS).
- Pass the written examination with a minimum score of 80% .

Credentials

E&A lifeguard credentials are valid for one (1) year and only in the aquatic environments specified by the certification type. Credentials must be renewed each year.

- **Shallow water lifeguard** credential – valid at facilities where the water depth is 5 feet (1.5 m) or less (excluding open-water environments)
- **Pool lifeguard** credential – valid at any facility where the water depth is greater than 5 feet (1.5 m) (excluding special facilities)
- **Special facilities: Wave pool lifeguard** credential – valid at any facility where the pool depth is greater than 5 feet (1.5 m)
- **Special facilities: Open water lifeguard** credential – valid for use at facilities that operate a designated swimming area in an open water environment

On-Going Training

Your training often continues after your lifeguard course is completed. Your aquatic facility is likely to provide you with the additional training you need to effectively perform at your specific job location. Those requirements will be made clear by your employer. Additional training may be provided:

- *Pre-service training* – site specific training at your facility, which takes place before you start working
- *In-service training/meetings* – regular training sessions and updates performed after you begin working designed to keep your skills, knowledge, and other work related abilities at peak performance
- *Operational drills/audits* – periodic testing to ensure you remain “test ready”

Pre-Service Training

Pre-service training may review how the concepts learned in a lifeguarding class apply at a specific site. Additional information may be provided such as:

- Train on individual Zone of Protection® areas to optimize your ability to provide guest protection at all duty stations.
- How the emergency action plan (EAP) is applied at specific locations
- Reviewing skills for operating in specific facility locations
- Reviewing the standard operating procedures for the facility/attraction

In-Service Training

In-service training is intended to serve as an ongoing practice session for you to maintain and enhance your skills learned during the original lifeguard class. In-service training can also be an opportunity for feedback on skill performance. In-service is also an excellent time to have lifeguard team meetings to review skill concepts. Your supervisor and company are responsible for scheduling and delivering your in-service training sessions. It is important that you attend these sessions as they contribute to your professionalism and help keep your skills sharp **(Figure 1.5).**

Figure 1.5 In-service training helps to keep your skills sharp.

Operational Drills/Audits

Operational drills and ***audits*** are conducted by some facilities throughout the operating day. These operational drills and audits may include lifeguard evaluations that can include the use of people, manikins, or silhouette dolls to monitor your vigilance. Some drills may also involve scenarios where rescue skills are performed. As an E&A lifeguard, you should embrace all opportunities to both improve and demonstrate your lifeguarding abilities.

Primary Responsibilities Of Lifeguards

E&A lifeguards are professional first responders. Your primary job function is to prevent aquatic emergencies. But not all incidents are foreseeable and preventable. In such cases you must also know how to recognize, respond, and render appropriate care.

Figure 1.6 Lifeguarding is a demanding job that requires you to remain alert at all times.

Preventive Lifeguarding

Preventive lifeguarding is a critical and demanding part of your lifeguarding job. A lifeguard must remain alert and work to prevent emergencies. As a lifeguard, people rely on you to prevent catastrophic incidents. This job requires your undivided attention. If you allow yourself to become distracted while lifeguarding, it could result in a loss of life. It is a difficult job, but it is very rewarding **(Figure 1.6).**

Preventive lifeguarding involves items such as:

- Being alert
- Enforcing facility rules
- Following your training
- Warning guests of potential hazards
- Answering swimmer's questions while continuing to effectively scan your zone
- Alerting your supervisor if you cannot see all of your assigned area
- Communicating with other lifeguards about hazards in the water

Expect the Unexpected

Guests can be unpredictable. They may enter water depths or elements that may cause them to get into trouble. The water conditions may become too challenging for a swimmer to manage on their own and require a rescue. They may suffer a medical emergency in or out of the water.

It is your job as a lifeguard to recognize when a swimmer is in trouble and to quickly react to render care. Recognizing an emergency means you must maintain a high level of vigilance, effectively scanning your assigned zone. Managing an aquatic emergency means reacting as trained, in a safe and effective manner **(Figure 1.7).**

Figure 1.7 When a guest is in trouble you must recognize the emergency and respond promptly.

Secondary Responsibilities of Lifeguards

As a lifeguard you will have numerous secondary responsibilities such as:

- Crowd control
- Inspecting the facility
- Documentation
- Cleaning the facility
- Testing water chemistry
- Providing guest services

Crowd Control

During an emergency, crowds may gather around the scene and you will be tasked with controlling the situation. Know your facility's emergency action plan (EAP) to be prepared for any incident requiring crowd control. Crowd control might be necessary during guests altercations, special events, severe weather conditions, rescues with resuscitation efforts, chemical leaks, and terrorism threats. Become familiar with all the access and exit points in case an area needs to be evacuated in the facility or a path needs to open so that emergency medical services (EMS) personnel can access a scene to render care and/or support.

When you need to control a crowd:

- Remain calm
- Speak loudly and with authority
- Give clear, precise and simple instructions

Inspecting the Facility

You may be required to inspect your facility before opening it for daily guests. This inspection will attest to the facility being in appropriate operating condition. This includes having a means of calling 9-1-1, and appropriately operating safety and response equipment.

Documentation

Your facility may require you to maintain accurate documentation. Each facility is likely to have records and reports specific to its unique operation such as:

- Daily sign-in sheets
- Facility inspection checklists
- Attendance records
- Lifeguard rotation logs
- Facility maintenance records
- Equipment inspection forms
- Rescue reports
- Incident and witness reports
- Daily work schedules
- Water chemistry logs
- Weather condition reports
- In-service training records
- Attraction downtime records

Rescue reports and Incident reports, and witness statement reports are among the most important paperwork you will complete. The documentation must be completed as soon as the incident or rescue has been resolved. Make sure to fill in each section completely. These forms may become legal records in the future, and adequate, careful documentation will minimize problems at that time.

Cleaning the Facility

You may be required to clean your facility area and visitor seating areas daily, and collect debris or rubbish in the area, potentially preventing it from blowing in the pool and contaminating the water. You may also be expected to vacuum the pools, skim the top of the pool to remove debris, and clean pool walls, patio areas, and other areas of the facility. These tasks are part of preventive lifeguarding which removes hazards and potential risks that could cause problems later. A lifeguard who removes puddles from the pool patio area can help eliminate a potential algae hazard that causes a slippery surface. As a professional lifeguard, it is your task to keep your facility and area clean eliminating potential risks and hazards **(Figure 1.8).**

Figure 1.8 Secondary tasks include keeping your facility clean.

Testing Water Chemistry

Some facilities may require that you test and monitor the water chemistry of the swimming pool before opening the pool and throughout the day to ensure that it matches the requirements based on the guidelines listed in your local codes and/or the Model Aquatic Health Code (MAHC) recommendations. If your facility requires you to test the water chemicals as a part of your job responsibility, your facility should provide you with additional training for this task. If you are responsible for adding chemicals and managing the pumps, you may be required to take a separate course to become trained as a Certified Pool Operator (CPO), Aquatic Facility Operator (AFO) or complete a unique facility requirement training course **(Figure 1.9).**

Figure 1.9 You may have to test water chemistry as part of your job responsibilities.

Providing Guest Services

Lifeguards are the employees of the facility most noticeable to guests. You are likely to encounter guests asking questions about the attractions, directions to various points in the facility, advise on caring for sunburn, and many others. You will be interacting with guests to make certain they understand and comply with the rules of the facility. Be professional in all your interactions with guests, determine their needs, and resolve any guest issues in a cordial manner. If you are uncertain about how to help a guest, contact a supervisor.

Being Held Accountable

As a lifeguard you are expected to anticipate, recognize, and manage aquatic emergencies. Your training does not end after the course. Your skills need to be maintained at a ***test-ready*** level throughout your credential validity period. As an E&A lifeguard you are accountable to:

- **Facility guests** - Provide a safe environment for guests, while minimizing hazardous situations whenever possible and responding appropriately to emergency situations.
- **Your employer** - Perform the duties outlined and taught to you when you were hired. Show dedication in your work, commitment to your job, and perform at or above expectations. While at work, you can expect to be evaluated on your performance on a regular basis.
- **Yourself** - Believe in your abilities to perform the tasks of the job. Practice your skills so that you are capable and confident in your abilities. Seek clarification from a supervisor or lifeguard instructor if you do not understand something. Know that you are responsible for human lives each day you show up for work. Evaluate your own performance on a continuous basis. A professional lifeguard accepts the responsibility of protecting the lives of others.

Accountability Through Audits

Lifeguards can be held ***accountable*** through performance evaluations that include audits. ***Audits*** verify that lifeguards are still maintaining their test-ready commitment to their lifeguard training. Some lifeguards are audited solely by their employer while others may be audited by E&A auditors. E&A conducts audits that evaluate lifeguard accountability and skills performance (**Figure 1.10**).

Figure 1.10 Professional lifeguards embrace operational drills and audits.

Audits typically measure a lifeguard's ability to:

- Act professionally
- Remain vigilant
- Provide proactive surveillance of the assigned Zone of Protection, and the ability to recognize and react to a distressed guest
- Appropriate scan an assigned Zone of Protection, demonstrating recognition of a guest in distress
- Respond and manage simulated aquatic emergencies
- Protect oneself from the environment
- Demonstrate rescue readiness
- Function within your aquatic facility's emergency action plan

Professional lifeguards embrace audit accountability as an opportunity to demonstrate all aspects of their job. The auditing process helps you and your fellow lifeguards (and secondary support staff) to anticipate, prevent, recognize, and respond to aquatic emergencies and other incidents. Lifeguard accountability saves lives!

Legal Concepts That Apply to Lifeguards

There are legal concepts that apply to you as a professional lifeguard. It is important that you understand how these concepts apply to your job:

Abandonment: When you begin to render care, it must be continued until emergency medical services (EMS) personnel or someone with equal or greater training arrives and takes over. You can be held legally responsible for abandoning a person who requires ongoing care if they leave the scene or stop providing care.

Confidentiality: While rendering care to a guest, you may learn something about the injured or ill person, such as personal information about medical conditions, physical problems, and medications taken. This person has a right to privacy and is protected by laws that require you to keep information confidential. The media, investigators, law enforcement, attorneys, and even insurance companies, may ask questions following an incident. This information should not be shared with anyone except EMS personnel directly associated with the person's care. Sharing someone's personal medical information with individuals not directly associated with the care of the injured person may constitute a breach of the victim's privacy and could cause legal problems.

Consent: You must be granted permission to render appropriate hands on emergency care. Verbally seek consent to provide care to a responsive (conscious) guests in distress who needs assistance. The guest's consent is referred to as informed consent and it should be expressly provided to you. This does not apply to guests who are unconscious, confused, or needing assistance in the water. In such cases it is considered to be implied consent because it would be reasonable to assume consent would be granted if the guest were able to do so.

Documentation: Properly documenting injuries and incidents is critical. If legal action occurs later, your facility records and reports can provide a legal record of what happened. It is important to compete any required witness and incident forms as soon as possible after an incident occurs. Ideally this would happen immediately after the incident has ended so that details are fresh in the memory of everyone involved. As time passes, critical details may be forgotten. When completing a report, each person writing a statement, must clearly document the facts of the incident without opinions. Once the report is complete, it should be signed and dated. The facility will maintain copies of the reports for their record as they are likely to become legal records for any investigation.

Duty to Act: While on the job, you have a legal responsibility to act in an emergency by responding and rendering appropriate care. Failure to adhere to this duty could result in legal action.

Negligence: When a guest is injured or suffers additional harm because of your actions or inactions, you may be considered negligent. Negligence may include failure to prevent or control any behaviors that could result in further harm, failure to provide appropriate care, and/or rendering care beyond the scope of your training.

Refusal of care: Sometimes, guests who are injured or sick may refuse assistance even though they desperately need it. Also, parents may refuse care for their children. If this occurs, try to convince them why care is necessary. If you are unsuccessful, contact your supervisor if one is readily available. You will have to respect their decision but with proper documentation. For significant injuries, you should call EMS to evaluate the situation. For non-life-threatening emergencies, when care is refused, make it clear that you are not denying or withholding care, but that the guest does not wish to have the care. Document the refusal and get the guest's signature indicating the refusal of care.

Standard of care – ***Standard of Care*** refers to the degree of care that a responsible person is expected to provide to prevent further harm and/ or manage the injury or illness for a guest in need. In your case, the standard of care considers the practices of what equally qualified lifeguards would have done if placed in the same or similar circumstance.

Standard Of Care

Guests that come to a facility have a right to expect that the lifeguards working are competent and attentive with a purpose to protect them while they are swimming. As a lifeguard, you work to uphold the standard of care expected of you. How you perform your job will be measured against the standard currently expected in the aquatic industry. In the event you are involved in an incident that ends up in court, you could be expected to demonstrate your competency and awareness at the time of the incident. Proactively scanning your zone and performing all skills to a high level of competency can help avoid litigation **(Figure 1.11).**

Figure 1.11 Preventive actions including proactive scanning can help avoid litigation.

The E&A lifeguard standard of care includes, but is not limited to:

- Consistently delivering proactive swimmer protection
- Acting in a professional manner
- Being test-ready for all lifeguard skills
- Knowing how to appropriately use all available equipment
- Taking workplace measures to mitigate risks arising from on-the-job hazards
- Executing a facility's EAP effectively as an individual or team

Lifeguard Liability

The cost of not maintaining a standard of care is beyond measure when weighed against the lives and welfare of the guests in your facility. Failing to act by not responding or not rendering the appropriate care may make you criminally or civilly responsible.

As a lifeguard, there is a possibility that you may be involved in a serious situation that could result in a fatality. And if that occurs, there is likely going to be an investigation and litigation that follows the event. If there is a lawsuit over the incident, it is not likely to be resolved quickly. The litigation could last several years and may impact you emotionally, physically, and financially.

Dealing with Stress Following an Incident

There are several steps you can follow to help reduce the post-traumatic stress associated with being a part of a drowning event:

- Complete the incident report promptly and accurately
- Reflect on the positive steps you did during the event
- Exercise to help reduce stress
- Expect to have questioning sessions with authorities as part of the post incident investigation process; do not let yourself feel intimidated
- Prepare for media coverage - The media will not have all the facts, so do not comment
- Resume your familiar routines at work, school, and with family
- Share support with other lifeguards on the team experiencing the same trauma as you **(Figure 1.12)**
- Ask for help if you need it
- Take advantage of any support counselors or trained mental health professionals available to help you cope with a traumatic experience
- Consider long term counseling services if you feel you need additional support

Figure 1.12 Reduce post-traumatic stress by sharing the experience with other team members.

FOR YOUR REVIEW

Summary

The job of a professional lifeguard has evolved dramatically since the days when coast guard and military personnel traveled the world's waterways with a mission to rescue and retrieve. Today, a lifeguard's primary job responsibility is preventive - protecting guests at a lifeguarded facility.

Employing well trained, professional, accountable lifeguards is a proven way to prevent drownings and other tragic incidents. E&A has an unmatched, safety record in the aquatic industry because it holds its lifeguards accountable to high standard of care.

You are expected to minimize risks in your aquatic facility and to recognize and react promptly to those in distress. You will be held accountable as lifeguard and expected to maintain the high standard of care that E&A is committed to. Upholding that standard means being committed to your lifeguard course training as well as ongoing training during the period your credentials are valid. While on the job you should be prepared to be evaluated to verify your constant commitment to excellence.

You are specifically expected to:

- Act as a professional, committed to the protection of the guests at your facility
- Be proactive, preventing problems before they occur
- Effectively scan your assigned zone of protection
- Recognize and respond and provide appropriate care to as guest in need

Key Terms

→ Accountable
→ Audit
→ In-Service Training
→ Operational Drills
→ Pre-service Training
→ Preventive Lifeguarding
→ Standard of Care
→ Test-ready

Chapter 2
PROFESSIONAL IMAGE AND ACTIONS

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- List professional lifeguard behaviors
- Identify the standard lifeguard uniform
- Describe how to provide positive guest interactions
- Discover effective ways to handle difficult guest situations
- Discuss the lifeguard's role as it relates to rule enforcement and injury prevention

Chapter Overview

→ Lifeguard Appearance and Behavior
→ Lifeguard Uniform and Equipment
→ Positive Guest Interactions
→ Rule Enforcement
→ For Your Review

Lifeguard Appearance And Behavior

As a lifeguard, you are a highly-visible facility employee. You need to project a positive professional image to guests, demonstrating how seriously you are committed to safety and your job. When guests view you as a ***professional***, they are more likely to follow your directions. These lifeguard behaviors identify you as a professional:

Figure 2.1 Professional lifeguards are alert, attentive and vigilant, always ready to respond.

- **Being Prepared** – Always have the items you need to do the job such as a uniform, whistle, rescue tube, stocked hip pack, hydration supplies and if outdoors, sun protection
- **Rescue Ready** – Maintain your skills at a test-ready level
- **Safety Aware** – Take proactive measures to maintain your personal safety by adhering to good pool habits, taking measures that limit hazards and using personal protective equipment when appropriate
- **Vigilant** – Always keep your eyes on your assigned Zone of Protection area and avoid distractions **(Fig 2.1)**
- **Identifiable** – Dress in a neat, clean uniform to always look professional so guests can easily recognize you
- **Punctuality** – As a professional, you must be on time to work, returning from breaks, and rotating shifts
- **Team Member** – Be courteous and work together with your fellow lifeguards and co-workers
- **Focus on Health** – You must meet specific physical requirements to complete your lifeguard training. Beyond your training, you need to remain in good physical and mental condition to perform the tasks of your job. You may want to consider participating in a wellness program that encourages strength, flexibility, and cardiovascular fitness. Regular exercise helps you to remain alert. It also helps you cope with stress and fatigue It conditions you to perform strenuous rescues. Wellness also encourages proper nutrition and weight control. Good nutrition helps provide you with the energy needed to remain vigilant and active. Drinking plenty of water prevents dehydration, especially while working in hot environments. Be sure to get adequate rest which increases your ability to be alert and ready to perform your job.
- **Guest Ambassador** – As a professional lifeguard, you are a guest ambassador who interacts in a cordial and polite way with guests creating positive guest experiences. Always model and enforce the rules consistently in a positive manner when addressing guests. Know and follow your facilities policies and procedures **(Figure 2.2).**

Figure 2.2 Lifeguards are guest ambassadors who deliver positive guest interactions.

Unprofessional Lifeguards

It's not hard to spot unprofessional lifeguards. They do not appear ready to respond and may not even know how to act if called upon to do so. Unprofessional lifeguards tend to be inattentive, rude when addressing guests, and do not appear to be concerned about their appearance or being a team member.

These behaviors identify a lifeguard as unprofessional:

- Using mobile devices while on duty
- Not actively watching the assigned zone consistently while at a station
- Having extensive conversations while at a station
- Not attending training
- Being under the influence of alcohol, other drugs, or medications that inhibit abilities
- Leaving a lifeguard station unattended
- Not rotating stations properly

Lifeguard Uniform and Equipment

Lifeguard uniforms are unique to each facility. The standard lifeguard uniform typically includes personal safety equipment that protects both you and the guests in your facility. Your employer will provide the specifics on the standard lifeguard uniform for your facility. Lifeguard uniforms might include items such as:

- **Bathing suit/shorts or trunks** – Appropriate attire to enter the water and execute rescues
- **Shirt** – An item of clothing that provides protection from weather elements and includes a name or logo identifying you as a lifeguard
- **Hat/visor** – Most often used outdoors, providing protection from sunlight exposure and other weather elements
- **Polarized sunglasses** – A personal accessory that provides proper eye protection from harmful ultraviolet rays and is critical for outdoor lifeguards working in sunny conditions

Figure 2.3 Professional lifeguards are always dressed in the proper uniform and have access to the equipment they need to save a life.

As a lifeguard, in addition to standard uniform elements, you will also be issued (or will use while on duty) standard equipment (**Figure 2.3**) for use at your facility such as:

- **Rescue tube** – Helps identify you as a lifeguard and is critical when responding to water emergencies
- **Whistle** – The primary emergency communication device used by lifeguards. It is also used to communicate with guests and other lifeguards
- **Hip pack** – Provides convenient storage and quick access to Personal Protective Equipment (PPE) used in emergency situations
- **Sun protection** – Includes items such as umbrella, sunscreen, and protective clothing and eye wear

Rescue Tube

Professional lifeguards carry rescue tubes while working. Rescue tubes help identify you as the lifeguard on duty. The ***rescue tube*** is safe, lightweight, and an effective lifesaving device for situations requiring rescues from the water.

Using a rescue tube (Figure 2.4) has advantages, such as:

- The ability to support several large people in the water
- Reducing the amount of energy that you must expend when bringing one or more guests in distress to safety
- Provides lifeguard safety. Positioned between you and a guest, the rescue tube reduces the likelihood that the guest will grab you during a rescue. And if a guest does happen to grab you, the rescue tube is likely to keep both you and the guest above water
- The ability to quickly position the guest on the tube so that rescue breathing can be provided in the water when necessary
- The ability to support a backboard in the water while performing extrications in which spinal injury is suspected

Figure 2.4 A rescue tube is an important piece of equipment for all lifeguards. A whistle safely available on a lanyard is also important for communicating with guests and other lifeguards.

Because each facility has unique operating procedures, your facility will provide specific site training on how to wear your tube in unique work locations. Normally, the shoulder strap attached to the rescue tube should fit diagonally across your chest with the excess cord secured in your hand.

The rescue tube may be held:

- In front of you while standing or roving
- At your side while standing or roving
- Across your lap while sitting

In some situations, such as open water elevated guard stands, it may not be practical to hold or wear the rescue tube. The tube is positioned so that it is immediately accessible to the lifeguard if needed.

Figure 2.5 Hip packs store emergency supplies that are easily accessible.

Whistle

Your whistle provides you with the ability to immediately grab the attention of guests and other lifeguards due to the loud, piercing sound that it creates. Whistles are attached to lanyards that can be easily worn around your neck so that they are readily available when needed (**Figure 2.4**).

Hip Pack

Hip packs are an accessory that you will carry to provide immediate access to stored emergency supplies. These packs can be accessed while in the water or on land. While in the water, you can quickly retrieve resuscitation masks used to provide rescue breathing **(Figure 2.5).**

Sun Protection

Skin cancer is the most common preventable cancer in the United States. The U.S. Centers for Disease Control and Prevention (CDC) reports that nearly five million people are treated for skin cancer annually. Since many lifeguards work outdoors in direct sunlight, there is a real concern that exposure to the sun's ultraviolet rays can result in potential vision and skin damage. You can take steps to protect yourself from this threat by practicing safe behaviors that minimize your risks. Practicing good sun safety when lifeguarding outdoors includes taking a layered approach to protection from the sun.

Be Safe! Take a Layered Approach When Working in the Sun!

- Work under a shaded area or umbrella
- Wear a hat and sunglasses
- Wear a shirt that provides additional skin protection
- Apply a broad spectrum sunscreen with at least a 30 SPF for exposed skin
- Reapply sunscreen frequently to maintain protection

Dermatologists recommend a "broad spectrum" sunscreen with a ***sun protection factor (SPF)*** of at least 30. This will provide the best protection against the sun's rays that can cause overall skin damage. And because you are working in and around water, you may also consider wearing waterproof or water-resistant sunscreen.

- Waterproof sunscreen is capable of maintaining its SPF rating for 80 minutes when exposed to water.
- Water resistant sunscreen is capable of maintaining its SPF rating for 40 minutes when exposed to water.

Whichever sunscreen you choose, be sure to reapply it frequently based on your sun exposure during work **(Figure 2.6).**

Figure 2.6 Sunscreen provides critical protection for lifeguards working outdoors.

Did you Know? *Alarming Facts about Sun Risks*

- Skin cancer is the most common skin cancer in the United States
- Each year, five million people are treated for skin cancer
- Each year, 76,000 are diagnosed with melanoma, the most fatal type of skin cancer
- 9,000 of the 76,000 diagnosed die annually
- One in five Americans is likely to develop skin cancer during their life
- Major risk factors in the rise of melanoma cases are recreational sun exposure and sunburn

From the CDC Sun Safety and World Health Organization

Positive Guest Interactions

Figure 2.7 Professional lifeguards provide positive guest interactions.

Professional lifeguards provide positive guest interactions that make guests feel welcome. To make guests feel welcome in your facility, practice the "Golden Rule." This means treating others as you would want to be treated - with courtesy and respect.

Most likely, you'll find yourself working with the public and co-workers in a diverse, multicultural environment. It's important that you treat everyone with equal respect and consideration. Always keep an open mind. Be open to suggestions from guests, as well as other staff members who come from diverse backgrounds and cultures. Avoid being judgmental and biased based on your own personal background and experience. The friendlier, and more positive, open-minded lifeguard you are, the easier it will be for you to deliver a safe, enjoyable experience that creates positive guest interactions **(Figure 2.7).**

Lifeguards *CARE* for Their Facility Guests

As an E&A Lifeguard, you can deliver positive guest interactions by genuinely caring for the guests in your facility. ***CARE*** means being:

- **Confident** in your ability to maintain a test-ready skill level by enhancing your development through ongoing training participation.
- **Attentive** to your Zone of Protection Area while on duty, anticipating and preventing potential issues (weak swimmers, crowded conditions, surface glare).
- **Responsive** when faced with an emergency that requires you to quickly assess a situation and determine the best course of action. This includes identifying the type of care to render and the proper use of emergency equipment.
- **Empathetic** by placing yourself in the guest's position, understanding their needs and emotions. Always make eye contact and act courteously and respectfully. Appreciate the physical and emotional concerns a guest may have.

Lifeguards *DEAL* With Difficult Situations

Occasionally, you may encounter a difficult guest. Determine if you need help from a supervisor or if you can ***DEAL*** with the situation on your own **(Fig 2.8):**

- **De-escalate the situation** – Start with a clear understanding of the guest's concern. You can gain an understanding by listening carefully without interrupting the guest and then ask questions to clarify what you heard. Summarize what you heard to be certain the problem is clearly stated.
- **Evaluate alternatives** – Examine the options available to help with the guest's concern. Consider the consequences of each option. Ask the guest how he or she would like the situation resolved. Discuss options for possible resolutions.

Figure 2.8 Use DEAL for difficult guest situations.

- **Act quickly** – Based on the information you gather, and after considering your options, take action to improve the situation. Be specific when explaining to the guest what you are going to do and why you are doing it. Be clear to everyone involved in the situation of the actions you are taking.
- **Look at outcomes** – Evaluate how effective your action was afterward. Consider whether the guest left satisfied. Consider how you may have done a better job of handling the difficult situation. Guests may not always leave happy when you are enforcing a rule, but how you enforce it can change the experience for a guest. Evaluating the outcome of each situations a learning opportunity.

Each facility is unique and may provide additional customer service training. You may work with a lifeguard team and may have a supervisor to assist you when needed. If you are in doubt about your authority or ability to provide positive guest interactions, seek the assistance of a supervisor and/or fellow lifeguard.

Rule Enforcement

All aquatic facilities have rules to reduce and minimize risks or potential hazards These rules are established by authorities that have jurisdiction over the facility such as local health departments, municipalities, state regulatory agencies, and manufacturers of specific attractions. Some rules and regulations come from facility policies. As a lifeguard, you have the important responsibility of consistently enforcing the rules that have been designed to keep your facility guests safe. Rules are posted on signs throughout your facility. You should know where these signs are located and what each sign says **(Figure 2.9).**

Figure 2.9 Consistency in rule enforcement is an important responsibility of lifeguards.

Rules Keep Guests Safe

Rules are established to prevent potential risks and injury. At times, rule enforcement can seem difficult because the guests who visit an aquatic facility are there to have fun and may not be aware they are breaking a rule. This is where your professionalism comes into play. Address all guests in a friendly, courteous, but direct manner so they remain safe.

Whenever you interact with guests, make it your goal to keep the conversation positive. An example of this would be stating "Please walk" instead of "No running!" Or "Please go down the slide, feet first," instead of saying, "No head first sliding." Besides simply enforcing rules, it also helps to be able to explain the rules. If guests understand the reasoning for a rule, they are more likely to follow it. For example, if you say, "For your safety, please walk, this area can become slippery," you are explaining why they shouldn't run.

When Rules Need to be Enforced, Take the LEAD!

Whenever you are handing situations that involve rule enforcement, use the ***LEAD*** approach:

- **Listen** to guests' concerns about rules without interrupting them
- **Empathize** with guests regarding how they may feel
- **Apologize** for any misunderstanding about rules on their behalf
- **Discuss** the rule, and provide guests with options if available

FOR YOUR REVIEW

Summary

As a professional lifeguard, you will be a highly-visible facility employee. Your appearance and behavior should include being prepared, rescue ready, safe, vigilant, identifiable, punctual, a team member, healthy, and a guest ambassador. Maintain a professional image by dressing in a clean, recognizable uniform and utilizing the lifeguard equipment provided to you.

To avoid the hazards associated with the sun, protect yourself by wearing a shirt, hat or visor, and polarized sunglasses. When outdoors, apply sunscreen frequently and use an umbrella.

Provide positive experiences for guests during your interactions. Be respectful and courteous while still enforcing rules. Remind guests that the rules were created for their safety.

Show you CARE by being confident in your skills, attentive to your Zone of Protection area, responsive when faced with an emergency, and empathetic by always treating guests with courtesy and respect.

If you encounter a difficult situation, manage the situation on your own when possible, but do not be afraid to request assistance from a supervisor or other lifeguards. DEAL with those moments in a positive way by acting immediately to define the concern, evaluate options to handle the situation, and look back at the outcome to see what key learnings you can take from the experience.

Facility rules are developed to provide safety for each unique attraction. Remember to LEAD when handling guest situations regarding rule enforcement. Listen, empathize, apologize, and discuss. If you are ever in doubt about how to handle a situation, consult your supervisor for assistance.

Key Terms

- → CARE
- → DEAL
- → LEAD
- → Professional
- → Rescue ready
- → Rescue tube
- → Sun protection factor (SPF)

Chapter 3
ENVIRONMENTAL SAFETY

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Recognize the environmental risks associated with the job of a lifeguard
- Identify ways to protect yourself from environmental risks.
- Know the basic safety precautions to take during weather-related emergencies
- Understand how water chemistry impacts the safety of swimmers
- Be aware of how recreational waterborne illnesses can harm swimmers and know what steps to take when an incident occurs

Chapter Overview

→ General Environmental Safety
→ Weather Conditions
→ Hydration
→ Chemical Safety
→ Recreational Waterborne Illnesses
→ For Your Review

General Environmental Safety

While working as a lifeguard, you will be exposed to many potential physical risks. Your personal safety must come first. If you are not safe, you will not be able to aid others when needed. Practicing safe behaviors can help minimize environmental risk factors in your work place. Some of these risk factors include sun-exposure, dehydration, weather-related incidents, and exposure to chemicals. This chapter covers environmental risk factors and general safety measures that you should follow. Once employed as a lifeguard, your facility may provide training unique to your specific work environment.

Facility Type

You may work in indoor or outdoor facilities, or both. Each work environment has unique risk factors that you should be familiar with:

- **Indoor aquatic facilities** have air ventilation systems designed to heat and circulate air in the facility to maximize guest comfort. These systems create a warm, climate-controlled environment with elevated air temperature and higher humidity levels
- **Outdoor facilities** are likely to experience greater changes in air temperature and humidity. These facilities are also impacted by wind, rain, and direct sunlight

Weather Conditions

Weather is an environmental risk that lifeguards are exposed to while working. Weather is unpredictable and can change quickly. Weather affects your safety and that of facility guests. When faced with a weather-related emergency in your facility, take immediate action. Even indoor facilities may be impacted by weather-related emergencies such as losing power during a storm. Each facility has unique procedures for shutdown and managing weather situations. Be prepared. Your facility Emergency Action Plan (EAP) provides direction as to how to respond during such emergencies **(Figure 3.1).**

Figure 3.1 Some facility attractions may close during severe weather for safety.

Examples of weather-related emergencies that you are likely to face include:

- Sun exposure
- Rain
- Thunderstorms
- High wind
- Tornado
- Other unique conditions

Sun

Overexposure to the sun is a preventable environmental risk. Continued exposure to sun can cause sunburn, dehydration, fatigue, heat-related injuries and long-term damage to skin such as skin cancer. To prevent these potential risks, take a layered approach to sun protection while working in outdoor environments.

For lifeguards, the Layered Approach includes (Figure 3.2):

- Work in a shaded area or under an umbrella
- Wear a hat/visor
- Wear sunglasses with polarized lenses
- Wear a shirt as part of your uniform
- Apply sunscreen with an SPF broad factor of 30 frequently to all exposed skin

Figure 3.2 Take a layered approach to sun protection when working outdoors.

Rain

Light rain can have an impact on your ability to fully see and protect your assigned zone. When rain falls on the surface of the water in your pool, it creates a mild agitation, decreasing the visibility of the water below the surface. Notify your supervisor immediately if you lose the ability to see beneath the water's surface. If visual observation of the bottom of the pool is lost, check with your supervisor. It may be necessary to close the pool until weather conditions improve.

Thunderstorms

Thunderstorms are dangerous and considered a weather-related emergency. Thunder and lightning, typically accompanied by heavy rain or hail, are more frequent in the summer months or in warmer climates. Lightning can strike from as far as 10 to 15 miles away and a single lightning strike can reach over 5 miles in length. Your facility will have a specific Emergency Action Plan (EAP) in the event of a thunderstorm that will include procedures for closing the facility. There are multiple methods of determining if lightning poses an imminent threat, including lightning detection devices, website resources, smart phone apps, and counting time between strikes. Once it is determined that your facility needs to shut down, you must work quickly and safely to move guests to a secure and safe location **(Figure 3.3).**

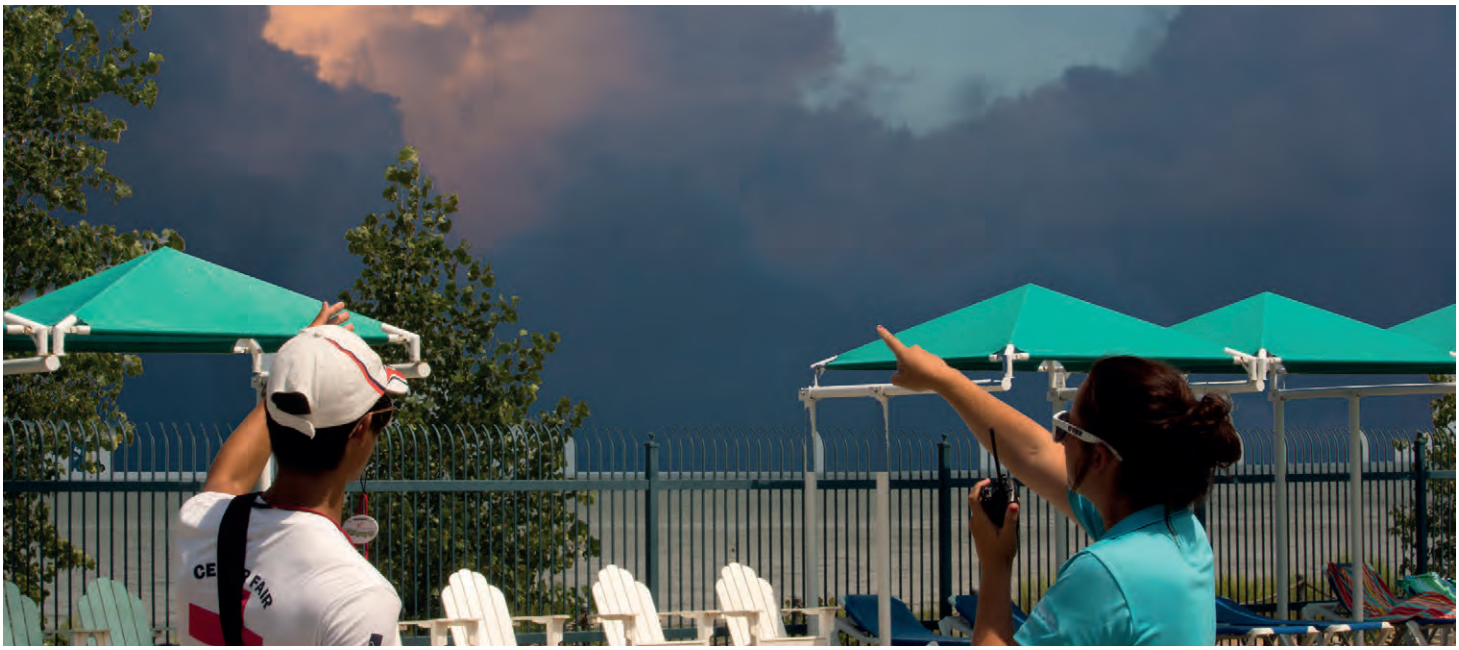


Figure 3.3 Work quickly to keep guests safe if your facility determines the need to shut down during severe weather.

Shelter During Thunderstorms

- If outside, take shelter in a building, completely enclosed structure, or hardtop vehicle
- Protect yourself from lightning - avoid shelter areas that are not fully enclosed
- Once guests are secure indoors, advise them to stay clear of metal objects, plumbing and even land lines. All three can conduct electricity from a direct lightning strike
- Check with the National Weather Service or National Oceanic and Atmospheric Administration (NOAA) for additional information about lightning safety

Wind

Wind can agitate the water's surface enough to affect your ability to see the pool bottom. Wind gusts can be dangerous, resulting in flying objects like furniture, umbrellas, towels, water bottles, and other items that are not secured. Your Emergency Action Plan (EAP) provides procedures in case wind conditions become dangerous. Normally, this includes clearing the facility of loose items, closing umbrellas and securing equipment.

Tornado

A tornado is a violently rotating column of air that is typically part of a larger thunderstorm. When conditions are right, a tornado can strike anywhere. Your facility staff will monitor the weather for tornadic conditions. A tornado watch means that tornadoes are possible. Tornado watches are issued long before a storm potentially reaches the area where the tornado may touch down. A tornado warning means that a tornado has touched down. If a tornado watch or warning is called, get yourself and your guests to safety by seeking an appropriate, covered shelter in the lowest point of a building, such as a basement. If a basement is not available, a hallway or interior room without windows is a good option. Be sure you and your guests remain in the location until the danger has passed.

Other Unique Weather Conditions

Many unique weather conditions may impact facility operations. This can include dense fog, smoke, smog and dirt/ sand storms. As with other environmental conditions, follow your Emergency Action Plan (EAP) to provide for the safety of your guests and yourself.

Hydration

Staying hydrated keeps lifeguards alert and vigilant. Inadequate ***hydration*** can lead to ***dehydration***, a loss of body fluid that leads to fatigue. Drink plenty of fluids throughout your shift to avoid the effects of dehydration. To help you remain hydrated, keep a water bottle available and drink frequently while working **(Figure 3.4).** When working in hot environments, take a dip in the water after a rotation is complete or apply a cool towel to your head and neck.

Figure 3.4 Staying hydrated is critical to maintaining your focus.

Chemical Safety

Your safety and that of your guests comes first. That's why the Occupational Safety and Health Administration (OSHA) requires that employers implement a Hazard Communication Standard to reduce and prevent injury and illness resulting from exposure to chemicals. This standard is met by requiring facilities to provide and make available ***Safety Data Sheets*** (SDS) for each chemical. These sheets must be easily accessible and include procedures for handling exposure to each substance, along with first aid measures and medical care requirements if exposure occurs **(Figure 3.5).**

Figure 3.5 Read the labels and placards to help identify the hazards regarding chemicals in your facility.

Lifeguards Have a Right to Know!

- What hazardous chemicals are in their facility
- Where the chemicals are stored in the facility
- How to properly store the chemicals
- The risks and dangers of each chemical
- How to protect themselves from the chemical
- What Personal Protective Equipment (PPE) is needed when using the chemicals
- How to handle the chemicals
- How to handle exposure and what treatment is needed
- Where the Safety Data Sheets (SDS) are located

Water Chemistry

Water chemistry in a pool is important to swimmer safety. Not only does it impact the water's clarity, but it can also affect whether or not contaminants like pathogens from recreational water borne illnesses are able to live and grow in the water. There are many factors that contribute to the ability to maintain proper water chemistry including sunlight, air temperature, wind, rain, number of guests, bodily fluids, and lotions.

A ***Certified Pool Operator (CPO)*** or an ***Aquatic Facility Operator (AFO)*** will handle the responsibility of managing the facility's water chemistry, adjusting chemicals, and maintaining the filtration system. As part of your lifeguard responsibilities, you may also be required to test the water to ensure it is in the proper operating ranges. If this is to be part of your job, you will be trained by your facility to test and possibly adjust the chemicals while maintaining your safety **(Figure 3.6).**

Figure 3.6 You may take regular chemical readings as a part of your secondary job duties.

Water Quality in Pools and Hot Tubs

One of the most important tasks of the swimming pool operator is vigilantly monitoring the pH and the free chlorine level of pool water to maintain water quality. ***Free chlorine*** references a measurement of active chlorine in the water, when chlorine based compounds are added. The free chlorine residual helps determine how well it will disinfect pathogens and oxidize contaminants. To work most effectively, a residual range of free chlorine must always be maintained. The typical free chlorine range is 1.0-3.0 parts per million (ppm), but the set point for pools and hot tubs at your facility may vary, depending on operation conditions, other chemicals in use, and the technology utilized. Local requirements may also stipulate a specific setting for the pool type.

pH stands for "potential of Hydrogen" in an aqueous solution, measuring the solution's acidity and basicity. The pH scale runs from "0" (extremely acidic) to "14" (extremely basic). "7" on the scale is neutral, meaning there is a balance between acidity and basicity. The typical pH target for pool water is approximately 7.4, but there may be reasons that the CPO/AFO at your facility targets a specific pool's pH slightly higher or lower. Generally, the CPO/AFO will avoid straying away from a pH in the 7s to avoid aggressive or corrosive water which may damage surfaces, equipment, and be uncomfortable for guests. Maintaining a proper pH will also help free chlorine disinfect and oxidize.

Both free chlorine and the pH of the water (among several other chemical and mechanical targets) are based on the requirements determined in your area by your state or county/municipal health department. Increasingly, the ***Model Aquatic Health Code (MAHC)*** is being adopted, setting a national standard for water quality and other operational benchmarks for the aquatics industry in the United States.

As mentioned, a common secondary task lifeguards may perform is periodic water chemistry testing. If you are tasked with this and something is out of range or seems unusual, do not simply log it and proceed with your duties. Make sure someone knows your findings right away so that it can be quickly addressed or explained. Unless you have been properly trained and importantly, you have been authorized to do so, never attempt to make adjustments to chemical controllers, pumps, filters, or other equipment. Even if you have the best of intentions or believe you are duplicating what you have seen others do in the past, you could inadvertently create a very unsafe or costly situation.

If you have questions or concerns about your aquatic facility's pool chemistry or mechanics, speak to your supervisor or one of your facility's CPO/AFO staff members. Likewise, report any concerns brought to your attention by others. This is especially important if something seems wrong with the water or if guests report unpleasant smells, tastes, or skin irritation while swimming. However, avoid having discussions with guests about the water's quality directly (beyond listening to concerns and passing them on). Always direct these guests to the appropriate staff member(s) who can in turn, expertly speak to them about the issues and provide the most accurate and appropriate information.

If you observe the water clarity in a pool or attraction diminishing, report this right away. Reporting this early may help avoid the water becoming so cloudy that it becomes difficult to see the pool bottom. As you will learn in the coming chapters and throughout this course, your ability to see all parts of the pool, including through the water and the pool bottom - is fundamental to your job as a lifeguard. Do not ignore it, assume that someone else will report it, or assume your supervisor already knows. If you are at a duty station and you can no longer see the bottom, call for a supervisor to determine a solution. It may be necessary to close the pool or attraction until it can be corrected.

As you spend more time at your facility, you will learn how each pool and attraction operates under normal circumstances and conditions, as well as what to expect in certain situations. It will become easier to recognize when something is out of the ordinary. You alerting the appropriate staff members at the first signs of an issue may help avoid closures (or extended closures) as well as numerous other problems.

Recreational Waterborne Illnesses

Recreational waterborne illnesses (RWIs) are spread to humans when they swallow, breathe, or come in contact with contaminated water. Typical signs can include skin rashes, ear aches, and diarrhea. Some cases, however, can result in pneumonia, neurological damage, and even death.

Common RWI's are caused by Norovirus, E-Coli, and Giardia. These gastrointestinal pathogens are highly contagious and have similar symptoms, including nausea, vomiting, abdominal pain, diarrhea, and dehydration. Another RWI is ***Cryptosporidium***, commonly known as "crypto" (both the pathogen and resulting illness). It is a microscopic parasite and can remain infectious for several days even when living in disinfected pool water at normal levels.

RWI's from pathogens like viruses, parasites, and bacteria can occur when feces are released into the water and this contaminated water is inadvertently swallowed (fecal-oral transmission). See Chapter 4 for more information on pathogens and how they are transmitted.

Fecal Incidents in Your Facility

Your facility will have a protocol outlined for handling ***accidental fecal release (AFR)*** incidents. During your orientation, or at an in-service training, your facility should provide training on how to respond to AFRs. The Centers for Disease Control and Prevention (CDC) and Model Aquatic Health Code provide guidance on the proper way to handle AFRs and maintain healthy swimming facilities **(Table 3.1).**

Table 3.1 Handling Accidental Fecal Release Incidents

The general steps for handling AFRs are:
1. Close the aquatic attraction where the event occurred
2. Remove as much of the fecal matter as possible using a net/scoop and dispose of it
3. Contact the person responsible for water chemistry and filtration
4. Properly sanitize equipment used before placing it back in service
5. Wait for instructions regarding when to reopen the attraction

Other Types of Water Contaminants

Other types of infectious contaminants may enter your facility's water. Guests may become injured or ill while visiting which may cause blood and/or vomit to be deposited in your water. Although guests are less likely to contract an RWI by swallowing, breathing, or contacting water that is contaminated by vomit or blood, these bodily fluids are considered infectious and pose risks if the water chemistry does not have a proper disinfectant level.

As a lifeguard, you may be responsible for cleaning up these types of bio spills when they occur in or around their water. Cleaning up vomit and blood is like cleaning up a well-formed accidental fecal release.

FOR YOUR REVIEW

Summary

Your work environment poses several risks and hazards that you should be aware of while on the job. As a lifeguard, it is your responsibility to protect yourself and your guests from the risks and hazards in your work environment. Your personal safety comes first.

- You should ensure that you protect yourself from the sun by taking a layered approach each time you are working outdoors, and always remain hydrated by drinking water when on duty.
- Each environment poses different challenges to your safety and health and that of your guests.
- Be aware of the general weather patterns unique to your location and follow your EAP regarding thunderstorms, lightning and other severe weather situations.
- Your job brings you in contact with chemicals which are used to keep the water in your facility sanitary and to keep your facility clean. Whenever you use a chemical, you should review the facility Safety Data Sheet (SDS) to be aware of the proper handling procedures and exposure protocols for the chemical.

If you are responsible for testing the water chemistry and adjusting chemicals, your facility will provide you specific training in operating procedures.

Recreational waterborne illnesses (RWIs) are caused by pathogens spread through contaminated water in your facility. RWIs can cause a wide variety of infections, including gastrointestinal, skin, ear, respiratory, eye, neurologic and wound infections. RWIs can contain highly contagious infections and some that may even be life-threatening. Most common RWIs include diarrheal illnesses such as E-Coli, Norovirus, Giardia and cryptosporidium. Be aware of your facility's procedures for handling accidental fecal release and bio-spills in and around the water to minimize the risk of exposure and harm from RWIs.

Key Terms

→ Aquatic Facility Operator (AFO)
→ Accidental Fecal Release (AFR)
→ Certified Pool Operator (CPO)
→ Cryptosporidium
→ Dehydration
→ Free Chlorine
→ Hydration
→ Model Aquatic Health Code (MAHC)
→ pH
→ Recreational Waterborne Illnesses (RWIs)
→ Safety Data Sheets (SDS)

Chapter 4
PREVENTING DISEASE TRANSMISSION

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Identify bloodborne and airborne diseases of concern to lifeguards
- Describe how diseases are transmitted
- Identify at least five disease prevention practices
- Describe the purpose of the OSHA protection standards
- Provide examples of personal protective equipment (PPE) available to lifeguards
- Describe what is meant by standard precautions
- Explain the purpose of an exposure control plan
- Demonstrate how to safely remove soiled medical exam gloves

Chapter Overview

→ Bloodborne and Airborne Pathogens
→ How Diseases are Transmitted
→ OSHA Protection Standards
→ Disease Prevention Practices
→ If an Exposure Occurs
→ For Your Review

Bloodborne And Airborne Pathogens

Pathogens are microorganisms (germs) which cause disease. These microorganisms include the following types: ***bacteria, viruses, fungi, protozoa, and parasites*** **(Figure 4.1)**. Pathogens may be present in blood, in body substances, in the air, in contaminated water, an infected animal or insect, or on contaminated surfaces. Some illnesses caused by pathogen exposure can be prevented (or minimized) with vaccines. To directly treat the illness cause, physicians may prescribe antibiotics for bacterial infections, anti-viral agents for viral infections, and anti-fungal drugs for fungal infections. Unfortunately, not all infections can be treated directly. In many cases, once a person becomes ill, physicians may only be able to prescribe medications to help manage symptoms until the person's immune system is able to take care of the infection.

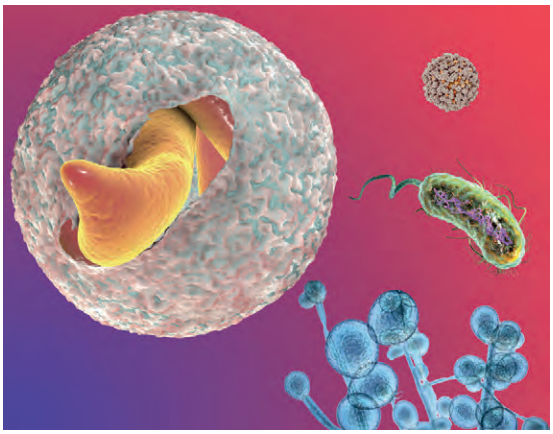


Figure 4.1 A parasite, virus, bacteria, and fungi - pathogens capable of causing disease.

Examples of viral bloodborne pathogens of concern are hepatitis A, B, and C viruses and human immunodeficiency virus (HIV). Tetanus is an example of a bacterial bloodborne pathogen of concern. Examples of infections caused by airborne pathogen transmission include: coronavirus (all types), tuberculosis, chickenpox, measles, mumps, rubella, meningitis and the annual strain of influenza. Fungal infection risk typical in an aquatic environment come from the pathogens trichophyton spp. and epidermophyton floccosum. As discussed in Chapter 3, water-borne pathogens transmitted via the fecal-oral route, such as giardia and cryptosporidium, could potentially contaminate a pool or aquatic attraction and are resistant to disinfection. Several harmful pathogens can be transmitted from animals and insects, which can be a concern if you are working at an outdoor facility in certain locations or times of the year. **Tables 4.1a** and **4.1b** (next two pages) provides an overview of several pathogens and resulting infections.

COVID-19

A viral pathogen known as **SARS-CoV-2** (**Figure 4.2**) is a novel (new to science) human coronavirus and causes the COVID-19 illness. Signs of infection may take up to 14 days to present following initial exposure. These signs include fever, upper respiratory congestion, coughing, sneezing, sore throat, shortness of breath, and general fatigue. However, signs may not present the same way for different individuals. Some of those infected may only have mild symptoms with many of these reporting altered smell or taste being their most noticeable symptom. As many as half of those infected may be asymptomatic, showing no obvious signs of illness but may nonetheless be capable of spreading the pathogen. In severe cases, this disease can cause hypoxia, inflammatory reactions, skin lesions, blood and circulation disorders, and **Acute Respiratory Distress Syndrome (ARDS)**, all of which requires hospitalization.

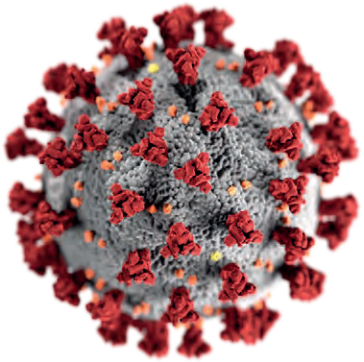


Figure 4.2 The SARS-CoV-2 virus.

The SARS-CoV-2 pathogen is primarily transmitted via respiratory droplets and aerosols that are produced when an infected person exhales, coughs, sneezes, and speaks. These droplets and aerosols may be inhaled when airborne by those who are nearby. They may also settle on surfaces where it may be possible to transfer the disease via contact. Several vaccines are available around the world, along with promising treatments to fight this disease. Depending on how this disease is spreading or being contained in your area, your facility may have additional controls in place. If there are measures required that are not discussed in this manual, your employer will provide any necessary additional training and information.

Table 4.1a Examples of Pathogens

Pathogen Group / Disease	Recognition	Description	Transmission	Vaccination or Treatment
"Common Cold" (Human Coronavirus group, "typical" HCoV)	Congestion, cough, runny nose, fever, sore throat, swollen glands and non-specific symptoms.	Along with rhinoviruses and a few others, Coronaviruses are thought to be a cause of the "Common Cold". Colds due to typical Human Coronaviruses are highly contagious but rarely result in severe symptoms or secondary infections.	Airborne aerosol from coughing and sneezing. Direct contact with droplets on surfaces (Coronaviruses can remain active on surfaces for days).	No vaccine available at time of writing. Typically resolves without treatment within a few days.
"Common Cold" (Rhinoviruses A & B Virus Group)	Congestion, cough, runny nose, fever, sore throat, swollen glands and non-specific symptoms.	Along with Coronaviruses and a few others, Rhinoviruses are thought to be the primary cause of the "Common Cold". Colds due to Rhinoviruses may result in secondary infections which may increase illness severity and duration.	Airborne aerosol from coughing and sneezing. Direct contact with infected droplets on surfaces may be possible.	No vaccine available at time of writing. Typically resolves without treatment within a few days.
Chickenpox (Varicella Zoster, Herpesvirus 3 - HV3)	Fever, fatigue, rash, and fluid-filled, itchy blisters on body.	Traditionally seen as a childhood illness, it is increasingly less common due to vaccination availability. In addition to its primary symptoms, it may result in pneumonia, brain swelling, and other complications. The virus may remain dormant in the body and causes Shingles in older adults.	Airborne aerosol from coughing and sneezing. Direct contact with droplets on surfaces, skin blisters or mucous secretions.	Vaccine available. Treatment of symptoms available if infected.
Herpes Infections (Herpesvirus Group)	Sores or ulcerations, fever-blisters, rash, fever, swollen glands, runny nose, diarrhea, swollen eyelids, fatigue & non-specific symptoms.	There are a variety of Herpesviruses, including Herpes Simplex 1 & 2, Epstein-Barr, Shingles (Chickenpox), Roseola, Kapolsi's sarcoma, among others. Infections from Herpesviruses are a frequent cause of viral meningitis.	Most Herpesviruses require direct person-to-person contact or contact with body substances. Some, like HV3 can be airborne.	Only Chickenpox vaccine is available. Treatment of symptoms available if infected.
Hepatitis Infections (Hepatitis A, B & C Virus Group)	Jaundice, fever, fatigue, nausea, vomiting, abdominal pain, joint pain, dark urine, loss of appetite.	Each virus type can cause serious diseases of the liver, including cirrhosis and cancer. Hepatitis B is the most common in this group due to situational or employment exposure.	Bloodborne and direct contact with body substances including blood, saliva, vomit, semen, vaginal fluids, and mucous secretions.	Vaccines are available for Hepatitis A & B. Effective treatments available with early diagnosis.
Human Coronaviruses (Novel) COVID-19 (Novel group - SARS-CoV, MERS-CoV, SARS-CoV-2)	Mild-to-severe infection of the respiratory and other body systems. Flu-like symptoms, cough, fever, diarrhea, rash, hypoxia, circulation disorders, blood disorders, organ failure, altered taste and smell ability.	SARS-CoV-2 causes COVID-19, which became a worldwide pandemic in 2020. This disease may present with or without symptoms, with many cases requiring hospitalization. The elderly, those with compromised immune systems, or other chronic conditions are most suspectable for severe illness.	Airborne aerosol from coughing, sneezing, and talking. Direct contact with droplets on surfaces. Emerging evidence of bloodborne and body substance transmission.	At time of writing, multiple vaccines are available and promising treatments.
Human Immunodeficiency Virus / AIDS Infections (HIV)	Headache, fever, fatigue, sore throat, rash, muscle, and joint pain. Compromised immune system. Secondary infections.	HIV attacks the white blood cells, destroying the body's ability to fight infection, resulting in secondary infections becoming potentially life-threatening.	Bloodborne and direct contact with body substances. HIV is typically sexually transmitted.	At time of writing, no vaccine available with some promising treatments being explored
Human Papillomavirus Infections (HPV Group)	Warts, rash, skin irritations in the infected area. Frequently no symptoms are seen.	There are over 100 types of HPV with most being harmless. However, some strains are linked to the development of various cancers and other life-threatening conditions.	Bloodborne and direct contact with body substances. The most dangerous strains are sexually transmitted.	Vaccine series are available for ages 9-45 for HPV strains associated with cancers. Treatment for symptoms is available.
Influenza (Influenzavirus A,B,C)	Fever, runny nose, sore throat, muscle and joint pain, headache, coughing, and fatigue.	Depending on the strain, influenza may present mild-to-severe symptoms, with some requiring hospitalization. "Flu-season" is typically the Fall and Winter months each year.	Airborne aerosol from coughing and sneezing. Direct contact with droplets on surfaces.	Annual vaccine available. OTC treatment regimens and antiviral treatment for severe cases.

Table 4.1b Examples of Pathogens

Pathogen Group / Disease	Recognition	Description	Transmission	Vaccination or Treatment
Ingested Bacterial Infections (E. coli, Salmonella, Shigella)	Abdominal cramping, diarrhea, bloody stool, gas, loss of appetite, nausea, vomiting, fatigue, chills, dehydration, and fever	Infections caused by E.coli, Salmonella and Shigella have similar symptoms, which are frequently mild-to-moderate. Prolonged or severe symptoms require medical attention and possibly hospitalization.	Direct contact with contaminated surfaces, handling, or ingestion of infected raw or undercooked food.	No vaccines are available at time of writing. Antibiotics for treatment for severe cases are available. Generally, will self-resolve.
Measles (Measles Morbillivirus)	Blotchy red rash, fever, cough, sore throat, white spots in the mouth, secondary infections.	Measles is an infection of the respiratory system resulting in a red rash covering the body. It is immunosuppressive and may result in secondary infections including pneumonia, swelling of the brain, and blindness.	Airborne aerosol from coughing and sneezing. Direct contact with droplets on surfaces.	Vaccine available. Symptom treatments available if infected.
Meningitis (Various pathogens)	Fever, vomiting, headache, stiff neck, confusion, sound and light sensitivity, cold extremities, leg pain and abnormal skin color.	Meningitis can be caused by viruses (including many mentioned in this section), bacteria, fungi, or parasite that results in inflammation of the meninges (membranes) covering the brain and spinal cord	Transmission is dependent on the pathogen and may include: bloodborne, airborne aerosol, direct contact with droplets on surfaces, or oral ingestion. There are also non-pathogenic causes.	Vaccines for some pathogens linked to Meningitis are available. Anti-inflammatory drugs combined with antibiotics or antivirals if infected.
Mumps (Mumps Orthorubulavirus)	Facial swelling, fatigue, muscle aches, headache, fever.	Mumps infections are characterized by severe inflammation of glands. In severe cases, this can result in meningitis and infertility.	Airborne aerosol from coughing and sneezing. Direct contact with droplets on surfaces.	Vaccine available. Anti-inflammatory and OTC drugs for treatment if infected.
Parasitic Infections (Giardia and Cryptosporidium)	Fever, abdominal cramping, cough, runny nose, severe diarrhea, nausea, fatigue, dehydration	Parasites like Cryptosporidium and Giardia are found on surfaces, soil, food, or water that has been contaminated with the feces of an infected host animal or human. The cycle repeats when a new host ingests the contamination.	Direct contact with contaminated surfaces or soil; handling or ingestion of infected raw or undercooked food or ingestion of infected liquid.	Symptomatic treatments available. Generally, it will pass on its own within two weeks.
Rubella (Rubella virus)	Irritating rash covering the body, fatigue, muscle aches, headache, fever, common cold-like symptoms	Also known as German measles, it has symptoms similar to both Mumps and Measles. Secondary infections including pneumonia and swelling of the brain.	Airborne aerosol from coughing and sneezing. Direct contact with droplets on surfaces.	Vaccine available. Anti-inflammatory and OTC drugs for treatment if infected.
Tetanus (Clostridium tetani)	Fever, headache, sweating, muscle spasms, difficulty swallowing, breathing difficulty, difficulty with urination and defecation, high blood pressure and tachycardia	Tetanus infection symptoms are caused by the Tetanus neurotoxin which interferes with neuromuscular control. This results in mild to severe muscle spasms which may become life-threatening.	Direct contact with common Clostridium tetani endospores through an exposed open wound, puncture wounds, heroin drug use, and animal bites.	Vaccine available with a booster recommended every 10 years. Antibiotics if infected.
Tuberculosis (Mycobacterium tuberculosis)	Bad cough lasting weeks, chest pain, coughing up blood or sputum, fatigue, loss of appetite, and nail clubbing.	The majority of those infected may not show any symptoms. Those with the active disease will show severe lung infection. In cases of weakened immune system, this infection may spread to several other body symptoms.	Airborne aerosol from coughing and sneezing. Direct contact with droplets on surfaces.	A vaccine is available but rarely used in North America. Antibiotics if infected.
Candidiasis Yeast Infections (Candida fungi)	Skin – cracked, dry and/or red itchy skin, chaffing; Nails – discolored, thick, cracked; Mouth – white discolorations of the tongue and throat, sore throat; Genitals – burning, red itchy skin, inflammation, discharge, odor.	One of the most common chronic pathogenic infections, yeast infections can affect anywhere on the body. While rarer, yeast infections in the blood or internally are life-threatening and require hospitalization. A normal immune system and good hygiene will typically prevent most yeast infections.	Direct contact with Candida fungi combined with a moist environment that promotes growth. Infections of mucous membranes or broken skin may lead to internal infections.	Antifungal treatments are available.

How Diseases Are Transmitted

Understanding how diseases are transmitted is the foundation for minimizing the risks associated with any pathogen. The following conditions typically need to be met for disease transmission to occur:

- The pathogen must be present in adequate quantity to cause disease
- A person must be susceptible to the pathogen
- The pathogen must enter the body through a body orifice, such as the eyes, nose, mouth, and mucus membranes; through damaged skin, such as lacerations, abrasions, bites, or accidental (or intentional) needle stick puncture; or the skin itself can become infected, such as occurs with fungal infections.

Figure 4.3 You risk infection from bloodborne pathogens when providing emergency care that involves bleeding.

You risk disease transmission from bloodborne pathogens when providing first aid care such as controlling bleeding (**Figure 4.3**). Transmission can occur if infected blood splashes in your eyes or mouth, or if you touch the infected person's blood without gloves when your hand has an open sore. You risk transmission of airborne pathogens if an infected person coughs or sneezes directly at or near your unprotected face. You may also inhale the airborne pathogen if you are performing an ***aerosol generating procedure*** on the person, such as when performing CPR on someone who is infected, without adequate barrier protections. Pathogen transmission may occur through direct contact with an infected person or indirect contact with a contaminated object such as soiled clothing, equipment, or rescue supplies when not wearing ***Personal Protective Equipment (PPE)***. Touching or handling something contaminated with infected respiratory droplets (or other infected body substances) and then touching your mouth, nose, or eyes is the most common route of pathogen transmission.

Eating undercooked or raw food may contain pathogens that can infect your digestion track. Likewise, drinking water or another fluid that has been contaminated or not adequately decontaminated may similarly provide a pathway for infection. Similarly, recreational water illnesses such as those created by cryptosporidium and giardia can be transmitted through ingestion of contaminated water or food. Warm, damp, or humid environments may promote fungal growth if not adequately cleaned, which can infect skin and mucus membranes with minimal exposure. Pathogens can be transmitted when an animal or insect bites or stings you. Examples of diseases spread in this manner include Japanese encephalitis, malaria, yellow fever, and West Nile disease.

15 Ways to Avoid Catching or Spreading an Illness Caused by a Pathogen

- Avoid unprotected contact with body substances from other people and animals.
- Practice good hygiene - Regularly wash your hands using clean running water and soap.
- Use alcohol based hand sanitizers if you do not have access to clean running water and soap.
- Avoid touching anywhere on your face, especially your mouth, nose, and eyes, with unwashed hands.
- Wash your hands after: using the toilet, handling animals, handling equipment, interacting with others, coughing or sneezing.
- Wash your hands before: preparing food, handing different raw foods, eating food, handing the food of others.
- Avoid consuming raw or undercooked food or food that was not properly stored or handled.
- If you are currently sick, prone to diarrhea, nausea, or have open wounds or infected sores, cuts, or scratches, avoid swimming.
- When swimming in a pool or natural body of water, never swallow the water (discourage others as well, especially children).
- Be aware of all injuries sustained where the skin is broken. Take steps to keep these injuries clean and bandaged until healed.
- Have all significant wounds examined by a medical professional (e.g. serious burns, deep wounds, any heavy bleeding, etc.).
- If you have any wound that does not begin to heal within a few days or appears to be infected, seek medical attention.
- Consider receiving recommended vaccinations available for various preventable diseases (including recommended boosters).
- If you encounter someone who is sick, maintain your distance and avoid direct contact with surfaces/objects they may have touched or have been near (to the extent possible). Wash your hands as soon as possible.
- If you are sick, avoid unnecessary contact with others. When you sneeze or cough, turn away from others and use a tissue to cover your nose and mouth. If you need to cough and a tissue is not available, use the bend in your elbow to contain it.

OSHA Protection Standards

As a lifeguard, your job has the potential for contact with blood or ***other potentially infectious material (OPIM).*** The federal ***Occupational Safety and Health Administration (OSHA)*** established regulations to protect employees from on-the-job exposure to bloodborne and airborne pathogens and OPIM. This includes reducing or removing hazards from your workplace that may place you in contact with infectious materials.

The regulations are known as:

OSHA ***Bloodborne Pathogens Standard*** 29 CFR 1910.1030
OSHA ***PPE and Respiratory Protection Standard*** 29 CFR 1910.134

Since your job has tasks with a potential for occupational exposure to blood and OPIM, you must receive training to reduce or eliminate these hazards through protective measures. Training is required annually, or earlier if your job responsibilities, equipment or practices change. OSHA's standards require that your employer protect you when you are doing your job. This includes:

- Identifying duties that you will perform that fall within the protection offered by the standards.
- Establishing an Exposure Control Plan that includes protective measures to follow to minimize the chance of disease transmission.
- Seeking your input into engineering and work practice controls.
- Offering access to the Hepatitis B vaccination and other vaccinations when appropriate.
- Creating a system of record keeping that tracks required training and exposure incidents.
- Creating protocols to follow in the event of an exposure incident.
- Implementing a schedule for cleaning and decontaminating the workplace.
- Implementing a system to identify and properly dispose of soiled material.
- Ensuring confidentiality of your medical records and any exposure incidents.

Disease Prevention Practices

Disease prevention practices are made up of:

- Administrative controls
- Engineering controls
- Work practice controls
  - Standard precautions
  - Personal Protective Equipment (PPE)

Figure 4.4 Engineering controls involve workplace design and equipment to minimize the chances for disease transmission.

Administrative Controls

Administrative controls include the programs and policies that support and direct the overall disease prevention plan. Your facility's training program, vaccination program, and exposure control plan are examples of administrative controls.

Engineering Controls

Efforts implemented to minimize disease transmission through workspace design or equipment use are known as ***engineering controls***. Examples include self-sheathing needles, hand and eye washing stations (**Figure 4.4**), biohazard waste containers, sharps containers, and spill clean-up kits. When washing stations are not feasible, other options must be available, such as alcohol based hand sanitizers or eye irrigation bottles.

Work Practice Controls

Behaviors (practices) that are required to implement engineering controls are known as ***work practice controls***. Properly using washing stations, sharps containers, and waste containers are examples of work practice controls. Specific work practice controls include protocols that:

- Provide steps for removing soiled medical exam gloves **(Table 4.2)**
- Provide steps for cleaning up sharp items and contaminated spills
- Require hands to be immediately washed after removing soiled medical exam gloves
- Require that you clean and disinfect equipment and surfaces if soiled

If you are cleaning up a spill mixed with sharp objects such as broken glass and needles, do not pick these up with your hands. Use a broom, dustpan or cardboard to properly remove the broken glass and deposit it in the proper container **(Figure 4.5a, 4.5b)**. Use a disinfectant to clean the surface of any remaining blood. If you must make a disinfectant, prepare a mixture of 1 part bleach to 9 parts water. Flood the area and allow it to stand for approximately 15 minutes. Wipe up the remaining solution and dispose of it in a labeled biohazard container.

Figure 4.5a Deposit sharp objects such as broken glass and needles in puncture proof containers.

Figure 4.5b Deposit all soiled materials in properly labeled biohazard bags.

Standard Precautions and Personal Protective Equipment

Standard precautions are standardized safety measures that assume that all bodily fluids may be infectious, so precautions must always be taken. Standard precautions can be applied to engineering and work practice controls and to the use of Personal Protective Equipment (PPE). Along with sufficient training on how to use, PPE should be provided to you by your employer, so that you can safely perform your job as a lifeguard. PPE prevents blood and OPIM from coming into contact with your exposed skin, mucous membranes, eyes, and airway while you provide care.

Figure 4.6 Personal protective equipment is provided to keep you safe during BLS care.

Different PPE may be needed for particular tasks or when certain conditions are met. You will be provided PPE, such as medical exam gloves and barrier devices to be used when delivering ventilations during basic life support care (**Figure 4.6**). Medical exam gloves and a resuscitation mask are typically carried within your hip pack while on duty. Additional PPE and equipment designed to keep you safe may be brought to the scene of an emergency, before or while care is being provided.

Protection Using Procedures and PPE may include:

Low Risk - Minimal to limited moderate exposure (covers the majority of BLS, First Aid, and cleaning situations):

- Hand hygiene, skin exposure hygiene
- Physical awareness, body substance isolation
- PPE - Medical exam gloves or appropriate gloves for cleaning
- PPE - Barrier devices for BLS and/or First Aid care if appropriate

Extra Protection - Items which may be needed when a moderate or higher exposure is anticipated (some First Aid, BLS, decontamination/scene cleaning):

- PPE - Medical exam gloves or appropriate gloves for cleaning
- PPE - Eye Protection with goggles, if appropriate; Face shields if appropriate
- PPE - Respiratory protection, general use masks, medical masks, etc. (exact need variable to conditions at the scene)
- PPE - Apron or gown, with appropriate coverage (variable based on splash exposure)
- PPE - Barrier devices for BLS and/or First Aid care if appropriate
- PPE - Bacterial/Viral filters or HEPA filters for ventilation equipment (if situation requires)

Table 4.2 Proper Glove Removal

1. Pinch the outside of the glove near the wrist.

2. Peel downward and the glove will turn inside out. Secure this glove in your gloved hand.

3. Slide your finger(s) under the wrist of the remaining glove.

4. Peel downward and the glove will turn inside out over top the first glove.

Dispose properly.

Wash your hands & contaminated exposed skin with soap and clean running water or an alcohol based hand sanitizer.

Medical Exam Gloves

Regardless of the type of medical exam gloves you use (non-latex or latex) all gloves have the potential to fail (tear). None have been found to be impermeable to bacteria and viruses. Therefore, handwashing immediately after glove removal is recommended. Because of increased concerns of latex allergies, you are most likely to have non-latex gloves available when providing emergency care. This protects both the first aider and the guests when care is provided.

Lifeguards at an aquatic facility will rarely have an exposure situation that will require more than the previously discussed standard precautions. Occasionally, a lifeguard may need to use components listed for extra protection. If it becomes necessary for you or other employees to use additional precautions due to a particular set of circumstances, your employer will make this known to you, along with any information and training needed to effectively put into use.

It is very unlikely that anyone providing basic life support care (rescue breathing, CPR, etc.) will be exposed to a dangerous pathogen, under normal circumstances and conditions. This includes situations where standard precautions are not taken. It is no more likely to occur than it would during any other close interaction with another person. However, when you take standard precautions, you further reduce the already very small risk. This is especially true when body substances are clearly present at the scene.

The two simple actions you can make to protect yourself when providing First Aid or BLS care:

- Wash or sanitize your hands before and immediately following care.
- Actively maintain physical awareness during care - take deliberate actions where you do not directly touch body substances on or around the person you are helping. You do not touch any part of yourself during care unnecessarily. You do not touch any items unnecessarily.

Lifeguards and other facility employees should always use reasonable care to address hygiene before, during and after providing first aid, BLS care, or any cleaning tasks. Always wash your hands with soap and clean running water (**Figure 4.7**) or use an alcohol-based hand sanitizer (**Figure 4.8**) before putting on and immediately following removal of appropriate PPE. This is an important and easy step to minimize transmission of pathogens that may already be present on your hands before care or present following care.

To properly wash your hands before putting on and after removing PPE:

1. Wet your hands with clean running water. Rinse off any easily removed substance present.
2. Apply soap in an adequate amount to form a lather that covers your fingers, under your fingernails, palms, wrists, and the backs of your hands.
3. Rub your hands and fingers vigorously for at least 20 seconds, covering all surfaces of your hands,fingers, and wrists.
4. Rinse with clean running water. *Repeat steps 1-4, if your hands remain soiled*.
5. Dry thoroughly with a clean single use towel and properly dispose.

Figure 4.7 Wash your hands with soap and clean running water.

If using alcohol based hand sanitizers (60% ethyl alcohol or 70% Isopropyl alcohol), water is not needed. Place an adequate amount of the product in the palm of one of your hands and vigorously rub it over both hands, covering your fingers, under your fingernails, palms, wrists, and the backs of your hands. Continue to do this until your hands become dry. Do not rinse your hands or use a towel to dry them faster as all hand sanitizers need contact time for maximum effect.

Figure 4.8 If soap and clean running water are not available, use an alcohol based hand sanitizer.

For routine hand washing, it is not necessary to use soap with an "anti-microbial" component to be effective, when you are washing your hands as described above. However, your organization may use specialized cleaning products or sanitizers which are available to you for use before and following a specific task. These products may also have a procedure to follow, which may vary from the general guidance provided here. Your employer will clarify for you if this is the case and provide any needed training.

General Guidelines for Using PPE to Prevent Infection

- Follow your PPE training for proper use, including when to use, putting on, taking off, and proper disposal.
- Avoid handling non-care items unnecessarily, such as radios when wearing soiled gloves if possible.
- If you do handle equipment while wearing gloves, make sure you identify it for proper cleaning.
- Do not eat, drink or touch your mouth, nose, or eyes when wearing any PPE or providing care to a guest.
- Change PPE and wash or sanitize your hands before providing care to additional guests.
- Wear protective coverings of the face, eyes and body to avoid blood splatter from serious bleeding or other potentially infectious material, if appropriate.

Your employer will provide you with site specific training and procedures to follow. ***Always follow your training!***

Be aware of what you are touching (and why) at all times while providing care to avoid unnecessary contamination. Understanding your specific role during an emergency will also limit your exposure to what is necessary. Critically, you should always avoid touching your face, especially your mouth, nose, and eyes while wearing gloves or with unwashed hands. Additionally, any portion of your body (bare skin) that may have been exposed during care may need to be washed, especially if the exposed skin is damaged. Finally, if your clothing or uniform was potentially exposed or soiled during care, replacing these with clean clothing or a fresh uniform may further minimize cross contamination. Soiled or contaminated clothing should be properly disposed of or promptly laundered, if possible and appropriate.

If An Exposure Occurs

Disease prevention strategies are designed to minimize the likelihood of an exposure while you are on the job. If you suffer an ***occupational exposure***, follow the guidelines below for immediate care and report the incident according to your facility's ***Exposure Control Plan*** (**Figure 4.9**).

If you suffer an exposure, immediately take the following steps:

1. Clean the contaminated area, including any penetrating injuries involving cuts or punctures thoroughly with soap and water
2. If you are splashed with blood or OPIM around or in your mouth, nose, or eyes, flush the area thoroughly with water
3. Report the exposure incident to your supervisor immediately and to the EMS personnel if they are arriving to take over care of the guest
4. Document with your supervisor what happened. Include the time, date, and circumstances of the exposure as well the immediate actions taken post exposure
5. Seek immediate follow-up care with a qualified health care professional according to your facility's exposure control plan. The evaluation will determine the best course of treatment

Figure 4.9 If you suffer an exposure, report it to your supervisor who will instruct you according to the facility's exposure control plan.

Exposure Control Plan

Your facility is responsible for maintaining an exposure control plan. This written plan outlines protective measures used at your facility to eliminate or minimize exposure incidents. If an exposure does occur, the exposure control plan states how to report the exposure and what to do next. The plan also details how your employer will maintain records according to OSHA requirements. See **Appendix B** for a sample exposure control plan.

FOR YOUR REVIEW

Summary

Bacteria, viruses, parasites, protozoa, and fungi are pathogens which may be present in blood and other bodily fluids. These pathogens can cause various diseases if they infect humans. Bloodborne pathogen examples Hepatitis A, B and C virus and human immunodeficiency virus (HIV). Airborne pathogen examples include tuberculosis, chickenpox, measles, mumps, and COVID-19. For disease transmission to occur, three conditions must be met. The pathogen must be present in adequate quantity to cause disease. A person must be susceptible to the pathogen. And the pathogen must enter the body through an opening such as the eyes, nose, mouth, skin cuts, abrasions, bites, or needlestick puncture. Fungi may infect the skin directly.

The federal Occupational Safety and Health Administration (OSHA) established regulations to protect employees from on-the-job exposure to bloodborne and airborne pathogens and other potentially infectious material (OPIM). The OSHA regulations require your employer to protect you when you are doing your job.

Engineering controls are efforts implemented to minimize disease transmission through workspace design or equipment use. Work practice controls are behaviors (practices) that are required to implement engineering controls.

Standard precautions are standardized safety measures that assume that all bodily fluids may be infectious, so precautions must always be taken. Personal Protective Equipment (PPE) includes gloves, masks, eye protection, and BLS ventilation delivery barriers and devices. Wash or sanitize your hands before and immediately following care. Actively maintain physical awareness during care - take deliberate actions where you do not directly touch body substances on or around the person you are helping. You do not touch any part of yourself during care unnecessarily. You do not touch any items unnecessarily during care. Follow all site-specific training and procedures in place for standard precautions and wearing PPE.

If you suffer an occupational exposure, follow your Exposure Control Plan for reporting the incident to your supervisor and follow-up (post exposure) evaluation. Your employer is required to provide you with a written exposure control plan. This plan outlines the protective measures that will be used at your facility to minimize or eliminate exposure incidents as well as what to do if an exposure occurs.

Key Terms

- → Acute Respiratory Distress Syndrome (ARDS)
- → Airborne precautions
- → Airborne pathogens standard
- → Bloodborne pathogens standard
- → Engineering controls
- → Exposure control plan
- → Occupational exposure
- → Occupational Safety and Health Administration (OSHA)
- → Other Potentially Infectious Material (OPIM)
- → Pathogen
- → Personal Protective Equipment (PPE)
- → SARS-CoV-2
- → Standard precautions
- → Work practice controls

Chapter 5
GUEST SAFETY

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Understand how rules and regulations are created to keep guests safe
- Name common rules in aquatics facilities
- Recognize why attraction restrictions exist
- Identify risky behaviors that lead to shallow water blackout
- Describe secondary drowning
- Describe how to properly select and wear a life jacket

Chapter Overview

→ Health Codes, Laws and Standards
→ Rule Enforcement
→ Shallow Water Blackout
→ Secondary Drowning
→ Life Jackets
→ For Your Review

Health Codes, Laws And Standards

Health codes, laws, and standards exist to provide direction and guidelines for how to best design, and safely operate aquatic facilities. Your facility's management personnel are responsible for knowing the industry standards that apply to the facility in which you work. They are also responsible for establishing operating procedures and policies that adhere to the codes, laws and standards. Your job as a lifeguard is to enforce all the procedures and rules established by management to keep your guests safe **(Figure 5.1).**

Here are some examples of the codes, laws, and standards that provide safe operating guidance:

- Model Aquatic Health Code
- Local or State Swimming Pool Codes and Regulations
- American Society for Testing and Standards (now ASTM International)
- Manufacturer Manuals

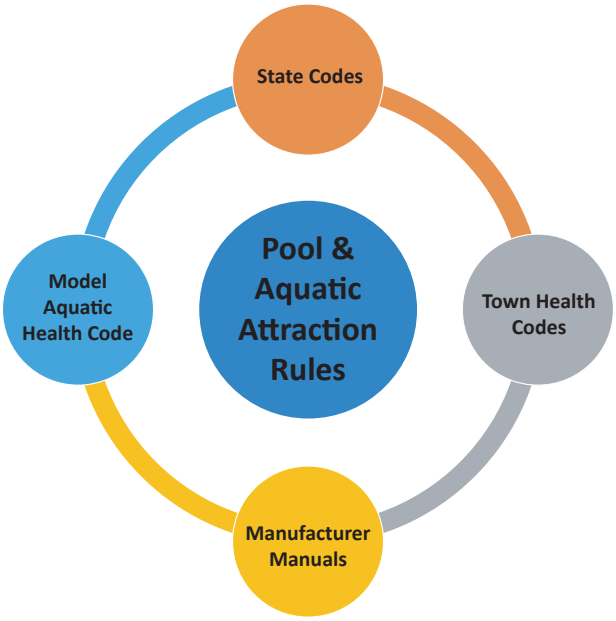


Figure 5.1 Health codes, laws and standards are used to create facility rules and regulations.

Model Aquatic Health Code

The ***Model Aquatic Health Code (MAHC)*** is a voluntary guidance document based on science and best practices. It helps local and state authorities and aquatics facilities to provide healthy and safe swimming and other water activities.

States and localities can use the MAHC to create or update existing pool codes to reduce risk for outbreaks, drowning, and pool-chemical injuries. **(Figure 5.2).**

Figure 5.2 MAHC guidelines address the design, construction, operation, maintenance, policies, and management of public aquatic facilities.

Local & State Swimming Pool Codes and Regulations

Most states or towns and municipalities have public swimming pool regulations. The regulations are enforced by the local Health Department. These regulations typically list the type of lifeguard training requirements needed to work in a facility, facility design elements and equipment, how to handle bio-spills and RWIs, and acceptable water chemistry requirements for operation.

ASTM International

The American Society of Testing and Materials International provides a set of industry standards that provide guidance for amusement devices. There are specific standards for maintenance and operation for aquatic facilities operating water slides, and water tree house attraction elements. These standards offer facility management guidance on how to operate in accordance with the builder/manufacture of the aquatic play attraction.

Operations and Maintenance Manual

The manual that comes from the builder of the attraction is known as the Original Equipment Manufacturers Operations and Maintenance Manual. Manuals such as these typically provide direction on how to operate, maintain, and repair the attraction. They provide recommended restrictions or limitations for attractions like water slides. These manuals also provide Information on when to dispatch (send) riders on the slide, how riders should participate on the slide, and what information should be placed on signage to describe the ride.

Company Procedures

Company procedures are developed based on codes, laws, and standards. A company with multiple beaches, pools, waterparks, and resorts will likely want all its properties to operate consistently. Sometimes they will select laws, codes and procedures that are the most stringent in one location and apply that standard to all their properties to ensure consistency.

Rule Enforcement

Each facility has its own set of rules designed to keep guests safe and prevent injuries. Your job is to know those rules, enforce them consistently, and follow them responsibly. When on duty, you will set the example for your guests to follow while at your facility **(Figure 5.3).**

Figure 5.3 When you enforce your facility rules and procedures, you are acting professionally and keeping your guests safe.

Enforcing rules may sometimes seem difficult because guests are visiting your facility to have fun. Just remember that enforcing a rule is for the guest's safety. Some of the more common rules found in aquatic facilities include:

- Proper swim wear required in pool
- Walk, no running
- No diving
- Obey lifeguards at all times
- No glass on the pool deck
- Supervise children at all times
- Please shower before entering the water

Rules should be posted in locations that are visible to all guests. Posted rules support you when you enforce them. Whenever you must enforce a rule, do so in a positive manner. Explaining why a specific rule exists can help guests understand the important safety reason for the rule and improve their experience.

When it Comes to Policies and Rules, Get in the *Know*

- Your facility policies, general rules and attraction specific rules
- Where policies and rules are posted
- Why policies and rules exist
- How to explain policies and rules to guests
- How policies and rules support positive guest interactions

Special Attraction Rules and Restrictions

Your facility has operational rules for the safe use of the attraction by guests, including water slides, tree house structures, diving boards, and surfing attractions. These rules can refer to the size and weight of the guests and rider configuration. If you are working at one of these types of aquatic attractions, your facility supervisors should provide you with specific attraction training.

Examples of restrictions include:

- No weak swimmers in deep water
- Children and weak swimmers must wear a life jacket
- No swimmers in the lazy river without a tube

Shallow Water Blackout

Sometimes guests play games in the water to see who can hold their breath the longest while submerged. They may breathe rapidly (hyperventilate) in preparation for this challenge. This practice of hyperventilating and then seeing how far or deep they can swim underwater is dangerous because it can lead to loss of consciousness while submerged. You should discourage the practice of hyperventilating and "breath-holding" activities where guests spend long amounts of time underwater **(Figure5.4).**

Figure 5.4 Lifeguards should monitor their zone for children playing breath-holding games to prevent shallow water blackout.

This potentially life-threatening condition is known as ***Shallow Water Blackout.*** This blackout results from reduced oxygen supplied to the brain. Breathing is normally triggered by the elevation of carbon dioxide (CO_2). Hyperventilating before submerging reduces the automatic response to breathe. As oxygen (O_2) is depleted, the guest can suddenly faint without feeling the need to breathe.

Secondary Drowning

Secondary drowning is sometimes called "delayed drowning," or "silent drowning." It is a type of drowning that occurs following a submersion incident in which the guest appears fine at first but within 24 hours shows signs of drowning. Secondary drowning happens when some water is inhaled into the lungs.

The signs of secondary drowning can include:

- Difficulty breathing
- Persistent coughing
- Froth (foam/fluid) from the nose or mouth
- Choking as if drinking water that "went down the wrong tube"
- Diminished consciousness
- Anxiety
- Extreme fatigue
- Pale/bluish/gray lips and fingers
- Chest pain
- Vomiting

If you suspect a secondary drowning, don't hesitate. Immediately call Emergency Medical Services (EMS). Monitor the guest and be ready to provide BLS care if needed.

Life Jackets

Drowning incidents among guests that are weak or non-swimmers can be prevented by using ***life jackets.*** A properly fitted and worn life jacket can keep a guest's head above the water surface. Life jackets should be U.S. Coast Guard approved and in good condition. The U.S. Coast Guard label is printed directly onto the flotation device. The most common life jacket facilities provide their guests has a Type II label. The inside of the life jacket lists sizes by weight load for each type **(Figure 5.5).**

Figure 5.5 Keep life jackets on display so guests see them available.

While some facilities may have policies allowing the use of inflatable swim aids such as water wings, these are not reliable flotation devices and are not U.S. Coast Guard approved. Be on the lookout for guests who are weak or non-swimmers. Request that they wear a life jacket as this is an established safety practice. Facilities often have life jackets available for guests. The best life jacket is the one that is properly fitted and always worn. You will need to learn how to fit a guest with a life jacket. Always enforce your facility's policy on life jackets and other personal flotation devices **(Figure 5.6).**

Figure 5.6 Lifeguards should assist guests with properly fitting and fastening their life jackets.

Life Jacket Inspections

Life jackets should be inspected daily for normal wear and tear and cleanliness. Life jackets that show damage should be removed from use. Look for holes, tears, and broken buckles or clips when checking a life jacket. Life jackets should be stored in a place that allows them to dry out when not in use yet still be visible for guests. If there is a smell of mildew, or signs of water logging, the life jacket should be removed.

Life jackets, Finding the Right Fit

A properly fitted life jacket:

- Fits snugly but comfortably to allow for the guest's arm movement without restricting breathing
- Does not allow a child's chin and ears to slip through
- Is tested out by the guest in shallow water to verify the guest's mouth does not slip below the water's surface
- Has all buckles connected

FOR YOUR REVIEW

Summary

There are numerous resources available that are used to create rules to keep aquatic facilities safe. Your facility manager is responsible for knowing these resources and applying them to create the rules at your facility. As a lifeguard employed at the facility, you are responsible for consistently enforcing the rules. Your facility should provide you with the standard operating procedures for any unique attractions at your facility during your pre-service training.

Every facility has some degree of operational risk. Understanding the risks associated with attractions at your facility is one of the ways you will keep your guests safe. Shallow water blackout is a risk that lifeguards should know about and try to prevent. Shallow water blackout is an underwater "faint" due to the lack of oxygen to the brain brought on by holding one's breath for long periods of time. Without immediate rescue, a guest that has lost consciousness can quickly drown. You can reduce or eliminate the danger of shallow water blackout by monitoring your zone and addressing behaviors that lead to this life-threatening risk as soon you observe them. Prevent swimmers from playing breath-holding games and or spending long lengths of time on the bottom of pool.

Another risk you should understand is secondary drowning, which can happen after a guest suffers a submersion incident. The guest might feel fine at first, but then begins to show drowning signs later. If you suspect a secondary drowning, immediately call Emergency Medical Services. Do not wait.

You can keep guests safe in and around the water by having U.S. Coast Guard approved life jackets available for them. Be sure to inspect the life jackets daily to ensure they are in good condition and clean. Make sure guests are wearing them properly and help any guest that needs assistance with proper fitting.

Key Terms

→ Life jackets
→ Model Aquatic Health Code (MAHC)
→ Secondary drowning
→ Shallow water blackout

Chapter 6
ZONE OF PROTECTION®

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Define the 10/20 Protection™ standard
- Explain how the 10/20 Protection™ standard relates to Zone of Protection area's size
- Describe how lifeguard Zone of Protection® areas are created at an aquatic facility
- Describe what you will do if you have a concern about a guest within a Zone of Protection® area while on duty
- Describe what you will do if you are unable to see part of your Zone of Protection® area
- Describe how Zone of Protection® documentation aids in your pre-service training

Chapter Overview

→ The 10/20 Protection™ standard
→ Lifeguard Zone of Protection® areas
→ Zone Documentation and Training
→ For Your Review

The 10/20 Protection™ Standard

The ***10/20 Protection™ standard*** is a guiding principle that is followed when on duty. Following this standard means that from your duty station, you are able to scan your ***Zone of Protection® area*** within 10 seconds. If a guest in distress is recognized, you activate your EAP and safely reach the guest in distress within 20 seconds.

The 10/20 Protection™ standard helps lifeguards monitor their assigned Zone of Protection® area while remaining in an optimal position for a quick response to any incident. Those first 30 seconds that the guest is in distress, is when the lifeguard on duty can have the most impact. Diligently maintaining the 10/20 Protection™ standard saves lives! **(Figure 6.1).**

Figure 6.1 You can prevent drowning incidents when you diligently maintain the 10/20 Protection™ standard consistently at assigned Zone of Protection® areas.

Lifeguard Zone of Protection® areas

Each duty station has an assigned, three-dimensional section of pool/attraction to carefully monitor, including the bottom, the volume of water below the surface, and the surface of the water. Combined, this is known as a Zone of Protection® area and may be referred to as a "zone" informally. Each Zone of Protection® area should be consistent with the 10/20 Protection™ standard. This means that its size, configuration, and the duty station location must allow for its entirety to be scanned within 10 seconds and all points within it reached in 20 seconds.

Your assigned Zone of Protection® area becomes your primary focus once you assume responsibility for it. You will remain responsible for it until you are relieved of that duty by another lifeguard, following a lifeguard rotation. Once the rotation is complete, you promptly move on to your next assigned Zone of Protection® area, which in turn becomes your primary focus, once you assume responsibility for it. Each Zone of Protection® area at your aquatic facility will have unique characteristics that may require you to adapt your actions or behaviors to maintain the 10/20 Protection™ standard.

Lifeguards at your facility learn about each Zone of Protection® area during site-specific, pre-service training. This training will help you and others on your team apply the skills learned during this course, to each unique environment at your aquatic facility.

During the pre-service training, ***Zone Coverage®*** at your facility will be discussed. Some pools or attractions at your facility may consist of a single Zone of Protection® area while others will have multiple Zone of Protection® areas. When two or more zones are set up, the assigned areas overlap so that no area is left unprotected when a team of lifeguards is working together (**Figure 6.2**). How these overlap with each other and work together is important to understand.

Figure 6.2 During pre-service training, you will learn about each Zone of Protection® area at the aquatic facility including overlapping coverage with other zones.

Creating Lifeguard Zone of Protection® areas

Zone Coverage® is depicted in a ***Zone Coverage® diagram*** **(Figure 6.3)**. In addition to Zone Coverage® diagrams graphic drawings, illustrations, or photographs are used by your aquatic facility within each ***Zone of Protection® area document***.

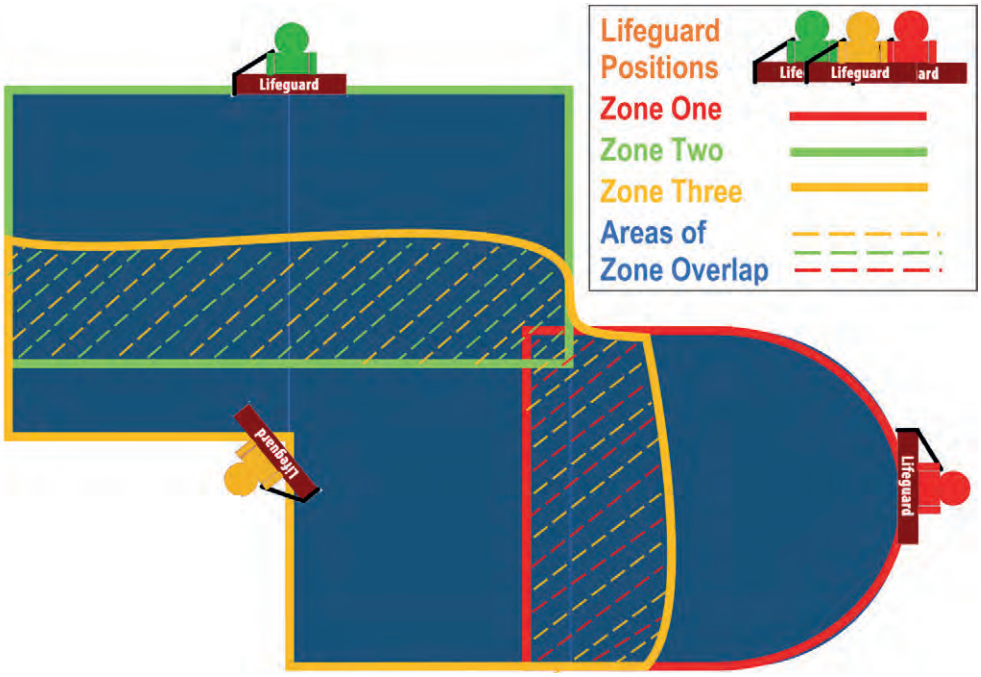


Figure 6.3 A Zone Coverage® diagram shows all zones and their overlapping areas at an aquatic attraction or pool.

Before making Zone of Protection® area documentation, your supervisor(s) should verify that each planned Zone of Protection® area is consistent with the 10/20 Protection™ standard. This is accomplished by using the Zone Validation® system. Any issues found during this process are addressed before the Zone of Protection® area being evaluated is finalized. This task is typically completed before the operational season or annually, as well as periodically throughout the season or year (to account for changes in guests, features, weather, sun, unique situations, and other possibilities). If adjustments are needed, they are made and Zone of Protection® area documentation is updated to match.

Concerns Within Your Zone of Protection® area

Chapters 7 and 8 will further expand on how to recognize a guest in distress and maintain optimal vigilance. However, from time to time you may be unsure about a situation within your Zone of Protection® area, such as not knowing if a guest may need help or you may think you saw something unusual below the surface. Treat these and any other moments of uncertainty about the condition of a guest as an emergency. Activate the EAP and respond immediately. When in doubt, always check it out by responding and confirming what it is. In other words, "if you don't know, go!"

IF YOU DON'T KNOW, GO!

Uncertainty or concern with the Zone of Protection® area itself may occur from time-to-time. You may be having difficulty seeing a particular location or the bottom clearly. Perhaps something unusual happens that makes maintaining the 10/20 Protection™ standard difficult. If something like this happens, do not hesitate to notify your supervisor immediately.

Some examples of situations that may impact your scanning ability or adequately see all parts of your Zone of Protection® area include:

- Water cloudiness, clarity; hard or persistent rain
- Sun glare, reflections, shadows
- A sudden influx of guests; opening of a feature
- Activities or objects in the water are creating an obstruction
- There is an issue with your sunglasses
- Issues with an umbrella or other equipment
- You are suddenly ill and need to be rotated down

Figure 6.4 If you are ever unable to see your entire assigned zone, contact your supervisor immediately.

For all these issues and any others that may occur, your supervisor can help determine how to provide protection within the standard (**Figure 6.4**). The faster you ask for help, the faster you will receive it! If the 10/20 Protection™ standard cannot be maintained, adjustments need to be made to accommodate. If there are no immediate solutions available, the activity should be closed and the water cleared of guests. Once the situation changes, normal activities can resume.

Zone of Protection® Documentation & Training

During pre-service training focusing on site-specific Zone of Protection® areas, you will learn about and discuss each Zone of Protection® area at your aquatic facility, to which you may be assigned as a lifeguard on duty. During this training, your supervisor(s) will plan appropriate activities at each Zone of Protection® area. In addition, some examples of documentation and other items that may be covered are provided below:

- Review all ***Zone of Protection® area documentation*** illustrating your surveillance responsibilities at each location (**Figure 6.5**). These should also be posted to allow you to review before assignment. Other documentation:
  - Zone Coverage® diagram(s) illustrating each Zone of Protection® area within a particular attraction or pool and how these overlap and work together.
  - ***Zone Validation® system documents*** created for each Zone of Protection® area at the aquatic facility following the Zone Validation® system process.
- Discuss the unique physical characteristics of each Zone of Protection® area for various times of day,programming, capacities, etc.

Figure 6.5 Each duty station should have a clearly identified zone.

- Discuss factors at each duty station that may impact the 10/20 Protection™ standard as well as how to mitigate those factors through specific behaviors as established through the Zone Validation® system process. Related to this, discuss any required actions or adjustments at each location and the acceptable ways for you to position yourself at each duty station or roving area.
- Review and confirm your understanding of the specific rules and policies that must be maintained while you and other lifeguards are on duty at each pool/attraction or specific Zone of Protection® area.

Always ask questions and confirm your understanding during training or afterward as needed. Your supervisor(s) may repeat this training for all or certain Zone of Protection® areas for you or the whole lifeguard team during in-service training, if they deem it necessary or as part of on-going training.

Changes may occur to one or several Zone of Protection® areas during the year or operational season. This may result in adjusted Zone of Protection® areas and/or changes to behaviors expected of lifeguards when assigned to these locations. This should be reviewed with you before being assigned to affected Zone of Protection® areas. If something changes due to a special event, your supervisor(s) should have a plan for appropriate adjustments to the affected the Zone of Protection® areas, including how each is to be managed, along with supporting zone documentation.

FOR YOUR REVIEW

Summary

The 10/20 Protection™ standard is a standard of care that lifeguards follow when scanning their assigned Zone of Protection® area. This two-faceted method reduces deaths resulting from drowning incidents by establishing simple and reasonable benchmarks for the recognition and reaching a guest in distress within a Zone of Protection® area. Specifically, a lifeguard must scan their entire assigned Zone of Protection® area in a manner that allows the recognition of a guest in distress within 10 seconds and reaching the guest in distress within 20 seconds and rendering aid. This means that each Zone of Protection® area's size, configuration, and the duty station location must allow for its entirety to be scanned within 10 seconds and all points within it reached in 20 seconds.

Zone of Protection® areas are created by supervisor(s) at your aquatic facility, consistent with the 10/20 Protection™ standard, through the use of the Zone Validation® system. Once created, your supervisor(s) should conduct a pre-service training session for each lifeguard before working. Your main objective during this training will be to thoroughly learn each Zone of Protection® area and how to best maintain the 10/20 Protection™ standard at each location.

Part of your pre-service training involves how multiple Zone of Protection® areas work together. Many pools and attractions will have two or more Zone of Protection® areas. These overlap so that no area is left unprotected when a team of lifeguards is working together. This also allows lifeguards to provide supporting coverage. This is referred to as Zone Coverage®.

During the pre-service training, your supervisor(s) will reference various documents that describe each Zone of Protection area, areas of overlapping coverage, and support the Zone Validation® system in place. These are:

- Zone of Protection® area documents, which describe and graphically depict each aquatic area requiring 10/20 Protection™ standard lifeguard surveillance and other appropriate details for the location.
- Zone Validation® system documents which graphically depict the process of validating each Zone of Protection® area as well as the behaviors or actions needed to be performed by lifeguards.
- Zone Coverage® diagrams show each Zone of Protection® area for an entire attraction or pool and how these interact with one another.

You are always accountable for maintaining the 10/20 Protection™ standard when at your assigned Zone of Protection® area, until relieved by another lifeguard. If you think you see something in the water and you are not sure what to do, activate your EAP, enter the water and check it out. If you do not know, GO!

If you are ever uncertain about your assigned Zone of Protection® area or are having difficulty maintaining the 10/20 Protection™ standard or seeing all areas within, do not hesitate to notify your supervisor immediately. Your supervisor can help determine how to provide protection within the standard. The activity should be closed and guests cleared from the water if it is determined that the 10/20 Protection™ standard cannot be maintained.

Key Terms

→ 10/20 Protection™ standard
→ Zone Coverage®
→ Zone Coverage® diagram
→ Zone of Protection® area
→ Zone of Protection® area documentation
→ Zone Validation® system
→ Zone Validation® system document

Chapter 7
SURVEILLANCE

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Identify a guest in distress
- Describe the drowning process
- Define proactive scanning
- List different scanning strategies

Chapter Overview

Introduction

Your primary duty as a lifeguard is to maintain the 10/20 Protection™ standard which holds you accountable for the safety of guests in your zone. To meet this duty you must remain alert and your skills must be at a "test-ready" level to respond appropriately. In order to do your job effectively, you must know what to look for when you're scanning. This means knowing what a guest in distress looks like and what behaviors distressed guests exhibit. In this section, you will learn how to recognize a guest in distress and gain an understanding of what a guest experiences when actively drowning.

Recognizing A Guest In Distress

A ***guest in distress*** is someone who needs immediate assistance. The guest will either be ***actively drowning*** or ***passively drowning***, and located in one of these areas:

- On the surface
- Below the surface, within arm's reach
- Below the surface, beyond arm's reach

Characteristics of Active (Responsive) Guests in Distress

Most responsive distressed guests exhibit similar behaviors and characteristics when struggling in the water. You should be aware of the body position, movement, facial expression, and breathing effort of guests in distress. The body position is typically vertical in the water with arms extended as if reaching for something to grab onto for support. There is minimal leg movement or kicking and little or no forward progress being made. These guests have a look of panic or fear on their faces. Their eyes may be closed or wide open, as if they are surprised to find themselves struggling in the water. Their heads may be tilted back to keep water out of their mouths. They rarely call out for help because all their efforts are focused on keeping their mouths above the surface in order to breathe **(Figure 7.1).**

Figure 7.1a Active guests in distress will be vertical in the water with ineffective leg and arm movements.

Figure 7.1b Active guests in distress may have their heads tilted back as they struggle to keep their mouths above the surface of the water.

Active (Responsive) Drowning Characteristics

Body Positioning & Movement

- Body is in a vertical position
- Arms are extended as if they are reaching to grab something
- Little to no leg movement or kicking
- Little to no forward movement

Facial Appearance & Breathing

- Facial expression of fear/panic
- Eyes may be open or closed
- Head tilted back to keep the mouth above the water surface to breathe

Characteristics of Passive (Unresponsive) Guests in Distress

There are times when conditions may impact your ability to immediately recognize a guest in distress. Conditions that might make it difficult for you to clearly see objects below the surface include an overly crowded pool, water turbidity (cloudiness), and glare from the sun. A submerged guest may look like a blurred spot or an object, such as piece of clothing. Passive guests are those who have lost consciousness.

An unresponsive guest may be seen bobbing or floating at the surface or submerged. If you notice something below the water surface and cannot quickly identify it, activate your Emergency Action Plan (EAP), and enter the water to determine what it is **(Figure 7.2).** Again, if you don't know, go!

Figure 7.2 Passive guests in distress may be seen bobbing or floating at the surface or submerged.

Table 7.1 General In-water Emergencies: Who, Where, and When?

Guest Types	Locations	Special Times
Unattended children under age 14	Water less than 5 feet (1.5 meters) deep	12:00 P.M. to 4:00 P.M.
Weak or non-swimmers not wearing a life jacket or wearing it improperly	Children's activity pools	Low attendance days
Adults under the influence of alcohol or other drugs	Slide catch pools	High attendance days
Guests with medical conditions prone to sudden illness	Wave pools	Special event days
	Traditional lap pools	Special programming periods
	Lazy Rivers	

Recognizing Risk Factors

Everyone who visits an aquatic facility is at risk. But looking at statistics helps us understand who the higher risk guests are, pool locations where a higher number of rescues are made, and time of day and holidays when a greater frequency of water rescues occur. See **Table 7.1** on the previous page for more detail.

The Drowning Process

Your ability to recognize a guest in distress and quickly respond can be the difference between life and death for the guest. Understanding the drowning process can enable you to better appreciate the critical importance of the 10/20 Protection™ standard.

The primary stages that make up the Drowning Process are summarized as follows:

- **Surprise** - Something happens to the guest that causes them to be in distress.
- **Respiratory Arrest** - The guest is unable to remain on the surface and therefore breath.
- **Unconsciousness** - Not taking in oxygen combined with the struggle will result in unconsciousness.
- **Hypoxic Convulsions** - Agonal responses to low oxygen levels in the body may result in convulsions.
- **Cardiac Arrest** - The heart is unable to properly function due to low oxygen levels.
- **Death** - If the guest is not rescued before cardiac arrest or shortly following it, death is increasingly likely.

At any moment, a typical guest can be seen enjoying the water. Suddenly, something unexpected occurs putting the guest in distress. This is the moment the drowning process begins. This unexpected “surprise” results in panic in the water. The guest instinctively struggles to keep their face (airway) above the water surface in order to breathe.

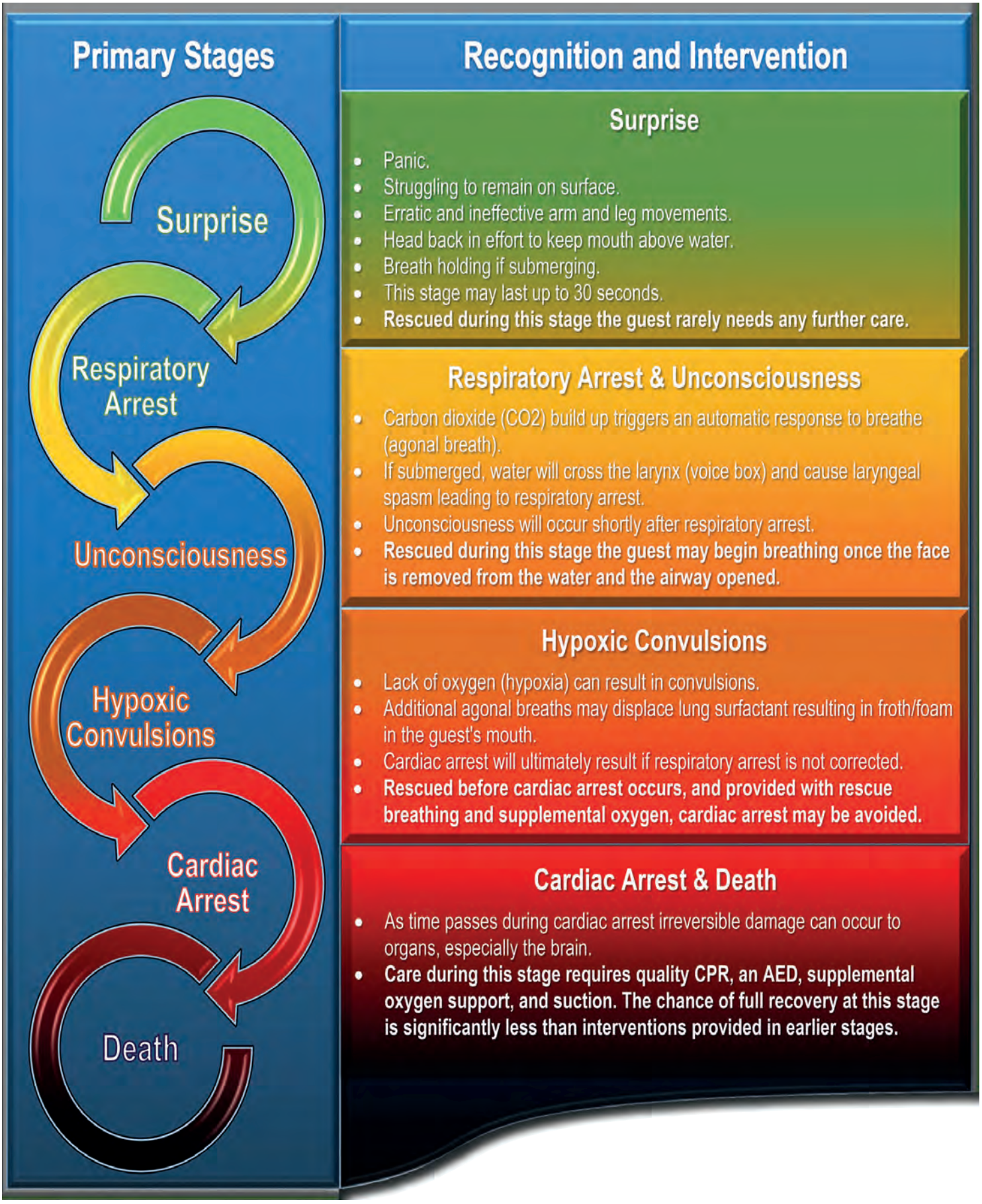
During this struggle, water can enter the airway and may cause the larynx to spasm (laryngospasm). This spasm is a protective mechanism to keep water out of the airway. Unfortunately, it keeps oxygen out as well. Alternatively, the guest may simply be unable to keep their head above water and may be deliberately holding their breath as a result. This “breath-holding” will eventually cause the guest to lose consciousness. With loss of consciousness, the guest will go limp in the water and may submerge. As the larynx spasm relaxes and as carbon dioxide levels in the body build, involuntary breaths may occur causing water to enter the lungs.

Regardless of how it occurs, when the guest is in respiratory arrest, the situation will become increasingly dire as time passes without rescue. Without oxygen, the guest’s heart cannot continue to function, and cardiac arrest will occur. When cardiac arrest occurs, the process of biological death will begin. With each passing second, organs will begin to fail and the brain will suffer damage. The longer the guest remains in cardiac arrest, the lower the chances of effectively resuscitating the guest. See **Table 7.2** on the next page for more information.

The time span for the drowning process to occur varies from seconds to minutes. Children may move through the drowning process quicker than adults. A child may appear to be bobbing in the water but is in distress. If you observe a child showing the slightest indication of distress, you need to respond immediately. Drownings (active or passive) can be caused by various medical conditions or special situations including heart attack, seizure, stroke, diabetic emergencies, head injury, shallow water blackout or substance abuse.

Guests that suffer a drowning incident need advanced life support from Emergency Medical Services (EMS) personnel as quickly as possible following rescue. Be sure that 9-1-1 has been called and begin basic life support (CPR/AED/supplemental oxygen). Lifeguards continue care, until EMS personnel arrive and take over care. Unfortunately, a guest who suffers from a drowning incident may die even when the best emergency care is provided. This is why the 10/20 Protection™ standard is so critical. You must always remain vigilant and respond immediately when you see a guest in distress before that guest becomes a victim of drowning.

Table 7.2 The Drowning Process



Proactive Scanning Strategies

Understanding your zone and being able to recognize a guest in distress is critical for lifeguard surveillance. Knowing how to effectively scan your Zone of Protection® area (and consistently doing it) is key to your success as a lifeguard. Consider the following:

- ***Proactively scanning*** is the consistent search of your entire assigned Zone of Protection® area, diligently performed over 10 seconds. Scanning is ongoing while on duty, stopping only when:
  - Properly relieved by another lifeguard (completed rotation).
  - Following your communication to another lifeguard to temporarily "cover your zone" and their acknowledgment that they now have responsibility for the zone.
  - If an in-water rescue needs to be made (EAP is activated and you enter the water).
  - The pool/zone is cleared of guests and closed (surveillance continues until the water is cleared).
- You are proactively scanning for guests in distress, looking at all depths of the water, starting at the bottom, through the middle, and surface of the Zone of Protection® area.
- You are searching the extreme areas of your zone and everything in between. When you are proactively scanning, you are actively "hunting" the water, often physically moving to see everything, and adjusting your body posture to search through all depths of water in the zone.
- If you are working in an elevated location, you may need to physically adjust your body position and head/eye movements so that you can clearly see along the walls and edges in your zone **(Table 7.3).**
- If you are unable to proactively scan and maintain the 10/20 Protection™ standard at your Zone of Protection® area, you should immediately communicate this to your supervisor.

Table 7.3 Proactive Scanning

Proactive scanning is:	Proactive scanning is NOT:
Concentrating on your zone	Taking your eyes off your zone
Observing guests	Allowing social distractions while on stand
Searching all depths of water	Having extended conversations that interfere with your ability to maintain the 10/20 Protection™ standard
Searching the extreme areas	
Physically moving to see all activity in your zone	
Using a searching pattern(s)	Sitting back in a chair without viewing the area beneath your feet
Facing your zone with your body when roving	
Actively using strategies to minimize distractions	Remaining stationary when your zone requires you to rove

Proactive Scanning

There are numerous scanning patterns that can help you maintain the 10/20 Protection™ standard. The most common involve sweeping movements forward, backward, and sideways **(Figure 7.3).** You determine which scanning patterns work best for you.

Scan your Zone of Protection® area from the bottom to the surface. You need to be able to see all depths and all areas in your assigned zone as you scan. Although there may be many types of activities, programming, and events that take place in your facility that may prove distracting, your duty is to keep your guests safe **(Figure 7.4).**

Figure 7.3 Use several scanning patterns and change your position frequently to stay alert.

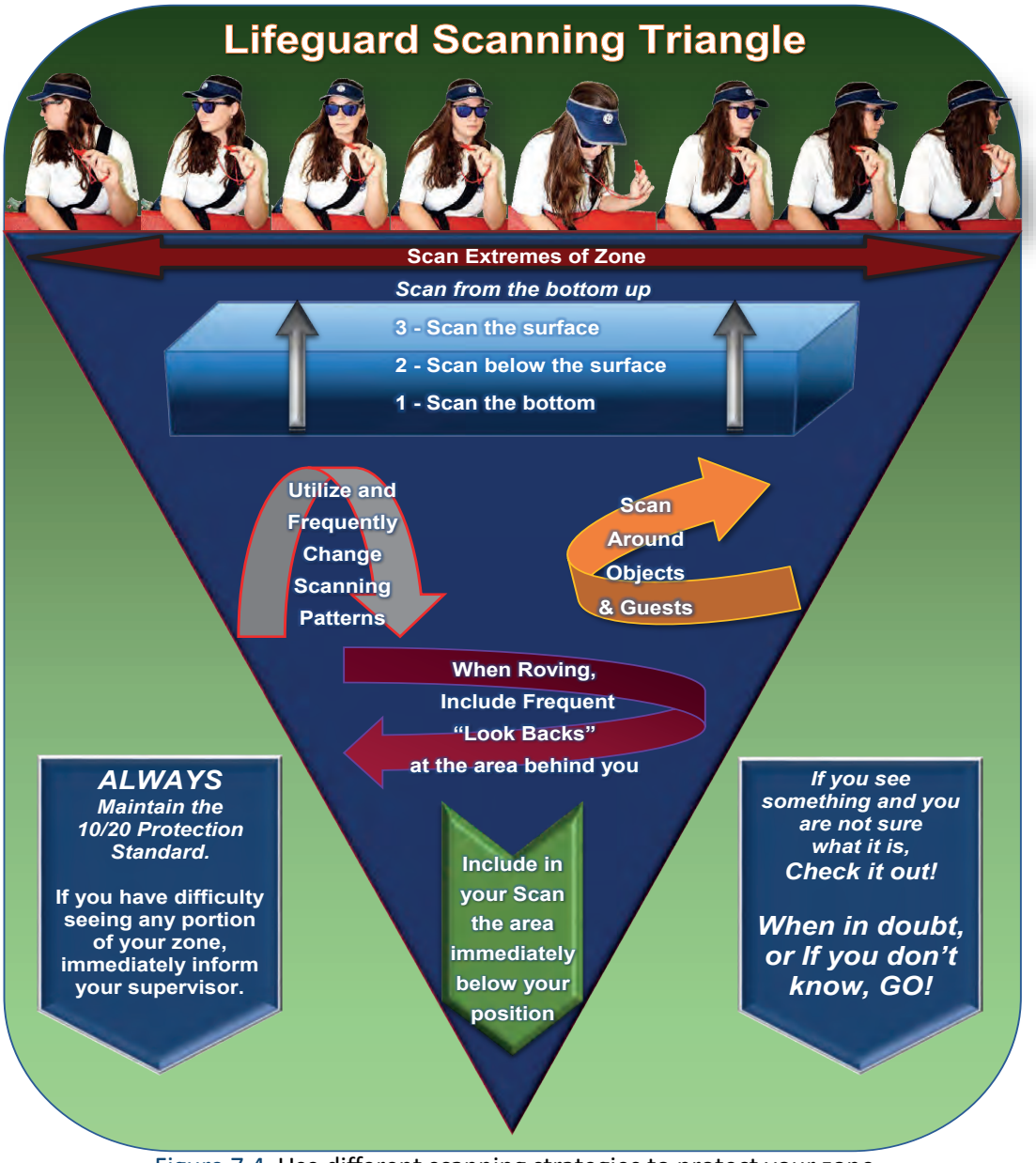


Figure 7.4 Use different scanning strategies to protect your zone.

FOR YOUR REVIEW

Summary

Your primary duty as a lifeguard is to maintain the 10/20 Protection™ standard which holds you accountable for the safety of guests in your zone. To do this adequately, you must be vigilant and at a “test-ready” skill level to respond at all times.

Active guests in distress are normally vertical in the water, with head tilted back on the surface to keep water from entering the mouth. Guests will have a look of “surprise” or fear on their face and will begin to panic. There will be little or no forward progress as leg and arm motion is erratic and ineffective.

The drowning process is a sequence of events that includes surprise, respiratory arrest, unconsciousness, convulsions, cardiac arrest, and death. If rescued promptly, the guest in distress will not progress through these stages. As time passes and the guest becomes submerged, the body is deprived of oxygen long enough to result in cardiac arrest, organ failure, and eventually brain death.

Scanning is proactively searching your entire assigned zone every 10 seconds for guests in distress, looking at all depths of the water including the bottom, middle and surface area.

Scanning is the visual technique for observing guests. While scanning, you should actively search your zone observing guest behaviors to recognize when a guest is in distress and in need of help. When you are proactively scanning, you are looking everywhere in your zone, actively moving to see everything, and adjusting your body posture when necessary to see your area. There are different scanning strategies and patterns available to use that will enable you to cover your entire zone effectively. Choose the method that works best for you.

Key Terms

- → Active drowning
- → Guest in distress
- → Passive drowning
- → Proactive scanning

Chapter 8
MAINTAINING VIGILANCE

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Define lifeguard vigilance
- Explain how to rotate lifeguard stations
- Describe how to perform a proactive bottom scan
- Identify challenges to vigilance and how to overcome each
- Recognize how distractions impact vigilance
- List ways to improve vigilance

Chapter Overview

Vigilance

Vigilance is being alert, attentive and always prepared to react while on watch. Vigilance is a proactive strategy applied to protect guests. Your duty as a lifeguard requires you to be vigilant so that you are ready to address potential problems before they escalate. Vigilance is critical when applying the 10/20 Protection™ standard while on duty, including during lifeguard station rotations.

Lifeguard Station Rotations

Some lifeguard duty positions are in elevated stands while others are walking (roving) positions Lifeguards rotate stations throughout the day. A lifeguard ***station rotation*** occurs when one lifeguard assumes the responsibilities from another lifeguard. During your shift, you may be asked to work at several different duty stations. Your supervisor will determine a rotation schedule that meets the needs of your facility. Rotation frequency will depend on how many attractions are open, the number of lifeguards on duty, and the number of 10/20 and non 10/20 duty stations. Moving from one duty station to another may seem simple, but it is a period of increased risk for guests due to its potential impact on lifeguard vigilance **(Figure 8.1).** Moving you from one location to another frequently provides a needed break from constant scanning. When rotating lifeguard stations, you will:

Figure 8.1 Your supervisor will establish the daily rotation schedule for all lifeguards

- Ensure that the 10/20 Protection™ standard is always maintained
- Avoid distractions that may prevent you from recognizing a guest in distress
- Be ready to react to any guest situation
- Perform a proactive bottom scan of your zone

Proactive Bottom Scan

A ***Proactive Bottom Scan*** is conducted prior to accepting and also when exiting zone of protection responsibilities. This scan is a careful check of the bottom of the zone that is already being protected by another lifeguard. You will need to check all areas of your zone including the top, middle and bottom of the water, corners, zone edges and around objects and features. You are confirming that the zone is free of any guests in distress before you assume responsibility for the zone and the current lifeguard leaves the position. Whenever you are preparing to rotate out of the zone, you will repeat the scan verifying that the bottom is clear before transferring the zone to the incoming lifeguard. When performing a Proactive Bottom Scan, you will communicate using verbal and hand signals to the lifeguard you are rotating with acknowledging that the zone is clear **(Figure 8.2).**

Figure 8.2 Lifeguards complete a proactive bottom scan and communicate with each other as part of duty station rotations.

Guest Safety During Station Rotations

It is important that the 10/20 Protection™ standard is maintained during lifeguard station rotations. Follow these steps during rotations:

1. The incoming lifeguard conducts a Proactive Bottom Scan confirming the zone is clear of any guests in distress and communicates this information to the on-duty lifeguard
2. Equipment, such as the rescue tube, is exchanged (if necessary)
3. The incoming lifeguard assumes the on-duty position and both lifeguards watch the zone
4. The outgoing lifeguard conducts a Proactive Bottom Scan and communicates "all is okay"" before leaving
5. The new on-duty lifeguard is in control of the lifeguard station until the next lifeguard rotation

See **Table 8.1** for more detailed information on lifeguard station rotations

Challenges To Vigilance

Be aware of several challenges that can prevent you from being able to maintain optimal vigilance. These include:

- Monotony
- Environmental conditions
- Glare on the water
- Attraction features
- Facility attendance extremes
- Facility programming
- Water turbidity

There are several practices you can use to overcome challenges and remain vigilant:

- The ***five minute scanning strategy®*** – The five-minute strategy involves changing your posture every five (5) minutes to stay alert. You might move from a sitting position to a standing or roving position **(Figure 8.3).**
- ***Station Rotations*** – Rotations necessary to provide lifeguards with a break from constant scanning
- ***Rotational task balance*** – Rotational task balance involves alternating your primary duty to watch your zone with other activities such as cleaning, slide dispatch, life jacket distribution, customer service, and breaks. Moving in and out of your primary duty that requires you to maintain the 10/20 Protection Standard can help keep you more alert.

Figure 8.3 Changing positions frequently helps you to stay alert.

- ***Strategic breaks*** –Breaks help keep you refreshed. There are certain points during your shift when a break will have the most positive impact on your ability to stay alert. Your supervisor will schedule your breaks accordingly.
- ***Personal self-care*** – Getting adequate sleep, eating healthy, staying hydrated, exercising regularly, and wearing the proper clothing for the environment can help you stay alert at work.

Table 8.1 Lifeguard Rotation

Lifeguard Rotation

The lifeguard team performs *Proactive Bottom Scans* before assuming and relinquishing responsibility of the Zone of Protection® area. One lifeguard is always maintaining the 10/20 Protection™ standard throughout the process.

The Incoming Lifeguard ("LG1") performs a proactive bottom scan of the entire Zone of Protection® area, actively looking around fixtures, features, corners and edges of the Zone of Protection® area to confirm the bottom is clear before taking over the position.

1

LG1 reports to the Outgoing Lifeguard ("LG2") that the bottom is clear (verbal and "thumbs up").

2

LG1 takes over 10/20 Protection™ standard scanning of the Zone of Protection® area, to allow LG2 to safely climb down from the stand.

3

Equipment is exchanged unless each guard has their own rescue tube. *At least one lifeguard has eyes on the water at all times.*

4

Equipment is exchanged again if needed and LG1 climbs up the stand. Both guards continue to scan the Zone of Protection® area.

5

Once LG1 is in position, LG2 relinquishes the Zone of Protection® area. Both guards continue to scan the Zone of Protection® area.

6

LG2 performs a proactive bottom scan, actively looking around fixtures, features, corners, and edges of the Zone of Protection® area to confirm the bottom is clear before relinquishing responsibility. When finished, LG2 signals to LG1 that the bottom is clear ("thumbs up"). LG2 may proceed to the next duty station.

Keep Your Rotation Safe

- Always maintain the 10/20 Protection™ standard while rotating
- When rotating in and rotating out, you must complete a Proactive Bottom Scan
- Keep communication to a minimum
- Face the zone when communicating during rotation
- If exchanging equipment, do so in a safe way that will not compromise your 10/20 Protection™ standard.

Table 8.2 on the next page summarizes some of the challenges you will face when trying to remain vigilant and how to apply practices that can help you to remain alert.

Avoiding Distractions

Social and technology distractions can greatly impair your ability to remain vigilant. Good lifeguards tend to be outgoing, friendly people and you are there to help others have a great time. While friendliness is encouraged, you need to remember that social interactions cannot interfere with your primary task to protect guests.

Social Distractions

There are days when friends or family may visit your facility and want to carry on a conversation with you. Let them know that when you are on duty, you must remain vigilant. Your eyes must remain on the water as you constantly scan. Tell them when you will be on break, when your shift ends, or other times when you will be available to talk. Sometimes interactions with guests are unavoidable and necessary due to questions about rule enforcement or your facility's policies. As with other situations, you need to respond to guests without compromising the 10/20 Protection™ standard. If a guest requires so much attention that it could prevent you from remaining vigilant, alert a supervisor to assist the guest. If a supervisor is unavailable, request the assistance of another lifeguard to either cover your zone or to assist the guest. If you need to speak with a supervisor or another staff member while at your station, keep the conversation brief and continue scanning your zone.

Technology Distractions

Although technology is extremely helpful in organizing our lives, it can become a distraction when you are on duty. Electronic devices such as two-way radios, smart phones, watches, and other gadgets can cause your attention to be diverted away from your zone. While having immediate access to such devices may be necessary at your duty station, you should use these as your local protocols dictate, such as emergency situations **(Figure 8.4).**

Figure 8.4 Use communication devices according to your operational protocols.

Non-work-related electronics should not be used while on duty. These items need to be stored in appropriate locations, away from lifeguard duty stations. Phones should not be held in your hands or kept in your pocket while on stand, since they can be a distraction and could impact your rescue readiness. Wearable devices, if allowed by your facility, should only be used for quick glances to confirm the time.

Table 8.2 Challenges to Vigilance

Challenges	Practices to Overcome Challenges to Vigilance
Monotony & Fatigue	Change your scanning pattern Use the 5-minute strategy Alternate lifeguard duties Use rotational task balance Take breaks Get adequate rest before working Eat healthy snacks
Environment	Protect yourself from heat and humidity by drinking plenty of water to avoid dehydration Use a layered approach to clothing Take cover under shade to stay cooler on hot days and to reduce the risk of sun exposure
Glare (Sun or Indoor lighting)	Wear polarized sunglasses to reduce glare and improve visibility Move to see your entire zone Contact your supervisor to conduct a zone validation and/or adjust your zone if necessary
Attraction Features	Know the attractions in your zone Advise guests of challenging water elements such as currents in slide catch pools or waterfalls Walk (rove) to search and eliminate potential blind spots
Facility **Attendance** **Extremes**	Change your posture often Use the 5-minute strategy Use rotational task balance Avoid distractions
Water turbidity	If your zone is not visible due to too many guests in the water, notify your supervisor and move to ensure you can see all activity in your zone. Contact your supervisor if the condition involves water turbidity (cloudiness).

Secondary Duties

In addition to your primary duty of guest safety, you will also have secondary duties. These secondary duties must not take away from your primary responsibility. Examples of secondary duties include (**Figure 8.5**):

- Teaching a swim lesson
- Coaching a swim team
- Leading a special event, such as a birthday party
- Taking attendance
- Completing opening or closing attraction inspections
- Cleaning the facility
- Working in admissions and cash handling
- Conducting a water fitness class
- Retrieving or putting away equipment
- Adjusting or moving lane lines
- Checking pool chemistry
- Documenting facility records, logs and reports
- Passing out tubes or rafts for an attraction
- Assisting guests with life jackets

These secondary duties should not be done while you are at a duty station protecting your zone. Anything that distracts you from scanning your zone in a manner consistent with the 10/20 Protection™ standard should be avoided. If you find yourself distracted from your primary job, you can transfer your primary task to another lifeguard, or you can clear the pool of all guests. None of your secondary duties are considered an emergency. But recognizing and responding to a guest in distress is, and must be your only focus while on duty.

Figure 8.5 Secondary duties should never impact your primary duty of maintaining the 10/20 Protection Standard.

Improving Performance

This course is just the beginning of your lifeguard training. Once you complete this course and are hired, your facility supervisor will typically continue your training with additional learning drills. These drills are designed to keep you alert, increase your ability to recognize guests in distress, and further your training to help you respond in a timely manner. This on-going training is designed to make sure you are accountable and at a test-ready level well beyond your initial training class and throughout your entire lifeguard career.

Vigilance Awareness Training® (VAT®)

Vigilance Awareness Training® (VAT®) was designed by Ellis & Associates (E&A) to evaluate the ability of lifeguards to recognize and respond to a guest in distress. Your facility will conduct VAT® drills which simulate real emergencies to evaluate your ability to evaluate your awareness relative to your assigned Zone of Protection® area. Drills use objects like submersible manikins, silhouette dolls, or live persons to test your ability to recognize a problem in your zone and respond accordingly. This is all part of your professional accountability. These drills reinforce the most important skills you need to effectively perform your job **(Figure 8.6).**

Figure 8.6 Vigilance Awareness Training® (VAT®) helps you to remain “rescue ready” at all times.

FOR YOUR REVIEW

Summary

Lifeguard vigilance is a proactive strategy used to protect guests. It requires you to stay alert, be prepared to act, and be focused on preventing problems before they escalate.

A lifeguard rotation describes the process in which lifeguards move from one duty station to another throughout their shifts. This process involves lifeguards transferring surveillance accountability from the on-duty lifeguard to the incoming lifeguard who will take over zone surveillance. When rotating, you must always maintain the 10/20 Protection™ standard. You will perform a Proactive Bottom Scan of the zone before you start and end a rotation. You will also avoid distractions that might prevent you from recognizing a guest in distress. Depending on your facility, you may exchange equipment during the rotation, or you may rotate with equipment.

When you perform a Proactive Bottom Scan, check all depths of the water in your zone including top, middle and bottom, scan along the edges and corners of the zone, and look around any guests, objects and features that might block your view. Your objective is to confirm that the bottom is clear.

Due to the nature of the job and working conditions, there can be challenges that impede your ability to maintain optimal vigilance. These challenges include fatigue, monotony, environment, glare, attraction features, guest crowding, activity programming, and water turbidity (cloudiness). You can overcome these challenges by using practices that include the 5-minute strategy, rotating duty stations, having rotational task balance, taking scheduled breaks, and taking good personal care to prepare yourself for the working conditions.

Social and technology distractions can greatly impair your ability to remain vigilant. Keep conversations with staff and guests to a minimum and always maintain the 10/20 Protection™ standard while on duty. Technology should only be used when necessary for communication. Personal devices should not be on a duty stand as they may distract you from your primary duty. Other duties are designed to be secondary and must not interfere with your primary duty which is to remain vigilant and protect guests.

Your facility will provide ongoing training called Vigilance Awareness Training® (VAT®) which utilizes live drills and manikin drops to simulate real emergencies that test your performance and ensure you are being accountable to the 10/20 Protection™ standard.

Key Terms

- → Five-minute scanning strategy®
- → Proactive bottom scan
- → Station rotation
- → Rotational task balance
- → Vigilance Awareness Training ®(VAT®)

Chapter 9
EMERGENCY ACTION PLAN

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Define emergency action plan (EAP)
- Describe the difference between single and multiple rescuer facility EAPs
- Recognize the duties of supplemental responders
- List different communication devices used in aquatic facilities
- Identify universal whistle codes and hand signals used in aquatic facilities

Chapter Overview

→ Emergency Action Plans
→ Single Rescuer Facilities
→ Multiple Rescuer Facilities
→ Communication Devices and Standards
→ Contacting EMS
→ For Your Review

Emergency Action Plans

Every facility has written procedures to practice and follow when there is an emergency. The procedures are specific to that facility and are part of their ***Emergency Action Plan,*** commonly called an EAP. There are different plans for different types of emergencies. As a lifeguard, you are often a primary responder in an emergency **(Figure 9.1).**

Figure 9.1 Lifeguards are often the primary providers initiating the EAP.

The EAP outlines a course of action that will help you, your supervisors, and other staff to work as a cohesive team to manage different emergency situations in the best way possible. You will work to achieve a successful outcome by:

- Rapidly recognizing a guest in distress
- Promptly providing a rescue and in-water care
- Moving a guest (extricating) from an area of danger when necessary
- Providing effective care on land while awaiting the arrival of Emergency Medical Services (EMS) personnel after being summoned

Figure 9.2 Communication is critical in any emergency.

During your pre-service and on-going training, you will review and practice your EAP. Anyone involved in the EAP process should be a part of the periodic practice. Supervisors may encourage you to provide feedback on the plan during your practice so that your entire emergency response team is confident and competent. If you are working a single rescuer facility, supplemental responders should participate in reviewing and practicing the EAP with the lifeguard staff they support. Each facility's EAP is unique; however, there are common pieces of information that may be included in your EAP:

- Type of emergency
- ***Emergency Medical Services (EMS)***
- Responding team leader (person ultimately in charge)
- Expected actions by personnel responding (supervisors, lifeguards, other staff)
- Location of equipment and description of how it will be brought to the scene
- Means for maintaining safety and control of remaining guests
- Transfer of care to EMS personnel
- Local authorities notified including public health department
- Reporting including incident report, rescue report, medical services form
- Witness statements
- Media crisis plan including media designated location, facility spokesperson and statement
- Debriefing and counseling services

The steps in an EAP are dependent on the specifics of the facility and the number of team members available. Every facility operates differently. If you are the responding lifeguard, your initial communication of a problem notifies others who put the steps of the EAP into motion. Failing to activate and follow the facility EAP in a prompt manner may jeopardize the guest's outcome **(Figure 9.2).**

Multiple Rescuer Facilities

Each person on the team needs to know their role in daily operations and in emergencies. Some facility emergency response teams include supervisors, support staff, and on-site EMS providers. Larger facilities might consist of lifeguard teams where everyone is trained as a lifeguard. Smaller facilities may have only one lifeguard with additional staff trained as "supplemental responders." Whatever their designation, all responders should know their roles in every situation.

Figure 9.3 In multiple rescuer facilities the lifeguards work together to respond to an emergency.

When your EAP is activated, working as a team will provide the most effective response in emergency situations. For example, a team would be able to simultaneously dedicate staff to airway management, supplemental oxygen administration, CPR, and AED use. Each person on the team has a specific duty during an emergency. Duties vary based on whether you are the primary responder or secondary responder. Communication is the key to successful teamwork. When all responders know all the roles, they can effectively communicate and fill the care gaps **(Figure 9.3).**

Single Rescuer Facilities

You might work in a facility that only has one lifeguard. Often single rescuer facilities are smaller pools where the entire zone can be seen by one lifeguard. When working at a single rescuer facility, you are the only lifeguard on deck at any time, responsible for recognizing and responding to any guest in distress. If there is a guest who needs assistance, you will render care. If you need assistance, request help from supplemental responders who are trained to do so.

Supplemental Responders

Supplemental responders are non-lifeguard team members trained to assist lifeguards in emergency response. For example, in cases of an unresponsive guest or a guest with a suspected spinal injury, two trained individuals are needed to secure the guest to a backboard and remove the guest from the water. As a lifeguard, you will be looked upon as the lead responder. It is recommended that you practice working with your facility supplemental responders so that you are comfortable as the lead responder.

Communication Devices and Standards

Communication is important when working as a lifeguard. The first step in every EAP is to communicate an emergency is occurring. Your whistle codes, hand signals or radio calls activate the EAP. **(Figure 9.4).** Your facility will have a communication process in place that allows you to activate your EAP and quickly share pertinent information. Facilities often tailor their communication program to fit its needs and environment. Knowing your communication program will help you:

- Contact EMS
- Effectively communicate with others while on duty
- Understand what is expected of you by others
- Receive assistance from other lifeguards and non-lifeguard staff

Lifeguards use different devices to communicate throughout their duty shift. The most common devices used in aquatic facilities include:

- Whistles
- Two-way radios
- Flags
- Hand signals
- Telephones
- Megaphones
- Public address systems
- Automated audio repeater systems

Figure 9.4 Whistle codes, hand signals, and communication devices are used by lifeguards.

Communication Methods

Communication codes and signals are two methods used for communicating when working at an aquatic facility. Codes and signals are designed to relay messages quickly, minimizing the need for discussion. Most lifeguards communicate using ***whistle codes*** and ***hand signals,*** but different facilities may opt to use additional or other devices **(Table 9.1).**

Hand signals

There are several common hand signals that lifeguards use (**Figure 9.5**). When using hand signals, hold the signal until you are sure it is noticed. Aquatics facilities tend to be noisy environments. Hand signals are often combined with whistle codes to ensure that the messages are being received. **Table 9.2** provides examples of common hand signals used by lifeguards.

Figure 9.5 Examples of common hand signals used by lifeguards. Raised Fist: Lifeguard needs assistance; Tapping the top of your head: Cover my zone; Crossed arms above head: Stop Dispatch/Activity; Thumbs up: Resume activity, all is clear, or Bottom is clear. See Table 9.2 for additional information.

Whistle Codes

Your whistle is the most frequently used device you will use to communicate. As a lifeguard, you will have a whistle at all times when on duty. The sound of your whistle needs to be recognized over your facility crowd noise and other facility distractions. When using your whistle, blow it loudly and firmly so that it produces a shrill sound loud enough to be heard. Common whistle codes involve short blasts and long blasts **(Table 9.3).**

Table 9.1 Communication Methods

Communication Methods	Purpose
Whistle	Series or pattern of whistle blasts to communicate with guests or to activate your EAP
Telephone	To request assistance from outside authorities such as EMS, Police and Fire Departments
Two-way radio	Codes or phrases used to succinctly communicate internal messages or actions privately among facility staff
Flag signals	Communicate hazards to guests in open water environments or to transmit messages to other open water lifeguards
Hand signals	Communicate messages to other lifeguards and or supervisors.
Megaphone alerts	Direct guests or communicate information
Public address announcements	Inform guests of rules, provide directions
Automated recordings	Used to share attraction rules or provide facility messages directing guests
Signs	Digital, printed or graphic messages that communicate rules or messages to facility guests

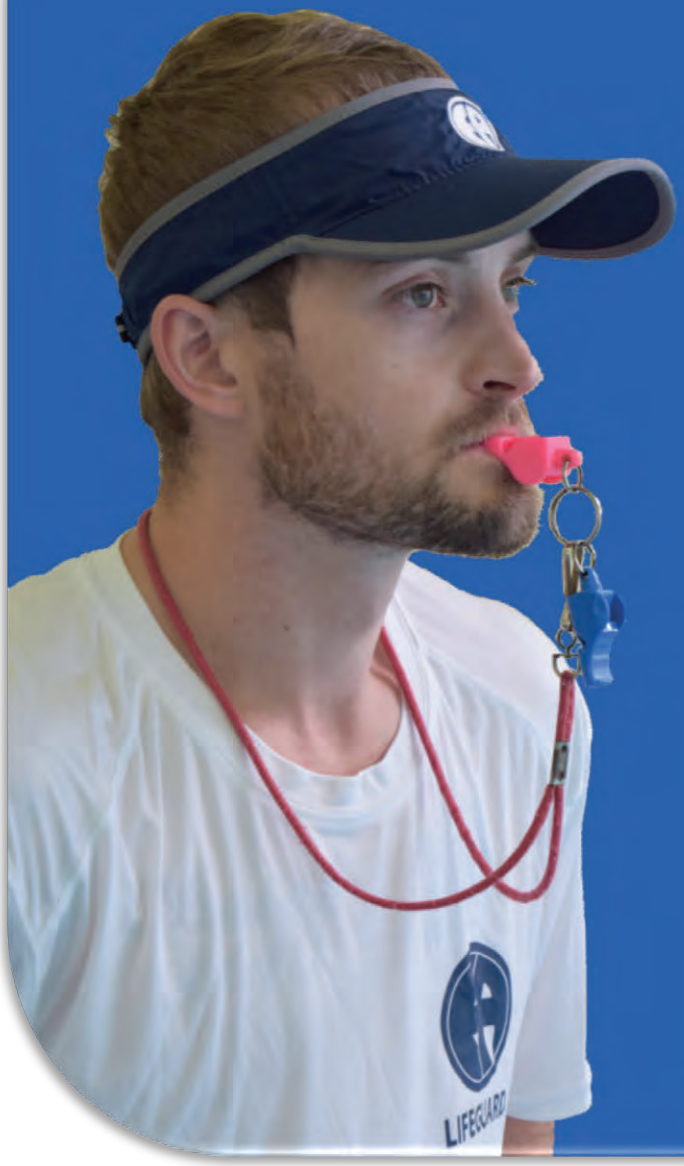
Table 9.2 Common Hand Signals

Hand Signal	Message Meaning
Pointing	Identify a location or person, provide direction
Raised clinched fist	Assistance needed from another lifeguard or a supervisor
Crossed arms above head	Stop dispatch. Used to stop sending guests into an area or down a water slide or an attraction
Thumbs up	All clear. It's safe to continue normal activity. Used to signal the bottom is clear during the Proactive Bottom Scan
Tapping of top of your head	Watch my zone. Indicates you are asking another lifeguard to watch your area.

Table 9.3 Whistle Codes

Whistle Codes

Whistles, hand signals and radio codes provide a means of staff communication. Your facility may use the following whistle codes or a variation.



One Short Whistle Blast:
To get a guest's attention.

Two Short Whistle Blasts:
To get the attention of another lifeguard or staff member.

One or Two Long Whistle Blast(s):
To activate the Emergency Action Plan (EAP); indicating an emergency that may require a rescue and the assistance of others.

A Case Study in Effective Communication

12:45pm
A female lifeguard working at a wave pool blows a long whistle blast and enters the water to rescue a submerged guest. Upon making the rescue, she raises a fist to signal that assistance is needed for an unresponsive guest. A second lifeguard has been covering her zone while the rescue is in progress. He sees her hand signal and understands her need. He blows two long whistle blasts to notify others of a major incident and alert them that help is needed.

12:46pm
The supervisor hears the whistle code and responds. He uses a two-way radio to notify the facility dispatch that there is an emergency in the pool requiring 9-1-1. Other lifeguards are notified of the incident and location and respond to an "unresponsive guest emergency at the wave pool" with appropriate equipment.

12:47pm
With the assistance of the lifeguard team, the guest is extricated from the water and more effective care is provided on deck. The call to 9-1-1 has been placed and the public safety dispatcher has dispatched a paramedic unit. Care continues until the unresponsive guest is transferred to higher trained health care providers upon their arrival.

Radio Codes

Just like personnel working in Emergency Medical Services (EMS), police, and fire departments, lifeguards may use radio codes to deliver messages. Radio codes are used to transmit information so that only persons working in your facility can understand what is being discussed. Radio codes are often site-specific and are understood by lifeguards and other staff in the facility. Special terms or phrases may be used during an emergency to distribute information quickly, make a request, or issue commands that will trigger a specific response **(Figure 9.6).**

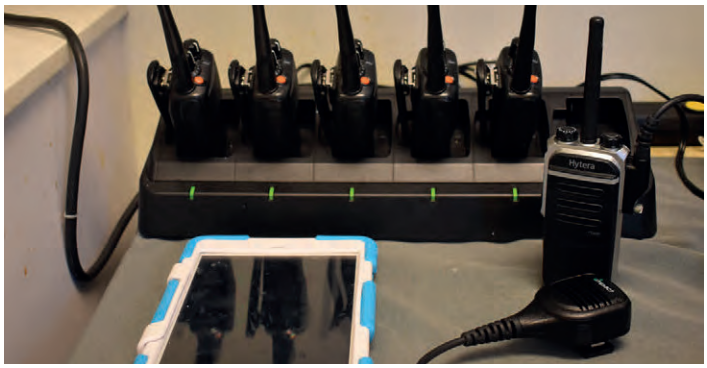


Figure 9.6 You may use two-way radios to communicate while working and to activate your EAP

Facility Signs

Most facilities have signs that communicate information and rules to guests. Signs can be in digital, illustrated or print format. Signs are typically posted at the entrance of the facility and near the attractions entrance. You should become familiar with content on these signs. Different types of facility signs may include **(Figure 9.7):**

- Safety information including water temperature, chemistry, weather
- Facility rules, policies and operating hours
- Life jacket information
- Attraction restrictions including height, weight, swimming requirements
- Guest education such as safe swimming guidelines, lifeguard training notifications

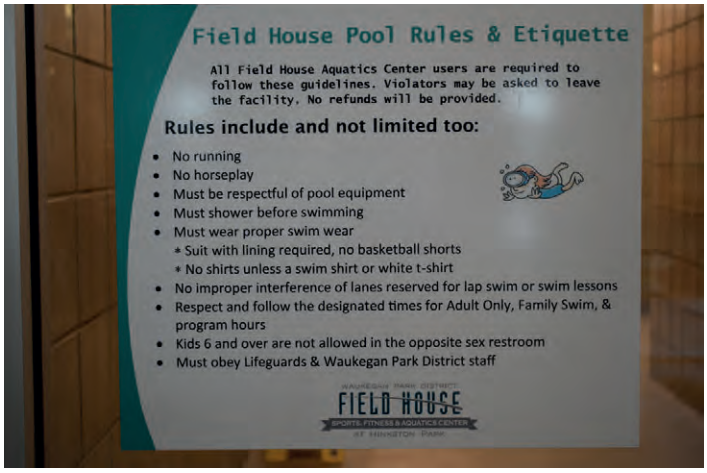


Figure 9.7 Your facility signs provide key information to guests.

Contacting EMS

Every facility will have a way to contact outside EMS assistance in the event of an emergency. It is a part of your EAP. As a lifeguard in your facility, you need to know how and when to contact EMS. Contacting EMS is normally done by calling 9-1-1 in the US, Canada, and Mexico. Other countries use a different emergency number. You might use a standard telephone or facility phone designated only for emergencies **(Figure 9.7)**. You might also contact EMS by activating an alarm that notifies other staff who will place the call.

Figure 9.7 You must know how to quickly access EMS as part of your EAP.

Once you reach an emergency dispatcher, clearly communicate all pertinent information. The dispatcher will ask you questions such as:

- Your name
- Name of the facility
- The facility address
- Where the guest is located within the facility
- Information on the emergency:
- What happened
- When it happened
- The guest's condition
- The care that is being provided

Do not hang up until the dispatcher tells you it is okay to hang up. The dispatcher can provide additional instructions for care if needed.

Other emergency related telephone numbers that you should know and keep posted near a phone are:

- Non-emergency local police department
- Poison control (in the United States, 800-222-1222; for international numbers, visit http://apps.who.int/poisoncentres/)
- Local hazardous material response

When to Summon EMS for Medical Problems

Besides drowning incidents, call 9-1-1 for other serious conditions such as:

- Loss of consciousness or an altered level of consciousness such as drowsiness or confusion
- Absent breathing or breathing difficulty
- Chest discomfort or pressure not relieved by resting, including pain radiating to the shoulder, arm, neck, jaw, stomach, or back
- Fracture or dislocation
- Persistent abdominal pain
- Possible spinal injury
- Severe burns
- Severe external bleeding
- Suspected poisoning including drug overdose
- Vomiting blood

FOR YOUR REVIEW

Summary

Emergency Action Plans (EAPs) are facility specific response steps you and other staff take if there is an emergency.

Lifeguards initiate the EAP when they begin a rescue by using a whistle code, hand signal or activating 9-1-1. Lifeguards must know their role and the role of other trained responders on the team during emergencies. Working as a cohesive team is the most efficient and effective way to respond.

Single rescuer facilities are locations where there is only one lifeguard needed to cover the entire facility. Single rescuer facilities often train other key designated personnel to be supplemental responders to support the lifeguard in emergency response.

Multiple rescuer facilities are often larger facilities that have multiple zones that must be protected. These larger facilities might consist of lifeguard teams where everyone is a trained lifeguard.

There are common whistle codes and hand signals used by lifeguards to communicate emergency related messages. Lifeguards often use a combination of whistle codes and hand signals when they need assistance. One or two long whistle blasts indicates there is an aquatic emergency.

When you need assistance, you can use the raised clenched fist hand signal to summon another trained lifeguard or supervisor.

Other communication devices used to distribute messages and information during emergencies and during normal daily operation include two-way radios, telephones, public address systems, megaphones, automated announcement systems, and facility signage.

When contacting EMS, you must provide important details related to the emergency such as who, what, where, when and how the emergency occurred so that responding EMS personnel team are prepared. You should not hang up the phone until the dispatcher you are speaking with hangs up first.

Key Terms

→ Emergency Action Plan (EAP)
→ Emergency Medical Services (EMS)
→ Hand signals
→ Supplemental responder
→ Whistle codes

Chapter 10

BASIC LIFE SUPPORT: RESPIRATORY EMERGENCIES & ASSESSMENT

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Describe the components and function of the respiratory system
- Identify causes of respiratory emergencies
- Describe how to assess and care for a guest experiencing respiratory distress
- Describe the adult and pediatric chains of survival and why each link is critical.
- Describe how to survey the scene, including what you are looking to determine and why.
- Demonstrate how to perform the Primary Check
- Demonstrate how to place an unresponsive guest into the recovery position and describe when this might be used.
- Demonstrate how to provide rescue breathing for an adult, child, and infant in respiratory arrest
- Describe how you would assist someone suffering from an opioid overdose
- Demonstrate how to care for an airway obstruction in a conscious (responsive) or unconscious (unresponsive) adult, child, and infant

Chapter Overview

The Respiratory System

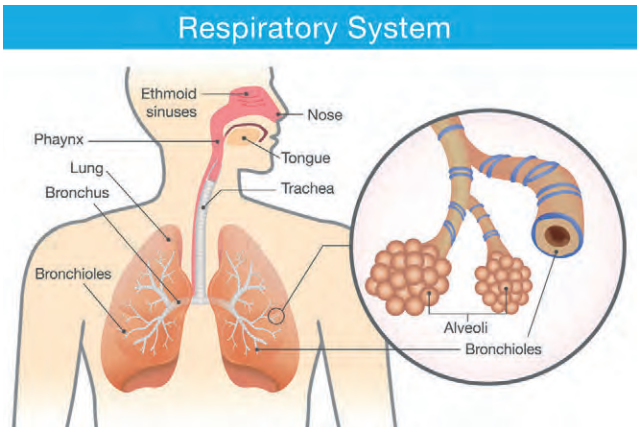


Figure 10.1 Oxygen and carbon dioxide exchange in the alveoli.

The respiratory system is responsible for delivering oxygen to the lungs during inhalation and removing waste products, such as carbon dioxide, during exhalation. This process is necessary to sustain life. Any interruption in this process caused by conditions such as choking, suffocation, or drowning, can result in death within minutes. During inhalation, air is drawn into the body as the muscles in the chest wall and the diaphragm contract. Air enters the mouth and nose, where it is filtered, warmed, and humidified. The air passes down the pharynx (throat) and past the epiglottis. The epiglottis is a thin flap of tissue that allows air to enter the lungs, while diverting food and fluid down the esophagus to the stomach. Once past the epiglottis, air enters the trachea (windpipe). The trachea divides into two main branches known as bronchi, which allow air to enter both lungs. The bronchi divide into smaller tubes known as bronchioles. At the end of the bronchioles, air enters small air sacs known as the alveoli which are in tiny blood vessels known as capillaries. It is here that oxygen and carbon dioxide are exchanged. When the muscles of the chest and the diaphragm relax, air is exhaled **(Figure 10.1).**

Respiratory Emergencies

There are numerous causes of respiratory emergencies which can result in respiratory distress or respiratory arrest. These include:

- Airway obstruction (Choking)
- Inhaling smoke or other toxic substances
- Aspiration (Breathing in stomach contents when vomiting)
- Asthma
- Anaphylaxis
- Lung infections such as pneumonia
- Near drowning
- Suffocation
- Chest trauma
- Opioid (narcotic) overdose
- Electrocution
- Heart attack
- Cardiac arrest

Respiratory Distress

Breathing problems are easy to identify. Watch and listen to how a guest breathes**.** Ask a responsive guest how they feel when breathing. Through observations, look for signs of ***respiratory distress.*** including:

- Labored breathing (straining to breathe)
- Noisy breathing (wheezing, gurgling, or high-pitched sounds)
- Unusually slow or fast breathing
- Unusually deep or shallow breathing
- Irregular breathing
- Gasping for breath
- Inability to speak in full sentences
- Restlessness, anxiety, and confusion
- Changes in level of consciousness
- Flushed, pale, or bluish (cyanotic) skin
- Chest pain or discomfort
- Tingling sensations

General care for a guest experiencing respiratory distress:

- Help the guest rest in a position that makes breathing easier. This is often a seated position
- Remove anything contributing to the distress, if possible (without delaying other care).
- Comfort and reassure the guest and call 9-1-1
- Assist the guest with prescribed medications, such as an inhaler or epinephrine autoinjector
- Administer emergency supplemental oxygen if available
- Keep the guest's airway clear
- If you know or suspect an opioid overdose is causing the guest respiratory distress or arrest, follow the opioid overdose response protocol (page 93).

Respiratory and Cardiac Arrest

If respiratory distress is not immediately addressed, including calling for EMS, the guest will eventually stop breathing (**Figure 10.2**). This condition is known as ***respiratory arrest***. In addition to prolonged respiratory distress, respiratory arrest may be a result of ***cardiac arrest.***

Respiratory and cardiac arrest will result in immediate unconsciousness because little or no oxygen is getting to the brain. This hypoxic state may result in a phenomenon known as ***agonal breathing***. Agonal breathing is characterized by gasping, labored breathing while unresponsive. However, this brain stem reflex is a sign of prolonged respiratory arrest and possibly cardiac arrest and should never be confused with normal breathing.

Figure 10.2 A guest in respiratory distress may decline into respiratory arrest if not treated promptly, including calling EMS.

Death is certain if either condition is left untreated, but might be reversed if cared for early and properly. The immediate care for respiratory arrest is to provide rescue breathing. Rescue breathing is discussed later in this chapter. The immediate care for cardiac arrest is CPR, which includes a rescue breathing element and the use of an AED. This will be introduced in this chapter, with expanded information and protocols in chapter 11.

Safely Helping During a BLS Emergency

Respiratory arrest and cardiac arrest are life threatening emergencies that require basic life support (BLS). Regardless of the nature of the BLS emergency, it is critical for you to quickly recognize the existence of the emergency and then take immediate and decisive actions. How you respond, both as an individual and as part of a team, may directly impact the very survival of the victim of this type of an emergency.

Chains of Survival

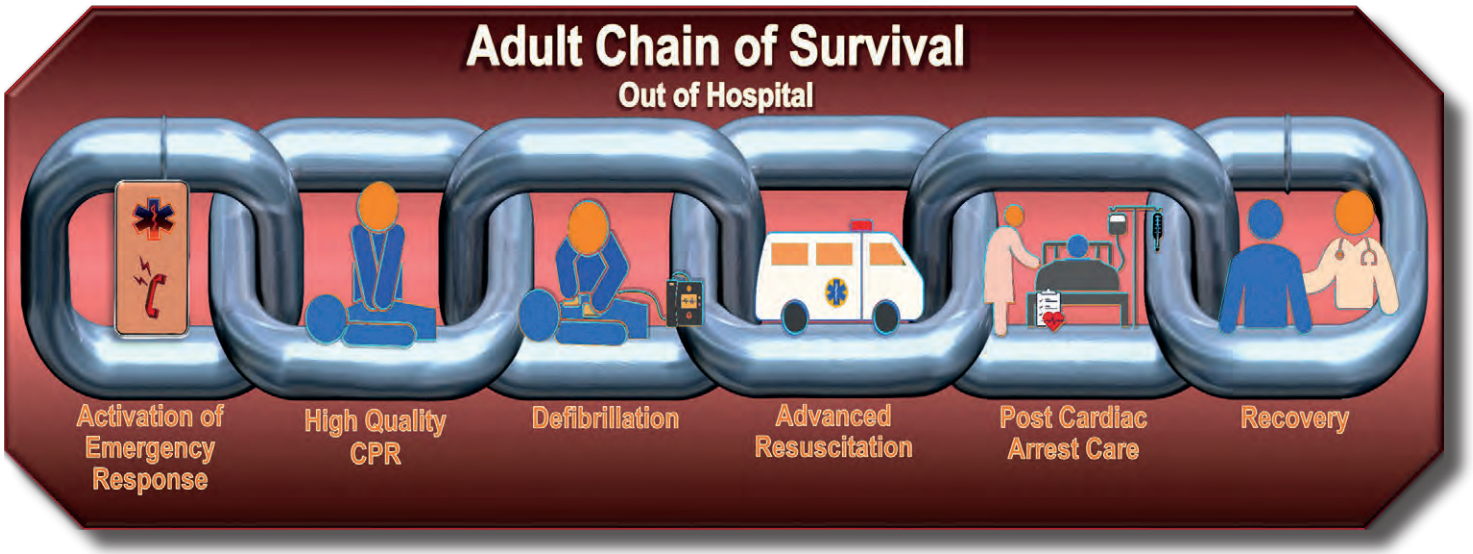
The ***Adult Chain of Survival*** and the ***Pediatric Chain of Survival*** illustrates a series of critical actions which have been determined to provide the best care and chance of survival for a person requiring emergency basic life support care. For these chains, it is assumed that the patient suffering from cardiac arrest or respiratory arrest that will lead to cardiac arrest. It is also assumed that the patient is found outside of a hospital environment. Ideally, the chain is initiated and carried out by responders with health care provider level basic life support training or higher, with access to basic response equipment at the scene. However, the chain link actions can be initiated by anyone willing to respond, regardless of training. These chains are illustrated and discussed further, starting on the next page. An overview of the critical links in order presented are below:

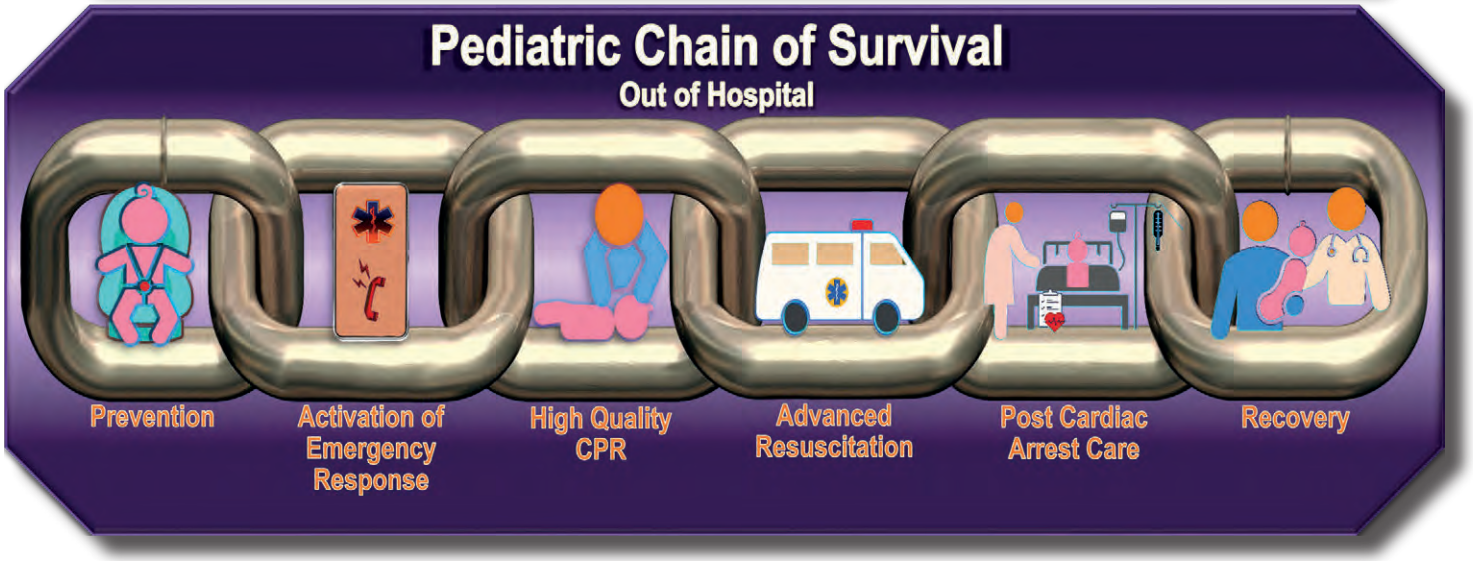
The Adult Chain of Survival links are:

1. Activation of Emergency Response
2. High Quality CPR
3. Defibrillation
4. Advanced Resuscitation
5. Post Cardiac Care
6. Recovery

The Pediatric Chain of Survival links are:

1. Prevention
2. Activation of Emergency Response
3. High Quality CPR
4. Advanced Resuscitation
5. Post Cardiac Care
6. Recovery





Prevention is identified as the first action link in the chain of survival for children because the majority of causes of cardiac arrest for this group are preventable through basic safety and sound risk management practices. Children need BLS care due to progressive respiratory related emergencies, forms of shock, and trauma. Everyone can play a part in prevention!

Examples of actions responsible adults can take that may prevent pediatric respiratory and cardiac arrest:

- **Support and encourage child safety initiatives.** Always follow proper use of child safety seats, safety restraints, and seat belt wearing whenever in a moving vehicle. Require children to wear helmets (and other safety gear) when engaging in activities such as bike riding, skate boarding, and similar.
- **Learn CPR and First Aid.** Everyone should, but this is especially important for parents and others who are frequently around or supervise children. Similarly, it is important that first aid and CPR related equipment (including an AED) be accessible in all public areas.
- **Commit to understanding preventable dangers and remain vigilant when children are present.** For example, expectant parents of infants should learn of the dangers of Sudden Infant Death syndrome (SIDS) and steps to take to prevent it. Likewise, parents should remain alert and physically close to infants and children whenever they are eating, bathing, near water of any depth, or actively swimming (regardless of ability). Ensuring that dangerous items, such as firearms, household chemicals, or drugs (prescribed or otherwise) are always kept secure and inaccessible to children in the home. Finally, enrolling children into swimming lessons, wearing life jackets, and only swimming in designated locations with lifeguards on duty.

Activation of the Emergency Action System is identified as the action link in the chain of survival that is directly initiated by a bystander or trained responder upon recognizing that an emergency is taking place. For lifeguards, this may mean using whistle codes or a radio call. The objective is to get maximum attention to the emergency situation as quickly as possible. Your facility EAP will now address the specific concern, which may include contacting outside assistance by calling 9-1-1. When away from the aquatic facility, the Emergency Action System is activated by calling for EMS, Fire, Police, Poison Control - whatever is urgently needed. In most cases, this is also accomplished by calling 9-1-1.

High Quality CPR is a catch all reference to the excellent performance of basic life support care at the scene (CPR being the most prominent among multiple BLS actions). "High Quality" is critical. Years of evidence indicates that the effectiveness of care is directly related to not only how quickly it is applied, but how well it was performed. This will be expanded on in this and the next two chapters, but the following key quality metrics will come into play:

- **Assessment** - The ability to accurately determine what may be wrong at the scene and with the patient. After making these determinations, the ability to take appropriate and decisive actions to correct the problem.
- **Chest Compressions** - The ability to deliver chest compressions in a manner that will maximize ***profusion*** (the circulation of oxygenated blood through tissues and organs in the body).
- **Airway Management** - The ability to establish and maintain an open airway throughout care. Equally critical, the ability to recognize when the airway may be compromised and taking the appropriate steps to correct.
- **Ventilations** - The ability to provide the patient with the appropriate volume of air at the proper rate during the rescue breathing components of BLS care.

Defibrillation is the prompt and correct use of a defibrillation device when the patient is in probable cardiac arrest. Most frequently outside of a hospital (and at your aquatic facility), this device will be an Automated External Defibrillator (AED). AEDs will be discussed further in the next chapter.

Advanced cardiac life support, commonly referred to as ACLS, involves specialized care procedures initiated by paramedics and EMTs in the prehospital setting (at the scene and during transport), and physicians and nurses in the hospital setting. ACLS includes use of mechanical CPR devices, intravenous (IV) therapy, medication administration, advanced airway management, 12-lead ECG and protocols for transport to a hospital with coronary catheterization capabilities. The use of extra-corporeal CPR (cardiopulmonary bypass) using venoarterial extra-corporeal circulation and membrane oxygenation (ECMO) may also be performed.

Post cardiac arrest care, refers to specialized measures provided to patients in the hospital following ***return of spontaneous circulation (ROSC).*** This link in the Chain of Survival is critical because many survivors of an initial cardiac arrest will still succumb to complications associated with the damage caused by the arrest or the underlying cause. Post cardiac care may include treating for reperfusion injuries, organ or tissue damage, and determining and treating potential neurological injury. Critically ill patients may require hemodynamic support, temperature management, and mechanical ventilation once they are stabilized. Treatment for multiple organ failure, shock, and seizures may also be required. Physicians will want to diagnose the underlying cause of the arrest and determine a treatment plan.

Recovery, refers to the total care required of survivors of cardiac arrest, along with their caregivers and loved ones. For all involved (including first responders), an assessment to identify post-traumatic stress, anxiety, and depression, followed by a treatment plan. Specifically for the patient, short term and long term physical rehabilitation needs should be assessed and addressed quickly following release from the hospital. Also, following release from the hospital, initial appointments should be made or confirmed with the various specialists needed for both short and long term treatment of injuries and damage sustained during the arrest.

Survey the Scene for Safety

Before you can assist any guest, you need to survey the scene. Frequently, it may not be immediately apparent what the full extent of the issues are at the scene. For this reason, you should pause and take a few seconds to use your observation skills from a safe distance to make a qualified assessment, based upon what can be observed. Depending on your observations, you may find that it is safe to approach the person or people affected by the emergency, which will allow you the chance to perform a more hands on assessment. However, you may also determine that you are not able to enter the scene and that additional help will be required. If the incident is happening at your aquatic facility, you should communicate this in accordance with your emergency action plan, before attempting any other action.

What are you looking for when you survey the scene? You are looking to collect valuable information such as:

- **What may have happened?** This does not require a thorough investigation - simply the assessment of the possible causes based upon readily observable elements at the scene.
- **What are the current and potential dangers, hazards, and risks?** This includes dangers that may affect you if you enter the scene, as well as those dangers that affect others, including the patient.
- **The number of casualties involved?** The number of people involved at the scene who may need assistance.
- **The apparent condition of the person or people involved**, to the extent it can be easily determined.
- **If the area is safe enough to enter and if not, what are your options?** For example, you (or your team) may be able to temporarily enter the scene to move the patient to a safer location. Unsafe areas include situations such as live electric wires, fire, smoke, toxic chemical exposure, and areas with active assailants.
- **What equipment may be needed if you do enter the scene?** For example, PPE. Can you retrieve it if you do not have it? Should someone else retrieve it? Can you help at the scene without this equipment?

If the scene is unsafe, try to make it safe without endangering your life. Never enter dangerous areas without the proper professional training and equipment. As a lifeguard, if the scene is not safe, it may be prudent to wait for other team members to arrive before determining the best course of action. As a team, something might be able to be done without risking safety that could not be done as an individual. If it is not possible to make the scene safe, then call 9-1-1 and monitor the scene, in case something changes. Keep others from entering dangerous areas.

Personal Protective Equipment (PPE)

As discussed in chapter 5, PPE in the form of standard precautions should be considered prior to entering an emergency scene. Depending on the circumstances, you may not require any PPE or you may need to take the time to put on several items for your protection. If body substances such as blood are clearly present on or near the patient, you should take standard precautions before getting near the guest. Ideally, you will determine during your survey of the scene what PPE is needed and put on before entering the scene. While working as a lifeguard, you should have immediate access to basic standard precautions while on duty. If you determine the need to take standard precautions, you should be able to quickly put them on and render aid without any unnecessary delay. If you are not sure if you should take standard precautions and they are available, err on the side of doing so.

Fortunately, research over many years has demonstrated that it is very unlikely to contract a dangerous disease from a patient while performing BLS or similar care, even if standard precautions are not taken. However, if your location is functioning under circumstances like we have seen during the COVID-19 pandemic, certain precautions and adjustments to procedure may be appropriate.

Primary Check

After determining if the scene is safe, position yourself next to the guest and prepare to perform a ***primary check***. This is a simple, systematic approach to determine the presence of immediate threats to life:

- Check a guest for ***responsiveness*** (**Figure 10.3**)
- Check to see if the guest is breathing normally
- Check for a pulse

Figure 10.3 Check responsiveness.

Checking Responsiveness, Breathing, and Pulse

If the guest is motionless, begin by checking for responsiveness. This check should only take a few seconds to complete. Perform the "Tap and Shout" - tap the shoulder of the guest and shout, "Are you OK?" or "Can you hear me?" If the guest does not respond, they are considered to be ***unresponsive***. Further, if the guest does not remain responsive without additional or continuous stimuli or if the guest appears intoxicated, they should be considered unresponsive as well. If the guest is unresponsive, activate the Emergency Action System following your EAP and communication used at your facility (which should include calling for EMS). If you are not at work and you are helping as a bystander, make sure 9-1-1 has been called.

Figure 10.4 Check for breathing and a carotid pulse (guests over 1 year of age) for up to 10 seconds.

Position the guest face up, on a firm (hard), flat surface. Next, open the airway by performing the head-tilt, chin-lift to elongate the neck (see *Opening the Airway* later in this chapter). Continue with these steps:

1. Bring your head (ear) near the guest's mouth while keeping your eyes on the guest's chest.
2. Using two fingers on one hand, find the location of the carotid artery in the neck (**Figure 10.4**).
3. **For a maximum of 10 seconds**, you will simultaneously attempt to find the guest's pulse (clear sensation of the guest's heart "thumping" on your finger tips) and signs of breathing by looking for normal chest movement consistent with breathing, and listening for normal breathing sounds.

If performing the primary check on an infant, follow the same procedure, but keep the infant's head in a neutral position and use two fingers to locate the brachial pulse in the upper arm (**Figure 10.5**). Assess pulse and breathing on the infant for up to 10 seconds.

Figure 10.5 Check an infant's breathing and brachial pulse, for up to 10 seconds.

During the primary check for a pulse and signs of breathing (*no more than 10 seconds)*, you must decide if the guest:

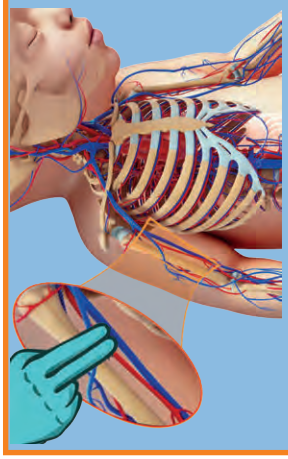
- **Is breathing and has a pulse**
- **Is not breathing, but has a pulse**
- **Does not have a pulse and is not breathing (normally)**

If the guest is unresponsive, not breathing (or only has occasional agonal gasps), and no pulse, the guest is in cardiac arrest and needs CPR and an AED. If the guest is unresponsive, not breathing (or only has occasional gasps), but has a definite pulse, the guest is in respiratory arrest and needs rescue breathing. Always err on the side of not finding what you are looking for during the primary check, if you have any doubt. Rescue breathing and CPR provided unnecessarily *will not harm the guest*. Failing to provide this care when it is needed will be very harmful. Some examples to consider:

- If you observe some chest movement but the sounds being made by the guest do not resemble normal breathing sounds, assume no breathing (ineffective agonal breathing). If you are certain about finding a pulse, begin rescue breathing.
- If you are feeling for a pulse and after 10 seconds you are not certain if you actually felt a regular "thump" against your fingers, assume no pulse was felt and begin CPR.
- For children and infants: If you feel or suspect a "slow pulse" (less than 60 beats per minute) equate this with no pulse and begin CPR.
- If you are not sure that you were feeling for a pulse in the correct location during the 10 second check and you think this is why you did not feel it - this still means no pulse was found and CPR should begin.
- If you are certain that the guest is breathing but you are unable to find a pulse during the 10 second check, assume that the breathing detected was ineffective agonal breathing and begin CPR.

Finding a Pulse

For adults and children over 1 year of age, use the head-tilt, chin-lift to open the airway to elongate the neck, which has been shown to help responders find the carotid pulse location. You might keep one hand on the guest's head to maintain this position while checking for pulse and breathing. To find the carotid pulse, use your index and middle fingers to locate the Adam's apple (voice box, at the center of the throat). Slide your fingers toward you, into the groove at the side of the neck (try finding yours).



For infants, do not perform the head-tilt, chin-lift, but instead keep the infant's head in a neutral position during the primary check. Bring your ear close to the infant's mouth and look at the chest, as you check the brachial pulse in the upper arm**.** To find the brachial pulse, use your index and middle fingers and gently place them on the inside of the upper arm, between the armpit and the center of the arm (between biceps and triceps). You should feel the arm bone (humerus). The brachial pulse can be felt along this bone (try finding yours). This pulse is the easiest to find on an infant, if present.

Remember, the pulse should be definitely felt within 10 seconds.
If you do not feel it or if you are not sure, start CPR.

Secondary Check

If you do not find any life-threatening conditions during the primary check, you should perform a secondary check. The secondary check is also appropriate following any successful resuscitation effort.

Figure 10.6 An example of the recovery position. There are different position options based on the circumstances at the scene.

If the guest is unresponsive, start by placing the guest into the ***recovery position***. The recovery position is a lateral recumbent (side-lying) position that facilitates maintaining an open airway. Placing the guest in this position will allow you to perform a secondary check. Similarly, if you need to briefly need to leave the scene either before or during care (as a single rescuer), the recovery position is the safest placement option for the unresponsive patient, reassessing once you return.

There are multiple methods recognized as acceptable when placing someone in a side-lying position, which results in the patient either facing you or facing away. The exact procedure you follow will depend on several factors, such as if you are alone or with other trained responders, if the patient is actively vomiting, if an AED is attached, how much space you have around the patient at the scene, among other possibilities (**Figure 10.6**).

The following steps may be among those followed to safely place the guest on their side to protect the airway while minimizing uneven movement of the spinal column, sometimes referred to as the "HAINES" recovery position (**Figure 10.7**):

Figure 10.7 An example of the "HAINES" recovery position.

1. With the guest lying flat on their back, position yourself at their side and bend the guest's leg nearest you at the knee.
2. Raise the guest's farthest arm to you above their head so that the guest's ear is against the raised arm at the shoulder.
3. Place the guest's nearest arm to you, across the guest's chest.
4. Place your hands on the guest's nearest shoulder and hip and slowly roll the patient's body as a single unit away from you until they are lying on their side, while making certain that the guest's head remains in line with their hips, against their raised arm.
5. Adjust the guest's free arm and top leg to support the their body and confirm that the area around the guest's mouth is clear and that the guest continues to breathe normally.
6. Confirm the guest is stable in this position before proceeding with the secondary check or another task.

If you suspect a possible head or spinal injury, it is advisable to leave the guest on their back unless the airway is at risk due to vomiting. Maintaining an airway and therefore the guest's ability to continue to breathe is your chief concern so close monitoring is important. However, if the guest is found to not be breathing during the primary check or if they become unresponsive at any point, you may need to initiate care, including rescue breathing and CPR.

Once in the recovery position, begin your secondary check. If the guest remains unresponsive, you will need to do an examination, starting at the head and ending at the feet. You are looking for any additional signs of injury or illness during this exam. This includes looking for wounds, deformities, tenderness, or swelling.

If responsive, place the guest in a position that is most comfortable for them. Keep them in the recovery position if you have any concerns about vomiting. Gain consent and begin the examination. As you go, get feedback from the guest concerning locations of tenderness or unusual sensations. Ask if the guest has had any previous medical problems or is currently taking any medications for the condition. If the guest is ill, look for signs like hives, rashes, or temperature extremes. More information on the secondary check, how to identify injuries and illnesses, and the appropriate first aid care to provide, is detailed in chapters 13 and 14.

Rescue Breathing

Rescue breathing is the process of manually providing oxygen to the lungs of a guest in respiratory arrest by giving ventilations using your own breath, or by an artificial means, such as the use of a ***bag valve mask (BVM)*** **(Figure 10.8)**. Personal protective equipment (PPE) is important when caring for a guest. When using your own breath, be sure to use a barrier device, such as a ***resuscitation mask*** **(Figure 10.9)**. These methods can provide adequate ventilations while also minimizing the likelihood of disease transmission.

Figure 10.8 Rescuers can provide rescue breathing by using a bag-valve-mask (BVM). This is an adult example. Additional sizes are available.

Figure 10.9 Rescuers can provide rescue breathing by breathing into a resuscitation mask. This mask is typical of what lifeguards carry in their hip pack.

Opening the Airway

To provide rescue breathing, you must first open the guest's airway so that the tongue does not restrict the back of the throat. There are three common maneuvers used by lifeguards (and other health care level providers of BLS) to open the airway:

- ***Jaw trust with head tilt***
- ***Jaw thrust without head tilt***
- ***Head-tilt, chin-lift***

The jaw thrust with head tilt is commonly used to open the airway when spinal injury is not suspected by lifeguards. To perform, position yourself at the top of the guest's head. Place your index and middle fingers of both hands behind the angle of the guest's jaw, and your thumbs on the cheekbones. Lift the jaw with your fingers and tilt the head back **(Figure 10.10)**. This method will be used by lifeguards when checking for breathing in the water. This will be discussed in chapter 16.

Figure 10.10 Opening the airway using the Jaw Thrust with head tilt.

Adults require more head tilt than children. Do not hyper-extend the neck of a child or infant, as this could cause narrowing of the trachea. An infant's head should be kept in a neutral position, where the chin is flat

and the head is tilted only slightly back. The jaw thrust without head tilt is the preferred method used by professionals to open the airway when a spinal injury is suspected. In this case, it would be unwise to tilt the head back, as this might cause further damage to the spine. Position yourself at the top of the guest's head. Place your index and middle fingers of both hands behind the angle of the guest's jaw, and your thumbs on the cheekbones. Lift the jaw with your fingers but do not tilt the head back. This will displace the tongue enough so that rescue breathing will be successful **(Figure 10.11)**.

Figure 10.11 Opening the airway using the Jaw Thrust without head tilt.

Figure 10.12 Head-tilt, chin-lift can be used to open the airway.

The head-tilt, chin-lift can also be used to open the airway when a spinal injury is not suspected (**Figure 10.12**). To perform, place your thumb just below and parallel to the guest's lips, with your index finger extended along the jaw line and middle finger just under the chin. Place your other hand on the guest's forehead or top-front portion of the head. Keeping your hands in these positions, gently and simultaneously lift the chin and tilt the head backwards. Open the mouth of the guest with the hand/thumb on the chin. As mentioned previously, this method can be used during the primary check (on land) to elongate the neck to aid in finding the carotid pulse on adults and children over the age of 1 year.

Providing Ventilations

With the airway open, provide rescue breathing in a manner that minimizes the risk of disease transmission. Health care providers commonly use devices such as resuscitation masks when responding to emergencies as a part of their job. These devices involve a face mask and a one way valve that attaches to the mask. The mask must be sealed properly on the guest's face, while maintaining an open airway. Using one of the jaw thrust techniques, hold the mask securely to the face with your thumbs. Provide ventilations through the one way valve **(Figure 10.13)**. Adjust appropriately when a different barrier mask is used, while being certain of an open airway and seal.

Figure 10.13 Use a resuscitation mask and jaw thrust to provide rescue breathing.

A bag-valve-mask (BVM) is a BVM is a skill that even experienced providers need to frequently practice to maintain proficiency. The BVM provides a higher concentration of oxygen than a resuscitation mask alone. When connected to an oxygen cylinder, the BVM provides the highest concentration of oxygen possible during rescue breathing. This will be discussed further in chapter 12.

The BVM is best used when two rescuers are available (**Figure 10.14**). One rescuer holds the mask securely to the face and maintains an open airway and a seal. This rescuer can also monitor the mask opening for vomit. The second rescuer squeezes the bag to provide ventilations. This rescuer should focus on the guest's chest as the bag is squeezed, to confirm chest rise.

For adults, select a BVM capable of delivering the intended delivery target 500-600 ml of tidal volume for each ventilation. Most adult sized BVMs have a maximum tidal volume potential of 1000 ml or more. Learn your equipment and adjust how you squeeze the bag accordingly.

Figure 10.14 Providing ventilations with a bag-valve-mask requires two rescuers.

For children and infants, select an appropriate sized pediatric BVM to accomplish the reduced tidal volume needed for younger ages, when compared to adults. Approximate ranges for children are 90-500 ml. Infants will approximately range from 25-90 ml (based on 50th percentile, 5-8ml per kg).

To provide high quality ventilations, apply the following guidance:

- For Adults with a pulse but not breathing: Provide 1 ventilation every 6 seconds for 2 minutes (20 ventilations), then reassess pulse and breathing.
- For children and infants with a pulse, but not breathing: Provide 1 ventilation every 2-3 seconds for 2 minutes (at least 40 ventilations), then reassess pulse and breathing. Each ventilation should be given gently, over the course of 1 second.
- If delivering a breath using a resuscitation mask, take in a normal amount of air before each rescue breath. "Normal" would be defined as the same inhalation you would make if you were not providing care.
- If delivering a ventilation with a BVM (you are squeezing the bag) use one hand to squeeze the bag and the other hand keeping the bag straight and connections aligned (oxygen, valves, etc.).
- As you deliver each 1 second ventilation, carefully watch the guest's chest. As soon as you detect chest rise (or at the 1 second mark), cease delivery to help avoid over ventilation.
- If the chest does not rise during your 1 second delivery: Stop the ventilation, remove the mask and reopen the airway. Reposition the mask and reattempt your ventilation. If your second attempt at delivering a ventilation is unsuccessful, the guest may an airway obstruction that needs to be cleared.

Table 10.1 Rescue Breathing Overview

Group	Age Distinction	Key Points
Adult	After the onset of adolescence.	1 ventilation (lasting 1 second) Look for the chest to start to rise with each ventilation. Repeat every 6 seconds and reassess every 2 minutes.
Child	1 year to onset of adolescence (approximately 9 - 12 years of age).	1 ventilation (lasting 1 second) Look for the chest to start to rise with each ventilation. Repeat every 2-3 seconds and reassess every 2 minutes.
Infant	Recently born (home from the hospital) to about 1 year of age.	1 ventilation (lasting 1 second) Look for the chest to start to rise with each ventilation. Repeat every 2-3 seconds and reassess every 2 minutes.

Special Situations

Laryngectomy

A guest who has had a ***laryngectomy*** has had the larynx surgically removed. This guest breathes through a small opening in the front of the neck called a ***stoma*** **(Figure 10.15)**. To provide rescue breathing for a guest with a laryngectomy, close the guest's mouth and nose, place a pediatric sized resuscitation mask over the stoma, and give ventilations. If a breathing tube is present a bag-valve-mask (BVM) can be attached directly to the tube.

Figure 10.15 A guest with a laryngectomy breathes through a stoma.

Vomiting

If a guest begins to vomit while providing care, quickly roll the guest onto their side, similar to the recovery position. With your gloved hand, wipe the guest's mouth clean. Carefully roll the guest back and continue the care that was interrupted. If you have immediate access to a manual suction device, this may also be used to clear the airway (**Figure 10.16**). To use a manual suction device, follow the specific directions that apply to your device.

Figure 10.16 A manual suction device may be used to clear vomit from the airway.

The following recommendations may be generally applied when these are used:

- Do not use on small children or infants unless the device is specifically designed for that age group.
- Before using: make sure the guest's body and head are turned to the side. If the guest is actively vomiting, allow the reflex to complete (removing anything solid with your gloved hand).
- Place the suction opening no farther than the base of the tongue or interior cheek and engage the device.
- Use the device quickly so that the care interrupted can be resumed (10 seconds or less is the target).
- Once vomit is removed with the device, secure the container, including replacing any protective cap and store in a position that will reduce the likelihood of leakage or accidental contact. If feasible (and it does not delay resumption of care) consider replacing the container in anticipation of additional vomiting.
- Properly dispose of fluid filled containers following your facility's exposure control plan.

It is generally recommended to have someone designated on your response team (who is not also assigned to perform compressions, airway management, or ventilations) to handle the used device and/or containment cartridge, if possible. This will allow rescue breathing or CPR care to immediately resume, without further interruption. If you are a lone rescuer and the guest vomits, focus on clearing the airway with your gloved hand.

Dentures

If you are providing rescue breathing for a guest with dentures, it is not necessary to remove them. Dentures will help maintain the seal of a resuscitation mask. However, if the dentures are very loose and may prevent air from entering freely, then the dentures should be removed.

Air in the Stomach

When providing rescue breathing ventilations, it is important to provide careful, monitored delivery to avoid getting air into the guest's stomach (gastric distention) which can result in vomiting. Even if vomit is not seen, stomach contents may regurgitate internally into the lungs (aspirate). It is estimated that nearly half of all BLS care involving rescue breathing will have either regurgitation resulting in aspiration or external vomit. There is an association with this occurring and longer hospital stays following resuscitation, among other negative outcomes. While these events are not always caused by over ventilations, it remains a frequent cause - and one that can be avoided. As a lifeguard, it is important that you are aware of the possibility and actively take steps to manage what is within your control.

Air in the stomach often results from one of the following errors:

- Not properly opening the airway or maintaining a consistent open airway during care.
- Giving ventilations that are too deep - exceeding 1 second and continuing after chest rise is seen.
- Giving ventilations too fast - at a rate that exceeds the recommended for the age group.
- Delivering a tidal volume that exceeds what is recommended for the size and age of the guest.

You can avoid air in the stomach and other unwanted issues by providing ventilations lasting 1 second, delivered every 6 seconds for adults (10 breaths per minute) or every 2-3 seconds for children and infants (20-30 breaths per minute). Always carefully monitor the chest as each ventilation is delivered. As soon as chest rise is detected, stop the ventilation delivery. If you are not the one providing the ventilations and you notice that they are being delivered in a manner that may result in over ventilation, say something. Successes and errors during resuscitation efforts will occur, based on the actions and inactions of individual team members. Errors will occur from time to time, but recognizing them and correcting will minimize the impact.

Suspected Spinal Injury

If you are caring for a guest that may have a spinal injury either from an injury in the pool or from some type of blunt force, you should take steps to avoid moving the victim's head and neck more than is needed. To open the airway, you want to modify your approach and use the jaw thrust without head tilt as discussed earlier in this chapter. You should always be careful and gentle with guests as you provide care, but extra concern needs to happen when dealing with a possible head, neck or back injury. However, it is important to remember that suspected spinal injuries are always secondary to your primary concern of moving oxygenated blood throughout the guest's body. If the guest is unable to do this on their own, you and the lifeguard team will need to assist with rescue breathing or CPR. No injuries, including suspected spinal injuries are more important than basic life support.

Careful, Quality Rescue Breathing - A Difference Maker

Ventilations must be provided in a manner that does not over-inflate the lungs or end up with air in the stomach. Ventilating too frequently, forcefully, or at a higher volume than is needed for the size/age of the guest can damage the lungs, reducing their capacity to transfer oxygen into the blood stream and remove waste gases. Over ventilation will cause distention of the abdomen that can result in vomiting or regurgitation and aspiration, which can also damage the lungs and further reduce their capacity. Over ventilation may cause the lungs to not fully inflate and increase internal pressure which will decrease the amount of blood that returns to the heart.

Careful, quality rescue breathing makes every other BLS effort more likely to be successful and should not be under appreciated. It is a true difference maker.

Opioid Overdose

Opioid drugs and medications depress the central nervous system resulting in loss of consciousness and depressed or absent breathing. Approximately 115 people die every day in the United States due to an opioid overdose or complication and this is trending to get worse. The opioid crisis effects nearly every demographic, with the primary age range of victims being aged 25 - 65. Increasingly, children are affected through accidental ingestion of prescribed medications. Unfortunately, it is more likely that lifeguards will experience an opioid overdose related emergency in the coming years.

Opioid Overdose Response Protocol

The following protocol is recommended when confronted with a possible or known opioid overdose emergency. When an opioid overdose is suspected, the priority of care adjusts to emphasize airway, breathing, circulation, and stimulating the central nervous system. If the overdose is from a different drug or substance, contact Poison Control at (800) 222-1222.

- **Recognize a possible emergency and take action.**
- **Survey the Scene for safety.** Take standard precautions. Be cautious of drug paraphernalia and drug residue. If possible (and safe to do so) secure or isolate any remaining drugs and drug paraphernalia to avoid accidental contact.
- **Check for responsiveness. "Tap and Shout".** Consider the patient to be unresponsive if they are clearly intoxicated or struggles to remain responsive without your continued efforts to stimulate. If the patient is responsive, place in the recovery position and evaluate for other issues using the Secondary Check (opioid overdose is not likely the issue if responsive as defined). If you believe this guest is a victim of an opioid overdose, proceed with the following:

Unresponsive

1. **Activate the Emergency Response System.** If at your facility, follow your EAP and communications. If you are not at your facility, shout for help and call 9-1-1 on your mobile phone (place on speaker) as you continue with care.
2. **Ask someone to retrieve an AED, Supplemental Oxygen, and *naloxone* or communicate to other responders on your team that these items are needed at the scene**. If you are not at work, completely alone, and these items are near by and accessible to you, place the patient in the recovery position and retrieve. Return to the patient as quickly as possible.
3. **Open the Airway and Quickly Check for Breathing.** Use and maintain the jaw thrust (similar to how it is performed in the water) or the head-tilt, chin-lift. Bring your ear within inches of the patient's mouth and look at the chest. Look, listen, and feel for signs of breathing. Take about 5 seconds but no more than 10 seconds to determine. If you are confident that the patient is breathing, place in the recovery position and continuously attempt to wake up the patient through on-going "Tap and Shout" like stimulus. Return the patient face up to open the airway and check for breathing after several seconds of "Tap and Shout". If oxygen is available, consider providing while continuing the "Tap and Shout" and "Check for Breathing" sequence. *Administer naloxone* as soon as it becomes available at the scene*.

Not Breathing

4. **Check for a pulse for up to 10 seconds.** If a pulse is found, begin Rescue Breathing. If no pulse is found, begin CPR, attaching an accessible AED as soon as it is available at the scene.

Naloxone Available at the Scene

5. **Pause care and administer a dose of Naloxone*, then resume the care that was interrupted.** If working as a team, care can continue while this is done. Proceed with Rescue Breathing or CPR/AED care in the same manner you would normally, until EMS arrives and takes over. **NOTE:** Once Rescue Breathing or CPR/AED care is started, only pause care if naloxone is at the scene. *Rescue Breathing or CPR/AED care should not be paused to retrieve naloxone.* Someone should be sent to retrieve to allow care to continue, if it is available.

Be prepared for the patient to be aggressive and possibly violent if they become responsive (or more responsive) following the administration of naloxone. The patient should be monitored and when EMS arrives, encouraged to be transported. Depending on the amount taken and opioid type, they may quickly fall back into an impaired state and need additional naloxone and BLS care.

*Administration of naloxone is discussed in chapter 14.

Airway Obstruction (Choking)

Airway obstruction, commonly called choking, can occur in a responsive or unresponsive guest.

Airway Obstruction in a Responsive Adult or Child

Airway obstruction (choking) in a responsive adult most often results from an object, such as food, becoming lodged in the throat. Children and infants also choke on small objects such as coins or toys. A choking guest may clutch the throat in what is commonly referred to as the universal distress sign of choking **(Figure 10.17)**.

Figure 10.17 Universal distress sign of choking.

If the guest can cough, the airway is only partially obstructed. Encourage the guest to continue coughing. This often aids in dislodging the obstruction. If the guest cannot cough, speak, cry, or breathe, or is coughing weakly or making high pitched "crowing" sounds, the airway is severely obstructed, and immediate care is needed.

If the choking guest is an adult or child, use the ***Heimlich Maneuver*** to dislodge the obstruction. Stand behind the guest. Reach around the guest's waist with one hand and locate the navel. Make a fist with your other hand and place the fist just above the navel. Grasp your fist and give inward and upward thrusts to force the object out **(Figure 10.18)**. Repeat these thrusts until the object is dislodged or the guest becomes unresponsive. If the guest becomes unresponsive, you will need to begin CPR. Be prepared with good body mechanics to accept the weight of the guest if they collapse while giving the Heimlich. Hook your arms at your elbows to to secure the guest slowly to the ground. Be extra careful to protect their head.

If a choking guest is too large and you are unable to reach around the guest to give effective abdominal thrusts, or if the guest is obviously pregnant, give chest thrusts. Reach under the guest's armpits and place the thumb side of your fist against the center of the guest's chest. Grasp your fist with your other hand and give quick, inward thrusts **(Figure 10.19)**.

Figure 10.18 Provide inward and upward abdominal thrusts to relieve an obstruction in adults and children.

Figure 10.19 Provide chest thrusts for a pregnant or large guest.

Airway Obstruction (Choking) In a Responsive Infant

If an infant (recently born, home from the hospital to 1 year of age) is responsive and choking, use a series of back slaps and chest compressions to relieve the obstruction.

Follow these steps to relieve a severe airway obstruction in an infant:

1. Grasp the infant's jaw, position the infant's face down on your forearm, and lower your forearm to your leg.
2. Use the heel of your free hand to give 5 back slaps between the infant's shoulder blades **(Figure 10.20).**
3. Grasp the back of the infant's head, roll the infant face up on your forearm, and lower your forearm to your leg.
4. With your free hand, place 2 fingers on the breastbone, about a finger width below the nipples, and give 5 chest compressions. Each compression should be at least 1/3 the depth of the chest (about 1.5 inches) and allow the chest to fully recoil after each compression **(Figure 10.21).**
5. Look in the mouth for any object. If an object is visible sweep the object out with your gloved finger.
6. Repeat these steps until the obstruction is dislodged or the infant becomes unresponsive. If the infant becomes unresponsive, begin CPR.

Figure 10.20 Provide 5 back slaps between the infant's shoulder blades to relieve an obstruction.

Figure 10.21 Provide 5 chest thrusts following back slaps to relieve an obstruction.

Airway Obstruction In an Unresponsive Guest

If a ventilation fails to make the chest rise, stop your delivery (do not breathe harder or increase the volume). The obstruction is most likely due to an improper airway position.

If this occurs, perform the following steps:

1. Remove the mask, then reapply confirming it is over the mouth and sealed properly (positioned correctly for the type of mask being used).
2. Reapply the open airway maneuver, with slightly more head tilt than before. If an infant, make sure the tilt is still slight, although a bit more than before.
3. Once you have the mask sealed and the airway repositioned, reattempt your ventilation.

Figure 10.22 Look in the mouth. If you see an object sweep it out with your finger.

If still unsuccessful, suspect an airway obstruction and begin (or resume) CPR. Provide 30 chest compressions, then before attempting ventilations, look in the mouth for any object and sweep the object out with your finger if you see it **(Figure 10.22)**. Attempt 2 ventilations (repeating the step sequence above if needed). This is normally all that is needed to dislodge the object. Repeat the entire process until chest rise is obtained. How to perform chest compressions and CPR are discussed in the next chapter.

FOR YOUR REVIEW

Summary

The respiratory system is responsible for delivering oxygen to the lungs during inhalation and removing waste products, such as carbon dioxide, during exhalation. This continuous process is necessary to sustain life. Any interruption in this process from conditions such as choking, suffocation, or drowning, can result in death within minutes. There are numerous causes of respiratory emergencies which can result in respiratory distress when a guest's breathing is compromised, or respiratory arrest, when a guest is no longer breathing. Cardiac arrest occurs when there is no pulse, in addition to the absence of breathing. Prolonged respiratory arrest will lead to cardiac arrest. The Chains of Survival were developed to illustrate the critical actions that need to occur for the guest in cardiac or respiratory arrest to have a chance at survival.

If you encounter a potential emergency situation, your actions may save a life! Survey the scene and if safe, carefully approach the guest. If appropriate, take standard precautions before touching the patient. Check for responsiveness by performing a "Tap and Shout". If a guest is unresponsive and not breathing, but has a pulse, the guest needs rescue breathing which is the process of providing oxygen to the lungs of a guest by giving ventilations using your own breath, or by an artificial means, such as the use of a bag-valve-mask (BVM). If the guest is in cardiac arrest, CPR should be started, which is a combination of chest compressions and rescue breaths. Consider taking standard precautions with personal protective equipment (PPE), such as a resuscitation mask, can be used to effectively provide ventilations. Ventilations should be given at a rate of one every 6 seconds for adults, and one every 2-3 seconds for children and infants. Do not breathe too fast, forcefully, or exceed the recommended tidal volume.

If the guest does not have a life-threatening condition (has a pulse and is breathing) you should perform a secondary check. If they are breathing but are unresponsive, placing the guest in the recovery position will help maintain their airway while you complete the secondary check.

If the guest is suffering from an opioid overdose, follow the opioid overdose response protocol. This includes administering naloxone as soon as it is available and following a priority of care of Airway, Breathing, and Circulation (ABCs), along with attempting to keep the central nervous system (CNS) stimulated.

If the airway is obstructed in a responsive adult or child, perform the Heimlich Maneuver. For responsive choking infants, provide back slaps and chest compressions. If ventilations are unsuccessful, suspect an airway obstruction. Reposition the head and repeat ventilations. If still unsuccessful, provide 30 chest compressions, check the airway, and reattempt ventilations. Continue these steps until the object is removed or professional rescuers take over.

Key Terms

- → Agonal breathing
- → Airway obstruction
- → Bag-valve-mask (BVM)
- → Cardiac arrest
- → Chains of Survival
- → Heimlich Maneuver
- → Jaw thrust
- → Laryngectomy
- → Naloxone
- → Opioid
- → Primary check
- → Recovery position
- → Rescue breathing
- → Respiratory distress
- → Respiratory arrest
- → Resuscitation mask
- → Stoma

Chapter 11
BASIC LIFE SUPPORT: CARDIAC EMERGENCIES

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Describe the components and function of the circulatory system
- Identify risk factors of cardiovascular disease
- Demonstrate how to provide cardiopulmonary resuscitation (CPR) for an adult, child, and infant in cardiac arrest
- Explain the electrical conduction system of the heart
- Explain the two abnormal heart rhythms that the AED can correct
- Identify the elements common to all AEDs
- Describe how an AED works to help a guest in cardiac arrest
- Describe special considerations when using an AED
- Describe how to maintain an AED in proper working condition
- Demonstrate how to use an AED for an adult, child, and infant in cardiac arrest

Chapter Overview

The Circulatory System

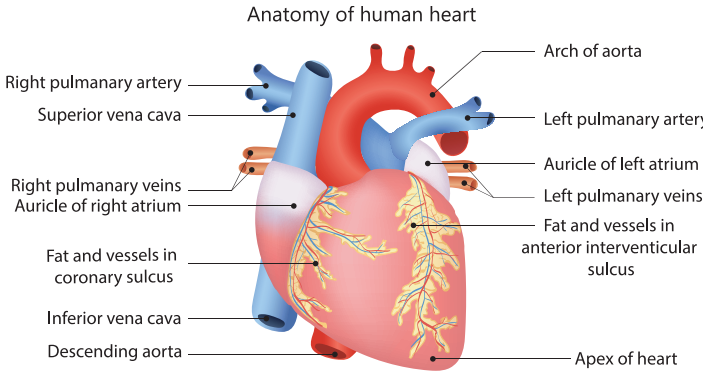


Figure 11.1 The circulatory system.

The circulatory system is made up of the heart and blood vessels. This system delivers oxygen and nutrients throughout the body and removes waste products such as carbon dioxide. The heart is an organ about the size of a guest's fist. It has four chambers through which blood moves in and out. The two upper chambers are the atria. The two lower chambers are the ventricles. The two chambers on the right side of the heart are the right atrium (upper chamber) and right ventricle (lower chamber). These chambers receive oxygen-poor venous blood from the body and pump it to the lungs, where the waste products are removed, and oxygen is picked up and returned to the left side of the heart. The two chambers on the left side of the heart are the left atrium (upper chamber) and left ventricle (lower chamber). These chambers accept the oxygen-rich blood and pump it out to all parts of the body through the arteries **(Figure 11.1)**.

The heart muscle is unique in that it creates its own electrical impulses automatically. These impulses, normally originating in the upper right side of the heart, move along an electrical conduction system in a wavelike pattern throughout the heart. When these impulses reach specialized muscle tissue, the chambers of the heart contract and then relax. This action moves blood throughout the body and generates a pulse. The electrical impulses in the heart can be viewed and interpreted through an electrocardiogram (ECG).

Cardiovascular Disease

Cardiovascular disease includes conditions that involve the heart and the blood vessels (arteries, veins, and capillaries). ***Coronary heart disease (CHD)*** involves the narrowing of the coronary arteries, the blood vessels that supply oxygen and blood to the heart. This is usually caused by atherosclerosis, which is the plaque (cholesterol substances) that accumulates on the inside walls of the arteries, causing them to narrow. This results in reduced blood flow to the heart. CHD commonly causes chest discomfort, shortness of breath, heart attack, or sudden cardiac death, known as cardiac arrest. Diseases of the blood vessels can also affect other organs, such as the brain, resulting in a stroke. Stroke is covered in detail in a later chapter.

Risk Factors for Cardiovascular Disease

There are 8 risk factors commonly associated with cardiovascular disease. Five risk factors that can be controlled are:

- High cholesterol – Total cholesterol level is a measure of all the cholesterol in the blood, including LDL (bad) cholesterol and HDL (good) cholesterol. The higher the LDL (bad) cholesterol number, the greater the risk of developing heart disease from cholesterol build up in the arteries
- High blood pressure – Blood pressure (BP) increases with each heartbeat and decreases when the heart relaxes. Blood pressure constantly changes as a result of exercise, stress, or sleep. For adults at rest, BP for adults should normally be less than 120/80 mm Hg (120 systolic and 80 diastolic)
- Overweight – Body Mass Index (BMI) is a method used to determine if a guest is overweight. It is calculated from a guest's weight and height and provides an indicator of body fatness that can lead to health problems. Although BMI correlates with the amount of body fat, it does not directly measure body fat. Some people, such as athletes, may have a BMI that identifies them as being overweight even though they do not have excess body fat.

- Smoking – Smoking is a major cause of heart disease. A guest's risk of heart disease and heart attack greatly increases with the number of cigarettes smoked. People who smoke are two to four times more likely to suffer heart disease. Women who smoke are twice as likely to have a heart attack as male smokers.
- Diabetes – Adults with diabetes are two to four times more likely to have cardiovascular disease than adults without diabetes. People with diabetes often have other risk factors that contribute to their risk for developing cardiovascular disease.

Risk factors that cannot be controlled are:

- Gender – Coronary heart disease, the single biggest cause of death in the United States, claims men and women in nearly equal numbers each year.
- Heredity – Certain inherited heart conditions can affect the physical structure of the heart and interfere with its ability to pump blood to the rest of the body. Hereditary electrical disturbances (dysrhythmias) can result in a heartbeat that is too fast, too slow or irregular. This can lead to rapid heartbeat, light-headedness, dizziness, fainting, and sometimes sudden death.
- Age – As people age, the risks of cardiovascular disease increase.

Cardiac Arrest & CPR

If the heart muscle is damaged due to prolonged respiratory arrest, complications from cardiovascular disease, or some other illness or injury, it may cease to function, resulting in cardiac arrest. The guest will become unresponsive, non-breathing, and pulseless. The immediate care for a guest in cardiac arrest is to activate EMS, which in most areas of North America means calling 9-1-1, and provide ***cardiopulmonary resuscitation (CPR)*** until a defibrillator is available. At your aquatic facility, the EAP is activated, which will include someone contacting EMS (see *Dealing with Cardiac Arrest Away From Work - Calling EMS* below).

CPR involves providing chest compressions and ventilations that help circulate blood and oxygen to vital organs throughout the body. If you conduct your primary check and confirm that the guest is unresponsive, not breathing, and pulseless, begin CPR starting with chest compressions. Make sure your EAP is activated in order to get an ***Automated External Defibrillator (AED)*** and EMS professionals called to the scene as soon as possible.

Dealing with Cardiac Arrest Away From Work - Calling EMS

At your aquatic facility, many systems are in place to help ensure that a guest in need of assistance (emergency or otherwise) will promptly receive it. Unfortunately, emergencies can happen at any time and at any location. You may to need to use your training away from work, at some point in the future. If this occurs, consider the following guidance about calling for EMS:

CARE PRIORITY: Make sure 9-1-1 is called and an accessible AED retrieved, as quickly as possible.

- For adults, secure emergency services via 9-1-1 and any accessible AED *before* proceeding with care. Ideally, ask a bystander to make the call and retrieve equipment. If you are alone, use your mobile phone, place on speaker and proceed with care. However, if you are alone (no bystanders) and without a phone, place the adult in the recovery position and get to a phone to make the call and retrieve an accessible AED if available. Return to the adult as quickly as possible.
- For children and infants, if bystanders or a phone is not immediately available, proceed with *approximately 2 minutes of care first*, then pause care to secure emergency services via 9-1-1 and any accessible AED and resume care. This also applies when you definitely know the reason for unresponsiveness (you witnessed) is respiratory/airway in nature (e.g. choking), regardless of age.

Providing Quality Chest Compressions on Adults

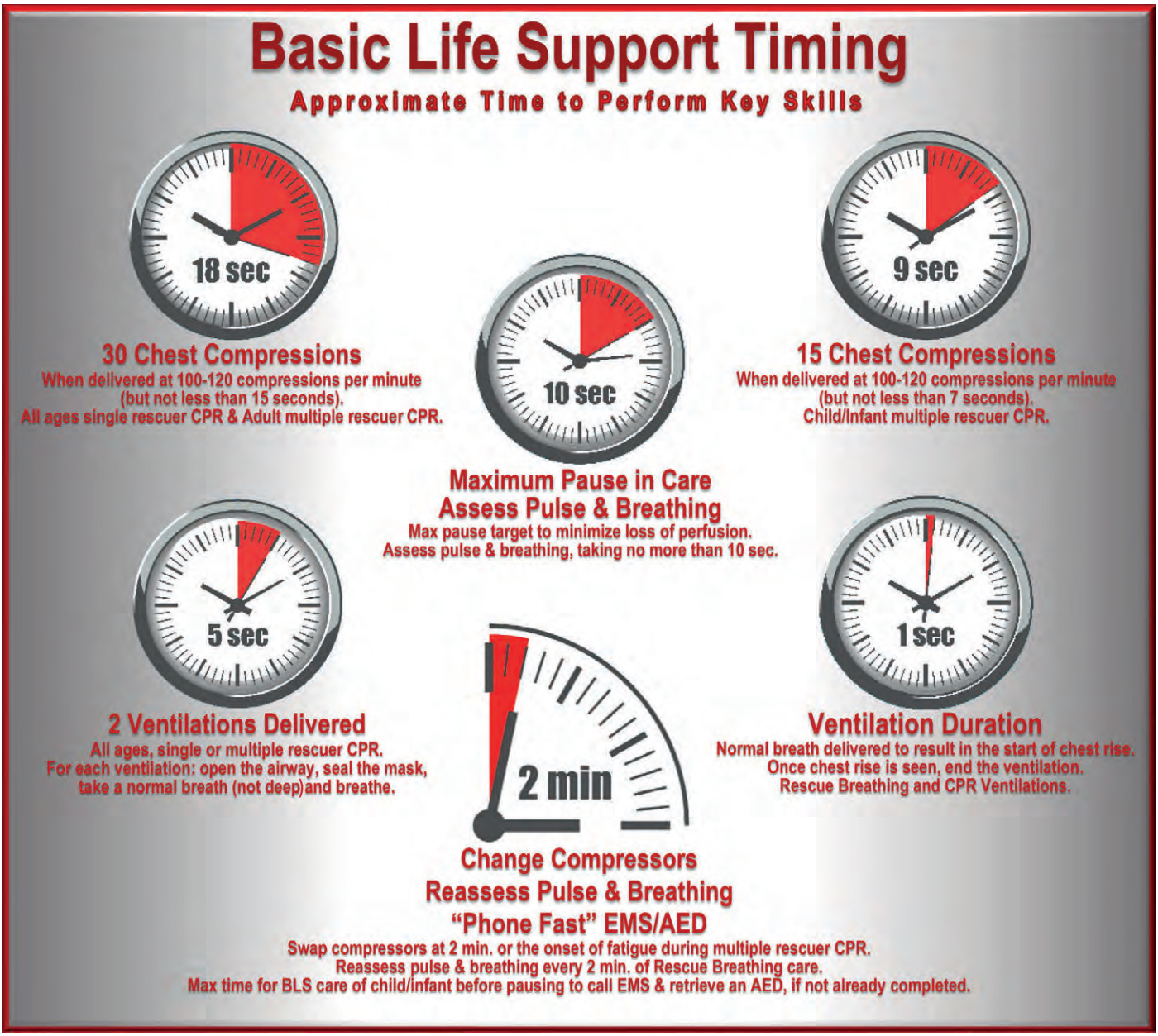
Providing quality chest compressions during CPR is critical for the overall effectiveness of care. For adults specifically, the components needed to accomplish quality compressions include:

- **Ensure the guest is positioned face up, on a flat, firm (hard) surface** (e.g. a backboard).
- **Get on your knees at guest's side, facing the center of the guest's chest.**
- **Position your knees against the guest's side, about a shoulder width apart.**
- **Locate the compression landmark at the center of the guest's chest**, between the guest's nipples, on the sternum. Be careful not to landmark too low on the sternum, to avoid putting pressure on the xiphoid process (delicate notch at the lower end of the sternum) and will be less effective.
- **Place the heel of one hand on the compression landmark,** with the other hand on top, interlocking fingers.
- **Bring your shoulders directly over the guest's chest and straighten both arms and back.**
- **Pivot at the hips to initiate each compression, while keeping both arms straight, push the heel of the first hand, 2 - 2.4 inches deep and then releases to allow the chest to fully recoil**.
- **The rate of each compression and release is performed between 100 - 120 compressions per minute.**
- **Each compression and release is performed rhythmically, in a consistent manner.**
- **Avoid leaning or tilting, keeping arms straight at all times.** Primary contact with the chest during each compressions is the heel of the hand, allowing a very slight loss of contact during the upstroke to help ensure that the chest fully recoils before each subsequent compression.
- **Single Rescuer CPR:** For all ages, perform 30 compressions and then provide 2 rescue breaths. 30 compressions at a rate of 100-120 compressions per minute should take up to 18 seconds to perform (not less than 15 seconds).
- **Multiple Rescuer CPR**: For adults, continue with 30 compressions, with other rescuers assisting with airway management, rescue breaths, and equipment. About every 2 minutes (or if at any point fatigue sets in), the compressor should swap positions with another rescuer. Once the AED is attached, it will call for CPR to pause to allow for heart rhythm analysis. This is an ideal time to swap positions.
- **Primary Objective:** Create and maintain perfusion of oxygenated blood through consistently delivered compressions (coupled with rescue breaths, ideally with a BVM connected to supplemental oxygen). Interruptions to the consistent delivery of compressions must be avoided, once compressions have started, to maintain perfusion. If an interruption is necessary, the rescuer should minimize it to less than 10 seconds in length.

Providing Quality Ventilations During CPR (Single Rescuer)

In the previous chapter, the skill of providing high quality rescue breaths was discussed. CPR includes rescue breathing, which follows compressions. Remember the following guidelines when delivering the rescue breathing component of CPR:

- **Following completion of compressions, take your resuscitation mask and reposition your body to allow quality ventilations to occur.**
- **Open the airway** using the technique best suited to the resuscitation mask being used. Seal the mask on the face over the mouth.
- **Take a normal breath (not deep) and deliver a ventilation lasting 1 second.** When you see the chest start to rise, the ventilation is complete. Take a normal breath and deliver another ventilation lasting 1 second. When you see the chest start to rise, the second ventilation is complete. For adults, each ventilation should have a tidal volume between 500-600 ml. For children and infants, this volume is greatly reduced based on their age/size. Approximate ranges for children are 90-500 ml. Infants will approximately range from 25-90 ml (based on 50th percentile, 5-8ml per kg).
- **Both ventilations should be performed within 5 seconds (unless there is an airway issue).** Immediately return to chest compressions after completing 2 ventilations.



When to Stop CPR

Continue CPR (BLS care) until the person shows signs of life (normal breathing, consciousness, etc.). Stop care and perform a secondary check. Care may also pause or stop under certain conditions:

- If working alone with a child or infant, you pause after 2 minutes of care to call EMS and retrieve an AED (if this was not already done). Resume BLS care as soon as possible.
- You pause at appropriate times, such as when it is time to attach an AED or when the AED advises you not to touch the patient.
- You pause care to take standard precautions due to the presence of body substances.
- The scene is no longer safe. If possible, attempt to move the patient to a safe location and resume BLS care.
- You are too exhausted to continue.
- You are replaced by another rescuer or multiple rescuers able to perform CPR.
- Responding EMS personnel take over care.
- Responding EMS or a physician advises to stop resuscitative efforts.
- Cardiac arrest is prolonged and your protocols allow for discontinuation of care.

Single Rescuer Adult CPR Procedure

Follow these steps to provide adult single rescuer CPR:

1. **Recognize a possible emergency and take action.**
2. **Survey the Scene.** Consider taking standard precautions. Enter the scene if it is safe to do so.
3. **Check for responsiveness.** "Tap and Shout".
4. **If unresponsive, call for help.** Activate the facility EAP. Request EMS be contacted and an AED retrieved.
5. **Check for pulse and breathing for up to 10 seconds.**
6. **If no pulse, begin CPR, starting with compressions.**
7. **Position yourself for quality compressions and deliver 30 compressions at a rate of 100-120 compressions per minute (Figure 11.2).**
8. **Position yourself for quality rescue breaths and deliver 2 ventilations (Figure 11.3).**
9. **Reposition for yourself for quality compressions.**
10. **Continue with 30 compressions followed by 2 ventilations**, repeating until additional rescuers arrive and then transition to Multiple Rescuer CPR.

If you are alone or not at your facility when this emergency occurred, continue CPR (and AED care) until another trained individual arrives to help or until EMS arrives and takes over care (or meet the conditions discussed in *When to Stop CPR*).

Figure 11.2 Chest compressions provided to an adult during CPR.

Figure 11.3 Ventilations provided to an adult during CPR.

Providing Quality Chest Compressions on Children

Many of the same components needed to accomplish this high quality delivery for adults, remain important for children (over the age of 1 year, until the onset of adolescence). Areas unique to children, include:

- **Place the heel of one hand on the compression landmark (same as adult), but with the option to place the other hand on top, interlocking fingers, or proceeding with a single hand.** Generally, one hand is adequate for younger children while two hands may be needed for older children or if you are fatigued. This remains the preference of the rescuer. It may not be necessary to place your knees up against the child, as with adults.
- **Deliver compressions.** While keeping your arm or arms compressing straight, push the heel of the compressing hand, about 2 inches deep (or about 1/3 the depth of the diameter of the child's chest) and then releases to allow the chest to fully recoil. Similar to the adult, allow a very slight loss of contact with the chest to ensure full recoil.
- **Single Rescuer CPR:** 30 compressions, followed by 2 ventilations. The rate of each compression and release is performed between 100-120 compressions per minute.
- **Multiple Rescuer CPR:** 15 compressions, followed by 2 ventilations, delivered at the same 100-120 compressions per minute. It take should just under 9 seconds to complete 15 compressions at this rate.

Single Rescuer Child CPR Procedure

Follow these steps to provide Child single rescuer CPR:

1. **Recognize a possible emergency and take action.**
2. **Survey the Scene.** Consider taking standard precautions. Enter the scene if it is safe to do so and/or alert the team.
3. **Check for responsiveness.** "Tap and Shout".
4. **If unresponsive, call for help.** Activate the facility EAP. Request EMS be contacted and an AED retrieved.
5. **Check for pulse and breathing for up to 10 seconds.**
6. **If no pulse, begin CPR, starting with compressions.**
7. **Position yourself for quality compressions.** Deliver 30 compressions at a rate of 100-120 compressions per minute, 2 inches deep **(Figure 11.4).**
8. **Position yourself for quality rescue breaths and deliver 2 ventilations**. Open the airway gently and seal your resuscitation mask over the child's mouth. Remember to reduce the volume of your breath to accommodate the size and age of the child **(Figure 11.5)**.
9. **Reposition for yourself for quality compressions.**
10. **Continue with 30 compressions followed by 2 ventilations**, repeating until additional rescuers arrive and then transition to Multiple Rescuer CPR.

If you are completely alone (without a phone at the scene) when this emergency occurred, continue CPR for 2 minutes (about 5 cycles of 30 compressions and 2 breaths). If you have not already called EMS and retrieved an AED, pause care to do so. If possible, bring the child with you. If not, place in the recovery position before leaving the scene and return as quickly as possible. After the call, continue CPR until another trained individual arrives to help or until EMS arrives and takes over care (or meet the conditions discussed in *When to Stop CPR*).

Figure 11.4 Use one or two hands to compress the chest of a child during CPR.

Figure 11.5 Ventilations provided to a child during CPR.

Providing Quality Chest Compressions on Infants

Many of the same components needed to accomplish this high quality delivery for adults, remain important for infants. Areas unique to infants, include:

- **An infant may be placed on a table or another safe elevated surface (as an alternative to placement on the ground), provided that the surface is flat and firm (hard) to facilitate chest compressions.**
- **Perform compressions using two fingers.** Landmark by using a finger to trace between the infant's nipples to reach the center of the chest. Place the two fingers being used to compress, about 1 finger's width below the nipple line on the sternum (above the xiphoid process).
- **Compress the chest with two fingers about 1.5 inches deep** (or about 1/3 the depth of the diameter of the infant's chest) and then release to allow the chest to fully recoil. Similar to the adult, allow a very slight loss of contact with the chest to ensure full recoil.
- **Single Rescuer CPR:** Provide 30 compressions then 2 breaths at a rate between 100- 120 compressions per minute.
- **Multiple Rescuer CPR:** Using two thumbs, provide 15 compressions, then 2 breaths at a rate between 100-120 compressions per minute. It should take just under 9 seconds to complete at this rate.

Single Rescuer Infant CPR Procedure

Follow these steps to provide Infant single rescuer CPR:

1. **Recognize a possible emergency and take action.**
2. **Survey the Scene.** Consider taking standard precautions. Enter the scene if it is safe to do so and/or alert the team.
3. **Check for responsiveness.** "Tap and Shout" (gently).
4. **If unresponsive, call for help.** Activate the facility EAP. Request EMS be contacted and an AED retrieved.
5. **Check for pulse and breathing for up to 10 seconds.**
6. **If no pulse, begin CPR, starting with compressions.**
7. **Position yourself for quality compressions.** Deliver 30 compressions at a rate of 100-120 compressions per minute, 1.5 inches deep **(Figure 11.6).**
8. **Position yourself for quality rescue breaths and deliver 2 ventilations**. Open the airway gently and seal your resuscitation mask over the infant's mouth. Remember to reduce the volume of your breath to accommodate the size of the infant **(Figure 11.7)**.
9. **Reposition for yourself for quality compressions.**
10. **Continue with 30 compressions followed by 2 ventilations**, repeating until additional rescuers arrive and then transition to Multiple Rescuer CPR.

If you are alone or not at your facility when this emergency occurred, continue CPR for 2 minutes (about 5 cycles of 30 compressions and 2 breaths). If you have not already called EMS and retrieved an AED, pause care to do so, bringing the infant with you. After the call, continue CPR until another trained individual arrives to help or until EMS arrives and takes over care (or meet the conditions discussed in *When to Stop CPR*).

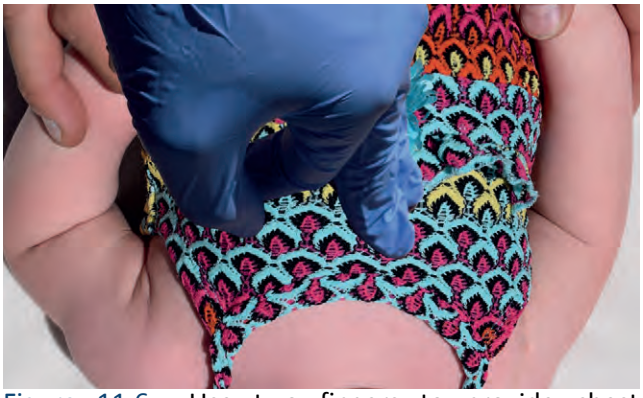


Figure 11.6 Use two fingers to provide chest compressions to an infant.

Figure 11.7 Ventilations provided to an infant during CPR.

Pregnancy and CPR

If a pregnant woman is in cardiac arrest, she needs CPR just like anyone else. But placing a woman in the later stage of pregnancy flat on her back can result in the weight of the fetus compromising blood flow in and out of the heart. You can correct this by carefully moving the fetus toward the left side of the abdomen, a technique known as ***lateral uterine displacement (LUD)***. Hold the fetus in this position while chest compressions are provided by other responders.

Multiple Rescuer CPR

Health care providers including nurses, physicians, EMS, and lifeguards often respond to cardiac arrest as part of a team. Two or more rescuers can work more efficiently than a single rescuer (**Figure 11.8**). Performing CPR as part of a team enables rescuers to change positions when one tires during chest compressions. This should be done about every two minutes to ensure that compression depth and rate are maintained at an optimal level. In multiple-rescuer CPR, one rescuer provides chest compressions and a second and third rescuer provide ventilations with a bag-valve-mask (BVM). Supplemental oxygen and an AED can also be more easily deployed, keeping interruptions to compressions to an absolute minimum (**Figure 11.9**).

Figure 11.8 Two-rescuer CPR for an adult.

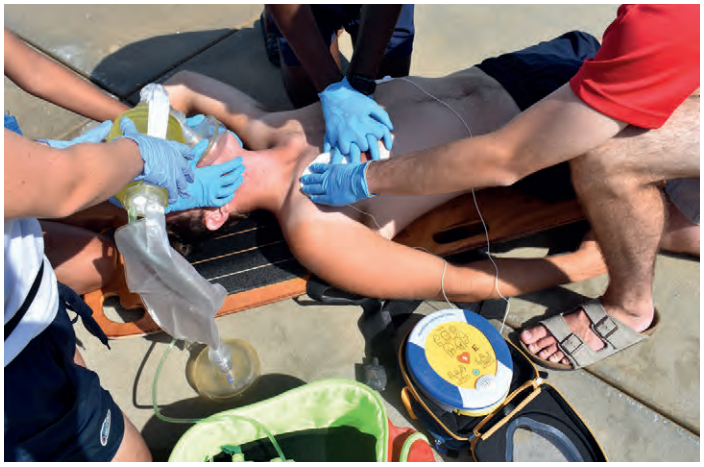


Figure 11.9 Multiple rescuers allow maximum care, using all the equipment available to the lifeguard team, with minimal interruptions to care.

Figure 11.10 Multiple rescuer CPR for an infant.

When performing multiple-rescuer CPR on an adult, the compression to ventilation ratio remains the same as one-rescuer CPR which is 30:2. When performing multiple-rescuer CPR on a child or infant, the compression to ventilation ratio changes to 15:2. When multiple-rescuers perform CPR on an infant, the rescuer providing compressions should use two thumbs to compress the chest, while encircling the infant's chest with both hands **(Figure 11.10)**.

Circulatory Assist Devices

Circulatory assist devices offer alternatives to conventional manual cardiopulmonary resuscitation (CPR). EMS personnel may use such devices as part of the care they provide upon arrival. These devices use a circumferential vest or an automatic mechanical piston. These devices are designed to provide continuous maximum compression and maximum recoil helping improve blood return to the heart while preventing rescuer fatigue **(Figures 11.11a and II.11b).**

Figure 11.11a Mechanical CPR Device – Lucas

Figure 11.11b Mechanical CPR Device - AutoPulse

Basic Life Support Summary Matrix

Health Care Provider Level Care – 2020 ECC Guidelines

Care Steps	Adults (Adolescence* and older) *Onset	Children (1 year of age to adolescence*) *Onset	Infants (Newborn* - 1 year of age) *Home from the hospital
Scene safety and recognition	Determine scene safety, PPE. Check for responsiveness: "*Tap and shout*"	Determine scene safety, PPE. Check for responsiveness: "*Tap and shout*"	Determine scene safety, PPE. Check for responsiveness: "*Tap and shout*"
Patient position and airway	Place adult face up (firm, flat surface). Tilt head backward, lift chin/jaw to open the airway.	Place child face up (firm, flat surface). Tilt head backward, lift chin/jaw to open the airway.	Place infant face up (firm, flat surface). Tilt head *slightly* backward, lift chin to open the airway.
Simultaneously Assess pulse/breathing	Look for chest rise and fall. Listen and feel for breathing. Attempt to find the *carotid pulse* in the neck for no more than 10 seconds.	Look for chest rise and fall. Listen and feel for breathing. Attempt to find the *carotid pulse* in the neck for no more than 10 seconds.	Look for chest rise and fall. Listen and feel for breathing. Attempt to find the *brachial pulse* in the arm for no more than 10 seconds.
Pulse present, Normal Breathing absent	Provide rescue breathing: 1 breath every 6 seconds with a resuscitation mask or BVM. Attach oxygen when/if available.	Provide rescue breathing: 1 breath every 2-3 seconds with a resuscitation mask or BVM. Attach oxygen when/if available.	Provide rescue breathing: 1 breath every 2-3 seconds with a resuscitation mask or BVM. Attach oxygen when/if available.
Pulse & Breathing absent or uncertain	Provide High Quality CPR: 30 Chest compressions. (two hands), center of chest and 2 breaths using a mask with O2 when/if available. Use AED when available.	Provide High Quality CPR: 30 Chest compressions. (1 or 2 hands), center of chest and 2 breaths using a mask with O2 when/if available. Use AED when available.	Provide High Quality CPR 30 Chest compressions. (two fingers), just below the nipple line and 2 breaths using a mask w/O2 when/if available. Use AED when available.
Multiple rescuers	CPR Ratio: 30:2 Alternate compressors every 2 min. Ventilate with Adult BVM and oxygen when/if available.	CPR Ratio: 15:2 Alternate compressors every 2 min. Ventilate with Pediatric BVM and oxygen when/if available.	CPR Ratio: 15:2 Using the two-thumb method, alternate compressors every 2 min. Ventilate with Infant BVM and oxygen when/if available.
High Quality Chest Compressions	Depth: 2 – 2.4 inches (5 – 6 cm). Rate:100-120 compressions/min (nearly 2 compressions per second). Allow full recoil. Limit interruptions to ≤10 sec.	Depth: 2 inches (about 5 cm) or 1/3 chest depth. Rate:100-120 compressions/min (nearly 2 compressions per second). Allow full recoil. Limit interruptions to ≤10 sec.	Depth: 1.5 inches (about 4 cm) or 1/3 chest depth. Rate:100-120 compressions/min (nearly 2 compressions per second). Allow full recoil. Limit interruptions to ≤10 sec.
High Quality Ventilations	Duration: About 1 second. Volume: Achieve visible chest rise (Approximate range 500-600 ml)	Duration: About 1 second Volume: Achieve visible chest rise (Approximate range 90-500 ml)	Duration: About 1 second Volume: Achieve visible chest rise (Approximate range 25-90 ml)

Automated External Defibrillation (AED)

The Heart's Electrical Conduction System

The electrical conduction system of the heart sends the signal that results in the contraction of the chambers of the heart and the pulse that is felt. The normal electrical impulse in the heart originates in the sinoatrial (SA) node, found in the upper part of the right atria. This impulse occurs about once every second and travels along pathways within both atria. The impulse moves downward, passing through the atrioventricular (AV) node located between the atria and ventricles.

Beneath the AV node, the electrical pathway divides into the right and left bundle branches, extending into the corresponding two ventricles. When the electrical impulse reaches the purkinje fibers in the ventricles, the heart muscle contracts, forcing blood to move throughout the body **(Figure 11.12)**.

The Cardiac Conduction System

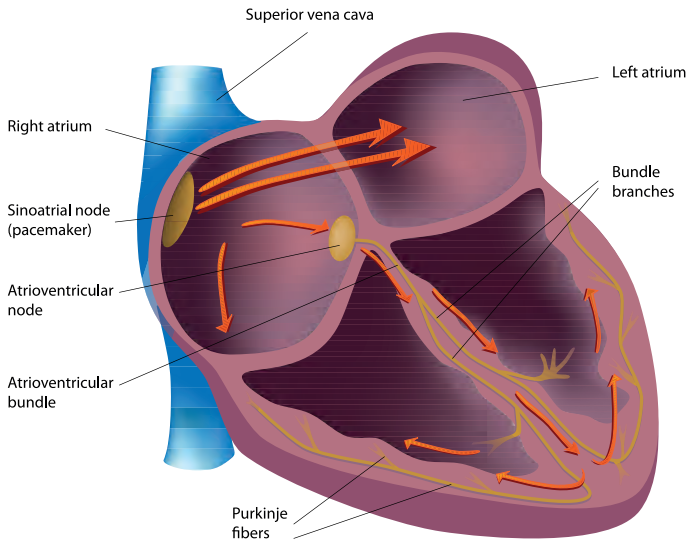


Figure 11.12 The heart's electrical conduction system.

When the normal electrical activity of the heart is interrupted, electrical disturbances known as dysrhythmias will occur. These dysrhythmias can be viewed as tracings on an electrocardiogram (ECG). Two of the most common life-threatening dysrhythmias seen in the first few minutes of sudden cardiac arrest are ventricular tachycardia (V-tach) and ventricular fibrillation (V-fib). ***Ventricular tachycardia*** causes the ventricles to beat far too fast. The chambers cannot fill properly or pump blood effectively. ***Ventricular fibrillation*** is disorganized, chaotic electrical activity that results in quivering of the ventricles. Blood cannot be pumped out of the heart so the guest will be pulseless.

About AEDs

An ***Automated External Defibrillator (AED)*** is a portable electronic device applied to a guest in cardiac arrest. It can analyze the heart rhythm and deliver an electric shock, known as ***Defibrillation***, to the heart of a guest to correct ventricular fibrillation or ventricular tachycardia. The goal of defibrillation is to reestablish a viable heart rhythm by shutting down the heart (asystole), enabling the heart to restart with normal electrical and mechanical function. Besides analyzing the heart rhythm and delivering a shock if needed, an AED also records data such as the number of shocks delivered, changes in the ECG, the date, and the time of use. There are several different AED manufacturers **(Figure 11.13)**.

Figure 11.13 All AEDs can analyze the heart rhythm, deliver a shock (defibrillation) if needed, and store data.

Beyond the minor differences in appearance (color, size, buttons, voice) AEDs have the following commonalities:

- Battery operated
- Self - maintained internal diagnostics
- Power on/off
- Voice prompts to guide users
- Cable and electrode pads to attach to the chest
- ECG analysis capability
- Defibrillation capability

Using an AED

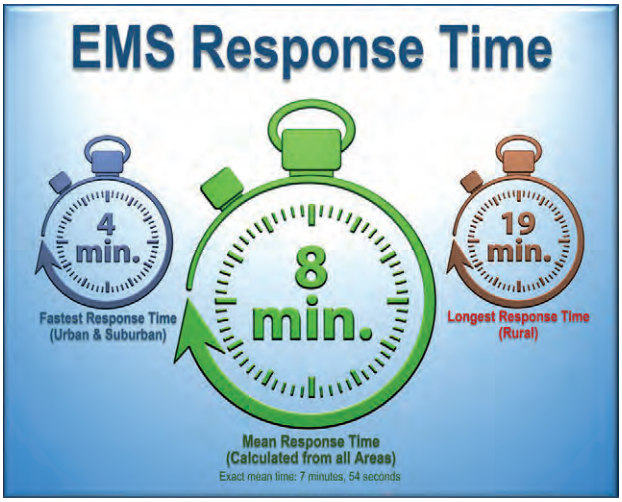


Figure 11.14 A recent study examined EMS response in the United States and found the mean response time was just under 8 minutes, when accounting for all area types (suburban, rural, and urban areas). The range of individual EMS response times recorded was 4 minutes (fastest) to 19 minutes (longest).

The initial care for a guest in cardiac arrest involves giving CPR until a defibrillator is available. For every minute that defibrillation is delayed, the chance that a guest in cardiac arrest will survive decreases 7% - 10%. Generally speaking, if an AED can be attached to someone in cardiac arrest (and is also already receiving high quality CPR) within the first 3 minutes, their chances of survival are higher. The key is how quickly critical care steps are started, following the onset of cardiac arrest. This includes: recognition of a possible emergency and acting, determining what care is needed and starting it, retrieving an AED, and contacting EMS.

Depending on the location of your aquatic facility (or the non-work location you happen to be at when you are helping someone in need), EMS may take around 8 minutes to arrive, following the call (the mean response time for all areas in the United States). However, there may be times when EMS is unable to arrive that quickly, even in urban areas. Response time may be even longer in rural areas (**Figure 11.14**). When EMS personnel arrives, they will have access to advanced equipment, medications and either a manual defibrillator or an AED. This advanced care is critical, as described previously in the *Chain of Survival*. However, the combination of CPR and the use of an AED before EMS arrives, has been shown to have the largest impact on patient survival and quality of life. The more you and your team can do in those first few minutes, the better the chances for a positive outcome.

Once an AED is available, turn the device on and follow the prompts. Prepare the guest's chest. This involves removing clothing, drying the chest if damp, and shaving any excessive hair where the electrodes will be placed. A "Ready Kit" is part of the AED, and normally includes scissors, razor, and a drying cloth for the purpose of preparing the guest's chest **(Figure 11.15)**. Remove the two ***electrode pads*** from the package. Peel the protective backing off the pads and place the pads on the chest according to the diagram on the packaging. For adults, one pad is placed just below the right collarbone. The other pad is placed on the lower left side of the chest **(Figure 11.16)**. Pad placement varies for children and infants. Follow the manufacturer's instructions for use of pediatric pads if you have these available. With the cable attached to the AED, the device will immediately begin analysis of the heart's electrical activity once the second electrode pad is attached. Stand clear and allow the device to analyze the rhythm **(Figure 11.17)**.

Figure 11.15 If the guest's chest is wet dry the chest in the areas where the electrode pads will be placed.

Figure 11.16 Electrode pads are placed on a bare, dry chest.

Figure 11.17 Make sure no one is in contact with the guest once the electrodes are attached.

Figure 11.18 Automatic AEDs deliver the shock without user aid. Semi-automatic devices require the user to press the shock button.

Figure 11.19 Provide 2 minutes of CPR between shocks, or whenever a shock is not advised.

The AED will advise when it is necessary to administer a shock. Some AED's are fully automated and will administer the shock automatically. Others are semi-automatic requiring the operator to push a flashing "shock" button. If advised to shock, make sure no one is in contact with the guest before the shock is administered **(Figure 11.18)**. If no shock is advised, it means that the AED did not find a shockable rhythm (V-fib or V-tach). Regardless of whether a "shock" or a "no shock" advisory is given, follow with 2 minutes of CPR if the guest is in cardiac arrest. In some cases, more than one shock will be needed to correct the dysrhythmias. Two minutes of CPR should be given following every analysis or shock **(Figure 11.19)**. If the shock is successful, the guest may begin to show signs of life.

AED Special Considerations

There are four special considerations to be aware of when using an AED:

- Medication patches
- Children and infants
- Water
- Implanted devices

Medication patches such as nitroglycerin, pain medication, or nicotine are worn on the skin and absorbed into the body. If a patch is worn on the chest and it is in the way of where an electrode pad will be placed, remove the patch and wipe the chest, then apply the electrode pad.

Primary cardiac arrest in children and infants is rare. Cardiac arrest in children and infants is usually secondary to airway and breathing problems that ultimately lead to cardiac arrest. When using an AED on a child or infant, it is best to use specialized pediatric electrode pads or a "key system," either of which can reduce the energy being delivered to those less than 8 years of age. Place the pediatric pads in accordance with the manufacturer's instructions. This may mean placement of one pad on the chest and the other on the back. If pediatric pads are not available, adult pads should be used **(Figure 11.20)**.

Implanted devices include internal pacemakers and cardioverter defibrillators (ICD). These devices are placed under the skin and attached to the heart in people with specific heart conditions. They can often be seen or felt once clothing is removed from the chest. Implanted devices can be placed on either side of the chest, so avoid placing electrode pads directly on top of the ICD **(Figure 11.21)**.

Figure 11.20 Follow the AED manufacturer's instructions on placement of pediatric electrode pads.

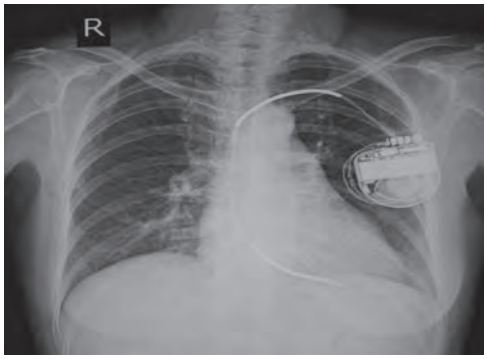


Figure 11.21 Implanted cardioverter defibrillator.

If the implanted device delivers a shock to the guest while you are using the AED (e.g. the guest's muscles contract similar to that observed during AED use), it will not damage your AED. The AED analysis may be interrupted during this time. Since an ICD shocks the heart directly, the energy is less powerful than a shock given externally through an AED. Though the guest will feel a jolt, the energy that escapes to the surface, where a rescuer might be in contact with the guest, is hard to detect and harmless.

Water is a conductor of electricity, which could provide a pathway for electricity between the AED and rescuers. Common practice is to remove the guest from any free-standing water. This can include moving a guest from a pool to at least 6 feet away from the pool edge. It could also include placing the guest on a backboard to further ensure separation from the water. Dry the guest's chest and then attach the electrode pads. Taking these precautions greatly reduces any risks to the guest and rescuers.

AED Maintenance

AEDs require very little maintenance. Devices run their own internal checks to verify proper operation. AEDs have warning lights that signal users that the device is functioning properly or that it is malfunctioning. If a device has a problem, such as a low battery, it can inform users by changing to a red light instead of its normal light and chirping the same way a smoke alarm does. This signals those responsible for the maintenance of the device that attention is needed immediately. Periodic inspection of the AED will also ensure that the proper supplies will be available, such as unexpired electrode pads, and items in the "ready kit." **(Figure 11.22)**.

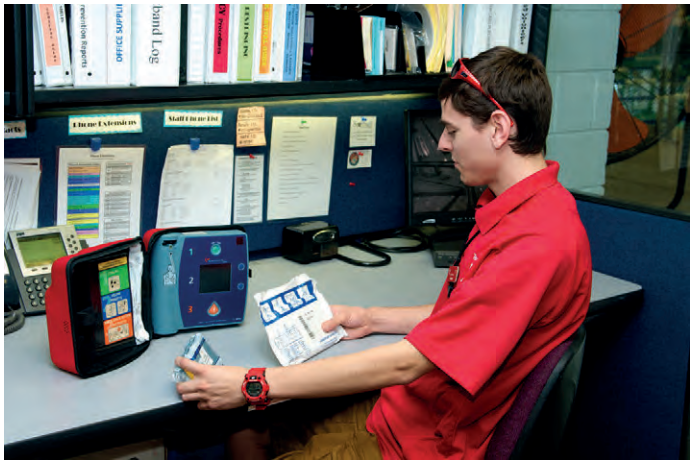
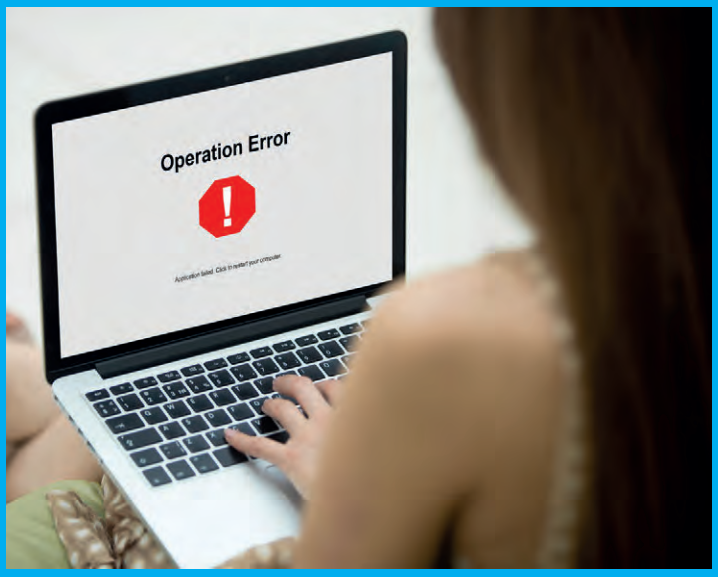


Figure 11.22 Periodic inspection of the AED will ensure that it is functioning and that the necessary supplies are available and up-to-date.

"Rebooting" the Heart

To help you better understand how an AED works, think of an AED as facilitating the restarting of the heart in the same way you would reboot a computer when it locks up. You shut the computer completely down and then restart it. It may not solve the underling issue that caused the problem, but it does get the computer functioning again in a basic way, allowing you to troubleshoot or recover work. An AED works to "reboot" the heart, not necessarily solving the cause, but allowing the heart to restore basic function and more importantly, providing time for the guest to get more advanced medical care.



FOR YOUR REVIEW

Summary

Cardiovascular disease includes conditions that involve the heart and the blood vessels (arteries, veins, and capillaries). Coronary heart disease (CHD) involves the narrowing of the coronary arteries, the blood vessels that supply oxygen and blood to the heart. If the heart muscle is damaged severely, a guest's heart can cease to function. This is known as Cardiac Arrest.

Caring for a life-threatening cardiac emergency begins by checking responsiveness, breathing, and circulation. If a guest is unresponsive, not breathing, and pulseless, the guest needs CPR. Regardless of whether the guest is an adult, child, or infant, the general steps of CPR are the same. Begin CPR with chest compressions. Compressions should be deep, fast, and with minimal interruptions. In single-rescuer CPR, provide 30 chest compressions at a rate of 100 -120 compressions per minute (almost 2 per second) and 2 ventilations. When performing multiple-rescuer CPR on an adult, the compression to ventilation ratio remains the same as one-rescuer CPR, 30 chest compressions and 2 ventilations.

When performing multiple-rescuer CPR on a child or infant, the compression to ventilation ratio changes to 15 compressions and 2 ventilations. Repeat cycles of compressions and ventilations until a defibrillator is available, you are too exhausted to continue, the guest shows signs of life, or EMS personnel take over care.

The electrical conduction system of the heart is responsible for coordinating the rhythmic pumping action of the heart. Ventricular fibrillation (V-fib) and ventricular tachycardia (V-tach) are two of the most common electrical disturbances present at the time of cardiac arrest. Both rhythms interrupt normal blood flow. Both respond to defibrillation. The earlier an AED can be used, the greater the chance the guest will survive.

Provide CPR until an AED is available. Once available, turn on the AED and follow the prompts of the device. An AED will give one of two commands – "Shock" or "No shock advised." Provide CPR for two minutes after receiving the command. After two minutes, the AED will advise you to stand clear so that it can reanalyze the heart and advise you as to how to continue with care. There are only a few special considerations when using an AED. These include water, medication patches, children and infants, and implanted devices. AEDs require little maintenance other than to inspect it regularly to verify that the device is functioning properly and has the necessary supplies to respond to a cardiac emergency.

When dealing with a cardiac emergency, it is important that you remain calm and provide the care you are being trained to give until EMS arrives.

Key Terms

- → Automated External Defibrillator (AED)
- → Cardiac Arrest
- → Cardiopulmonary Resuscitation (CPR)
- → Defibrillation
- → Electrode Pads
- → Ventricular Fibrillation
- → Ventricular Tachycardia

Chapter 12
SUPPLEMENTAL OXYGEN SYSTEM

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Describe the benefits of supplemental oxygen during resuscitation and drowning emergencies
- Explain the parts of the Supplemental Oxygen System (SOS)
- Demonstrate the use of the SOS
- Explain the necessary precautions when using the SOS
- Explain the basic care and maintenance of the SOS
- Demonstrate the use of the bag-valve-mask (BVM) and how to connect it to the SOS

Chapter Overview

Drowning and the Need for Supplemental Oxygen

During a drowning incident, oxygen is unable to reach the body's vital organs, such as the heart, lungs, and brain. These organs are not able to function without the continuous delivery of oxygen through the bloodstream. ***Supplemental oxygen*** should be provided to any guest experiencing respiratory distress from a drowning incident.

When providing rescue breaths through a resuscitation mask, approximately 16% oxygen is exhaled by the rescuer into the non-breathing guest. While this is adequate to support the amount of oxygen needed to resuscitate the guest, providing a higher concentration of oxygen can improve oxygenation. With the availability of inexpensive, easily deployable oxygen systems, lifeguards can successfully deliver supplemental oxygen to distressed guests during resuscitation **(Figure 12.1)**.

Figure 12.1 Supplemental oxygen should be used during resuscitation efforts.

Supplemental Oxygen Systems (SOS)

A ***supplemental oxygen system (SOS)*** can help with numerous breathing emergencies including drowning. A complete system is easy to use and meets or exceeds emergency oxygen requirements **(Figure 12.2)**.

Regulations Governing Supplemental Oxygen Use

Some states have established regulations for the purchase and use of supplemental oxygen. The device you use must be designed specifically for emergency use. The Food and Drug Administration does not require a prescription for emergency use oxygen, provided that oxygen systems designed for emergency use contain at least a 15-minute supply of oxygen and deliver a flow rate of at least 6 liters per minute (lpm). Your facility management is responsible for making sure that all local, regional, and state regulations governing emergency oxygen use are followed when providing a supplemental oxygen system, training, and operational protocols.

Figure 12.2 A supplemental oxygen system (SOS).

Oxygen Cylinder

Oxygen used during emergency care will be provided in a seamless steel, aluminum alloy, or kevlar cylinder. In the United States, ***oxygen cylinders*** will be green or will have a green band around the cylinder and a yellow diamond indicating "oxidizer." The product label will have appropriate warnings concerning the proper handling of the cylinder **(Figure 12.3)**.

The cylinder is filled to a working pressure of approximately 2000 pounds per square inch (psi). The size of the cylinder is identified by code letters. The most common sizes for portable oxygen cylinders are D and E cylinders, which hold 35-650 liters of oxygen at 2000 psi and 70°F (21°C). The size of the cylinder, the amount of oxygen in the cylinder, and the rate of oxygen flow from the cylinder will determine how long the oxygen in the cylinder will last.

Oxygen cylinders have a valve that allows high pressure gas in the cylinder to be delivered by a ***pressure regulator.*** U.S. federal law requires that most common refillable oxygen cylinders be tested every 5 years to ensure safe use. Oxygen suppliers can provide information on testing and servicing requirements.

Figure 12.3 Oxygen cylinders have distinctive color markings and labels.

Pressure Regulator

Oxygen must be administered at a safe working pressure. To accomplish this, a pressure regulator is placed on the cylinder valve post. The pressure regulators used on portable oxygen cylinders have metal prongs that engage matching holes on the cylinder valve. The arrangement of these holes varies for all various types of gas cylinders. This safety feature ensures that the correct type of regulator is attached **(Figure 12.4)**.

Figure 12.4 An oxygen pressure regulator has unique metal prongs that engage matching holes of the oxygen cylinder.

With the regulator properly positioned on the cylinder post valve, hand tighten the regulator in place and attach the oxygen tubing. Open the cylinder so that oxygen can flow into the pressure regulator. The cylinder post valve is opened by turning a knob or using a special key or wrench provided. Newer systems have a built-in mechanism to open the cylinder. Oxygen cylinder valves also contain safety relief devices (rupture/safety disks) designed to release gas from an over=pressurized cylinder, which can occur due to excessive heat. The pressure regulator is equipped with a gauge that indicates how much pressure is in the cylinder. By checking the gauge, you can estimate the amount of time supplemental oxygen can be delivered **(Figure 12.5)**. Cylinders should be changed if the gauge shows less than 15 minutes of oxygen remaining in the cylinder. The regulator also has a flow meter that controls the amount of oxygen delivered in liters per minute (lpm). Flow meters can deliver oxygen at 1-25 lpm. A continuous oxygen flow rate of 15 lpm is recommended during resuscitation efforts. The SOS system at your facility may have a preset flow meter that allows only a flow rate of 15 lpm.

Figure 12.5 With the cylinder opened the pressure gauge reflects the amount of pressure in the cylinder.

Changing Oxygen Cylinders

If you need to replace an oxygen cylinder, follow these steps:

1. Close the valve
2. Open the flow meter to bleed off oxygen remaining under pressure in the regulator (if adjustable)
3. Remove the regulator from the used oxygen cylinder
4. Properly seat the regulator on the new oxygen cylinder and hand-tighten it in place
5. With the flow meter off, open the valve and read the starting pressure in the cylinder, which should be approximately 2000 psi

Supplemental Oxygen Delivery Devices

Resuscitation Mask

The recommended style of ***resuscitation masks*** used by lifeguards have a port that allows oxygen to be attached through tubing connected to the oxygen flow meter. This allows rescue breaths to be delivered with a higher concentration of oxygen **(Figure 12.6)**.

Figure 12.6 A resuscitation mask can be attached to supplemental oxygen during rescue breathing.

Bag-Valve-Mask (BVM)

A bag-valve-mask (BVM) is a device used to provide breaths to a non-breathing guest by attaching a resuscitation mask to one end of a self-refilling bag and the other end of the bag to the SOS. When the bag is squeezed, air passes through a one-way valve attached to a mask positioned on the guest's face **(Figure 12.7)**.

Figure 12.7 A bag-valve-mask attached to supplemental oxygen can improve resuscitation efforts.

The BVM has advantages over a resuscitation mask. The BVM delivers oxygen without requiring you to breathe into the mask. The BVM is also able to provide a higher oxygen concentration (21%) when not attached to the SOS, and a much higher oxygen concentration (90%) when attached to the SOS.

BVMs should include the following features:

- Self-refilling bag
- Non-jam valve system allowing a minimum oxygen inlet flow of 15 lpm
- Standard 15-mm/22-mm fittings
- Reservoir system attached to the bag for delivering the highest concentration of oxygen
- Non-rebreathing valve
- Ability to perform under various environmental conditions
- Various sizes for use with infants, children, and adults

Store the BVM so that it is readily available with the SOS system to reduce the length of time that it takes to set up for use. Until the BVM is ready for use, provide rescue breaths with a resuscitation mask. Once the BVM is attached to the SOS, set the flow of oxygen at 15 lpm and allow the reservoir bag to fill completely.

Two lifeguards will be needed to use a BVM to provide ventilations during rescue breathing or CPR. One lifeguard will kneel above the guest's head, open the airway, and hold the mask on the face. A second lifeguard is positioned at the guest's side, near the head, and is responsible for squeezing the bag **(Figure 12.8)**. Adult, child, and infant-sized masks and bags are available for use. Regardless of the size of the bag used, squeeze the bag only enough to provide chest rise. During CPR, a third lifeguard will provide chest compressions **(Figure 12.9)**.

If you are using the BVM and the guest's chest does not rise when you squeeze the bag, the problem could be with the BVM or with your use of the BVM. Problems can be caused by failure to:

- Maintain a good mask seal
- Maintain an open airway
- Squeeze the bag to generate the necessary volume of air
- Remove a foreign body airway obstruction

If you believe the problem is with the BVM, switch to a resuscitation mask attached to oxygen until another BVM is available.

Figure 12.8 Two lifeguards are needed to properly use a BVM.

Figure 12.9 When using a BVM during CPR, three lifeguards are needed.

Non-rebreathing Mask

A ***non-rebreathing mask*** allows oxygen to be administered to a guest who is having breathing difficulty including a guest who might be experiencing a heart attack. A non-rebreathing mask is a combination mask and reservoir bag **(Figure 12.10)**. Oxygen fills the reservoir bag, which is attached to the mask by a one-way valve. Exhaled air escapes through flapper valve ports on the sides of the mask. These valves prevent the guest from rebreathing exhaled gases, delivering oxygen at a concentration of about 90%. To be effective, a non-rebreathing mask must be attached to a SOS capable of delivering an oxygen flow rate of 12–15 lpm **(Figure 12.11)**.

Figure 12.10 A non-rebreathing mask may be used for a guest having difficulty breathing.

Pulse Oximetry

Routinely administering supplemental oxygen to guests with medical conditions unrelated to drowning requires some caution. Evidence suggests that if a guest is having serious difficulty breathing, lifeguards should apply oxygen. For others, however, supplemental oxygen use over time should be adjusted in response to the percentage of oxygen in the blood and how the guest feels. The percentage of oxygen in the blood can be determined using ***pulse oximetry***, which involves placing a small, portable device called a ***pulse oximeter*** on a guest's finger **(Figure 12.12)**.

A pulse oximeter provides a measurement that appears as a percentage of hemoglobin saturated with oxygen. If you have a pulse oximeter available, you should use it to help guide how much supplemental oxygen should be provided to achieve a target saturation of over 94% for most acutely ill guests. Guests with known chronic obstructive pulmonary disease (COPD), such as emphysema, will usually have a saturation between 88% - 92%.

The guest should be constantly monitored and if the guest's oxygen level gets above the desired percentage, you may decrease the flow rate of oxygen or remove the oxygen. The guest should be monitored. If the guest's condition worsens or the pulse oximeter shows a reading of less than 94%, supplemental oxygen may be reapplied. See **Table 12.1** for an overview of the administration of oxygen to a responsive guest in respiratory distress.

Figure 12.11 Attach the non-rebreathing mask to a SOS with a flow rate of 12–15 lpm.

Figure 12.12 A pulse oximeter is used to measure oxygen saturation.

Care and Maintenance of Supplemental Oxygen Systems

Oxygen delivery systems require little maintenance. But to ensure optimum performance, your SOS should be checked at the beginning of each workday as part of your facility's opening procedures. Aquatic facilities often equip an emergency response bag with SOS equipment so that all items are available in one bag when responding to an emergency. Other items in the bag typically include bag-valve-masks, manual suction, resuscitation masks, gloves, first aid supplies, pulse oximeter, an automated external defibrillator (AED), and AED supplies **(Figure 12.13)**. Use of a trauma type bag also provides a safe place for the oxygen cylinder to be stored when providing care.

Figure 12.13 Check your equipment bag each day to ensure all items are in proper working condition.

The use of the SOS should be integrated into your facility's EAP. Protocols can be as simple as designating a member of the lifeguard team or supplemental responder to bring the SOS to the rescuer. Follow these guidelines for the proper care, maintenance, and use of your SOS:

- Do not expose the cylinder to temperatures above 130°F (54°C)
- Do not puncture or drop the cylinder
- Do not use any type of grease or oil (or petroleum jelly or suntan oil) on any part of the cylinder
- Do not use oxygen near a fire or open flame
- Do not remove the valve from the oxygen cylinder
- Have the cylinders refilled by a professional medical oxygen supplier
- Keep the cylinder secure in a carrying case. If you must remove the cylinder from its protective case, lay it down
- Replace masks, one-way valves, and oxygen tubing following use
- Depending on the equipment you have, the system may or may not be left assembled at the end of each day. Refer to the manufacturer's instructions for your system

A simple checklist for a facility's SOS can be seen in **Table 12.2 (next page).**

Table 12.1 Administering Oxygen to Responsive Guests

Administering Oxygen to a Responsive Guest in Respiratory Distress

Is it needed? Look for these signs:

- Breathing that is excessively fast, slow, weak or labored
- Skin is cool to the touch, pale or blue in appearance
- Reduced level of consciousness

If one or more of the above is true, confirm with pulse oximetry:

- Turn on device
- Place on dry finger
- Restrict guest's movement for 10 seconds
- Note the blood oxygen level:
  95% or more is normal for most; 89% or more normal for COPD sufferers

Provide oxygen if needed:

- Contact EMS
- Prepare Non-rebreathing mask (appropriate size for guest)
- Attach to oxygen tank (set at 15 lpm)
- Allow the reservoir bag to inflate and position on the guest's face
- Discontinue if the guest's condition improves and pulse oximetry levels return to a normal range for the guest
- Continue to monitor and care for the guest until EMS arrives

Table 12.2 Supplemental Oxygen System (SOS) Checklist

Oxygen cylinder	Be certain the cylinder says oxygen, that there is no damage to the valve and that the cylinder is still within its safe hydrostatic safety testing period
Amount of oxygen in the cylinder	Check the pressure gauge. Replace the cylinder if there is less than 15 minutes or 500psi remaining. Know the capacity and refill recommendations for your specific oxygen cylinder
Oxygen tubing and masks	Check that tubing is attached to the regulator and the mask
Pressure regulator	Check to see that no oxygen is leaking when under pressure
Documents	Maintain all documents regarding the purchase, refill, hydrostatic safety test, and daily inspections

FOR YOUR REVIEW

Summary

During certain medical events such as near-drownings, oxygen is cut off from vital organs. Supplemental oxygen should be provided to any guest experiencing breathing problems from a drowning event or other illness or injury resulting in severe respiratory distress.

Though delivering rescue breaths provides adequate oxygenation, providing a higher concentration of supplemental oxygen can improve a resuscitation effort.

The availability of a supplemental oxygen system (SOS), allows you to successfully deliver higher levels of oxygen to distressed guests. The system is simple and safe to use, providing a continuous flow rate of 15 liters per minute (lpm).

A bag-valve-mask (BVM) is a device used to provide ventilations to a non-breathing guest by attaching a resuscitation mask to one end of a self-refilling bag and the other end of the bag to the SOS.

For a guest who is breathing, but showing signs of severe respiratory distress, oxygen can be provided through a non-rebreathing mask.

A pulse oximeter provides a measurement of oxygen saturation in a guest with difficulty breathing. This will help you when administering supplemental oxygen to achieve a target saturation of 94–98% for most acutely ill guests. Monitor the guest until EMS personnel arrive.

Key Terms

→ Bag-valve-mask (BVM)
→ Non-Rebreathing Mask
→ Oxygen Cylinder
→ Pressure Regulator
→ Pulse Oximeter
→ Pulse Oximetry
→ Supplemental Oxygen System (SOS)

Chapter 13
CARING FOR INJURIES

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Recognize open and closed wounds, including burns and impaled objects
- Demonstrate how to control bleeding using a pressure bandage and commercial or improvised tourniquet
- Recognize the signs of soft muscle, bone, and joint injuries
- Describe how to care for muscle, bone, and joint injuries, including open and closed fractures
- Describe how to care for head, spine, chest, and abdomen injuries
- Recognize the signs of shock
- Describe emergency moves and the purpose of triage

Chapter Overview

Introduction

As a lifeguard, you must determine when it is necessary to activate your emergency action plan (EAP) and know what care to provide to injured guests until more advanced medical personnel arrive. Providing care in the first few minutes following a serious injury can minimize damage and potentially save lives. Some of the more common injuries that occur in the aquatic environment involve those such as wounds, strains, sprains, and fractures.

Scene Safety

Before you can provide emergency care to an injured guest, you must be certain the scene is safe. If it is unsafe, do not enter or allow others to enter the scene until it can be made safe. Unsafe scenes include those with toxic substances, live electrical wires, and fire. In some cases, you will have to wait for public safety professionals (EMS, fire, police) to make the scene safe. As part of ***Scene Safety***, follow standard precautions by putting on necessary personal protective equipment before having contact with a guest.

Assessing Injured Guests

Assessment of a guest begins with the ***Primary Check***, designed to locate and care for conditions that are immediately life-threatening. Once you have determined that there are no life-threatening conditions, you can do a secondary check. The ***Secondary Check*** identifies conditions that are not immediately life-threatening but may require care. During this check, you will search for signs of injury such as an open wound or a deformed arm, and listen closely to guests describing how they are feeling, including the degree of pain. Use the mnemonic DOTS to help you remember what signs of injury to look for as you check the guest.

DOTS stands for:

- Deformity
- Open wound
- Tenderness (pain)
- Swelling

Injured guests often have isolated injuries that they will be able to point out, so you can focus your attention on that area of the body (e.g. sprained ankle). Others may have suffered injuries to multiple areas of the body, requiring a more thorough physical check of the entire body. To perform a physical check as part of the secondary assessment, start at the head and end at the toes. Using DOTS, look and feel as you move down the body **(Figure 13.1, 13.2)**. Communicate with the guest as you complete this check.

Figure 13.1 Begin your physical check at the guest' head.

Figure 13.2 Complete your physical check with the lower limbs.

Ask what happened so that you can determine the cause of the injury. Ask the guest to describe any pain. You can also gather additional information for Emergency Medical Services (EMS) providers, such as a guest's medical history. If the guest is wearing a medical alert bracelet or necklace, ask the guest about the condition.

Wounds

Providing emergency care for injuries involving wounds can minimize the damage, reduce the chance of infection, and even save lives for those with severe bleeding. Wounds are either open (external bleeding) or closed (internal bleeding).

Types of Bleeding

There are three types of bleeding:

- **Capillary bleeding** – Minor bleeding where capillaries are damaged and blood oozes from a wound. This is often seen when the top layer of skin is damaged. This bleeding is easily controlled
- **Venous bleeding** – Steady blood flow from veins that can be serious due to the volume of blood loss. This is often more difficult to control than capillary bleeding
- **Arterial bleeding** – Blood spurting from an artery with each heartbeat. When an artery is damaged, it can bleed quickly, causing rapid blood loss that is harder to control than venous or capillary bleeding

Open Wounds

Open wounds include:

- **Abrasion** – Commonly called scrape, rug burn, or road rash **(Figure 13.3)**
- **Incision** – Smooth-edge cut, often seen with very sharp, thin objects such as a razor blade, or paper edge
- **Laceration** – Jagged-edge cut that tears away skin tissue, caused by items such as irregular broken glass, or a saw
- **Puncture** – Injury from a pointed object that penetrates the skin, such as a nail, icepick, or bullet
- **Avulsion** – Tissue torn away and hanging from the body

Figure 13.3 An abrasion is a common type of open wound occurring at aquatic facilities.

- **Amputation** – Injury resulting in the loss of a body part, such as a finger or toe
- **Impaled object** – Injury where an object, such as a nail, knife, or glass has punctured the skin and is impaled (embedded) in the body

External Bleeding

Caring for an open wound involves protecting against disease transmission, stopping the external bleeding, and reducing the chance of infection.

Dressings and Bandages

Bandages and dressings are items commonly found in first aid kits and are used to control external bleeding. ***Dressings*** are often sterile gauze pads that are placed over an open wound to help prevent infection and absorb blood. Dressings vary in size from 2, 3, or 4-inch squares, to much larger and thicker ones for more serious wounds. A ***bandage*** is used to cover and hold a dressing in place while maintaining pressure over the wound. A roll of gauze is a common bandage. Like dressings, bandages also come in various sizes.

Care for External Bleeding

Follow these steps to care for open wounds:

- Use Standard Precautions before providing care
- For shallow wounds, wash the wound, apply an antibiotic ointment, and cover the wound
- For larger, deeper wounds, you must focus on stopping the bleeding. Place a dressing over the wound and apply direct pressure with your gloved hand **(Figure 13.4)**
- Use a roll of gauze to wrap a bandage in a spiral pattern over the entire dressing. The bandage should be snug but not too tight that it constricts all circulation. This will help maintain pressure and keep the wound clean until the guest can receive proper medical care **(Figure 13.5)**
- If bleeding continues and the gauze becomes soaked, apply additional gauze and bandage over the first layer
- Call 9-1-1 if bleeding is severe or cannot be controlled
- If an object is impaled (embedded) anywhere in the body, leave the object in place and stabilize it until EMS personnel arrive. This can be done by holding it in place or by placing rolls of gauze around the object and bandaging it to restrict movement

Figure 13.4 Apply a gauze pad and pressure to control bleeding from an open wound.

Figure 13.5 Wrap roller gauze in a spiral pattern to maintain pressure and stop bleeding. Use roller gauze to stabilize an impaled object.

Figure 13.6 6 Keep an amputated part clean and cool.

For an amputated body part, such as a finger, toe, or larger limb, stop the bleeding with pressure and bandage. Retrieve the severed part with a gauze pad, place it in a container such as a plastic bag, and keep the part cool if possible **(Figure 13.6)**. Provide the severed part to EMS personnel when they arrive.

Hemostatic Gauze and Tourniquets

Hemostatic gauze dressings are advances in care for severe external bleeding that help promote clotting. These gauze dressings can be applied to areas of the body other than just the limbs. Apply pressure in the same manner as you would for regular gauze dressings. Hemostatic gauze is embedded with a shellfish-derived polysaccharide that quickly promotes clot formation.

QuikClot® is a hemostatic dressing impregnated with kaolin clay. Kaolin triggers factors in the blood that result in rapid clotting. Hemostatic agents are available in many stores, including those for outdoor adventure, as well as pharmacies **(Figure 13.7)**.

Figure 13.7 QuikClot® hemostatic dressing.

Tourniquets are used to control life-threatening bleeding from extremity wounds that would otherwise be unlikely to be controlled with normal procedures such as direct pressure and bandaging and hemostatic gauze. They are available commercially, or can be improvised from a belt, stretch band, or triangle bandage.

Tourniquets may be necessary in situations such as:

- Incidents involving high-velocity gunshot wounds, stabbings, or blast injuries involving the limbs
- Serious limb injuries in rural or wilderness areas, including industrial or farm injuries where resources are limited, and transport delayed

Tourniquets provide circumferential pressure to the limb. Once tightened, bleeding will cease, and pressure can be maintained through transport of the injured guest by EMS personnel **(Figure 13.8)**.

Figure 13.8 A tourniquet is applied to life-threatening bleeding from an extremity.

Internal Bleeding

Closed wounds involve internal bleeding and result from blunt injury that does not break the skin **(Figure 13.9)**. Since the injury is beneath the skin it can be hard to determine the extent of the damage. Signs of internal bleeding can include:

- Bruising
- Swelling
- Tenderness
- For injuries to the organs of the chest or abdomen the guest might cough up or vomit blood or have bloody stool

Figure 13.9 A bruise is an example of a closed wound.

Care for Internal Bleeding

Internal bleeding from common injuries to extremities, such as a bruised leg or twisted ankle, is best cared for by following the mnemonic ***RICE***, which stands for:

- Rest – Stop using the injured body part
- Ice – Apply ice for up to 20 minutes
- Compression – Apply an elastic bandage for several hours when possible
- Elevation – Raise an injured limb

More serious internal bleeding, such as abdominal bleeding, requires more advanced care. Call 911. Care for shock by placing the guest on his/her back and keeping the guest warm.

Burns

There are four types of burns:

- Thermal (Heat)
- Chemical
- Electrical
- Radiation

Thermal burns are caused by contact with heat, including flames, hot liquids, steam, and hot solid objects. Chemical burns are the result of exposure to chemicals, such as dry powers, liquids, or gases. Electrical burns can be caused by contact with electrical wires, outlets, power supply lines, and lightning. Radiation burns involve damage to the skin as a result of exposure to radiation, most commonly the sun.

Figure 13.10 Burns are classified according to the extent of injury.

Burn Classifications

Burns are classified according to the depth or severity of tissue damage that occurs **(Figure 13.10)**:

- **First degree burns (Superficial)** – Burns affecting the outer layers of skin. The skin is often red, swollen, and tender. Sunburn is a common example of a superficial burn
- **Second degree burns (Partial thickness)** – Burns affecting deeper layers of skin. The skin is swollen, tender, and blisters in a variety of sizes form on the skin's surface
- **Third degree burns (Full-thickness)** – Burns affecting all layers of the skin and underlying fat. Nerves, blood vessels, and muscle can also be affected. The skin can appear charred, gray, waxy, or leathery. If nerve endings are damaged, the exact area of the full-thickness burn may be painless, but the guest will feel pain from the surrounding lesser damaged areas.

Assessing the Extent of Burns

The extent of burn damage is not always immediately recognizable. It may take a little time to see the full extent of a burn, such as the formation of blisters. The severity of the burn injury includes an estimate of the total surface area affected. This can rapidly be assessed by using the ***Rule of the Hand***. The size of the guest's hand is equal to approximately 1% of the total surface area of the guest's body.

Estimate the extent of damage by counting the approximate number of hands it would take to cover the burned area. Guests may suffer all three levels of severity during the same incident. Burns are more serious on certain parts of the body, such as the head, neck, chest, genitals, hands, and feet. Burns are also more serious for young children and the elderly. Care for any burn based on the type of burn, the highest level of severity, and the extent of the burn.

Caring for Thermal Burns

To care for 1st degree Thermal burns:

- Stop the burning process and reduce the pain by applying cool water
- Once the burn cools, apply aloe vera gel or a skin moisturizer
- Control pain and swelling with an over-the-counter medication such as ibuprofen

To care for 2nd degree thermal burns covering less than 10 percent of the body:

- Stop the burning process and reduce the pain by applying cool water
- Loosely cover the burn with a nonstick dressing and bandage, taking care not to apply pressure to any blisters
- Control pain and swelling with an over-the-counter medication such as ibuprofen
- Seek medical care

To care for 2nd degree burns of more than 10 percent of the body, and all 3rd degree burns:

- Stop the burning process and reduce the pain by applying cool water
- Do not attempt to remove any clothing stuck to the skin
- Cover the burn with a cool, moist dressing and bandage loosely
- Care for shock
- Call 9-1-1

Caring for Chemical Burns

Acids and alkalis are examples of caustic or corrosive chemicals that can result in burns. Organic compounds, including petroleum products can also cause chemical burns. To care for chemical burns:

- Remove the chemicals from the skin as quickly as possible by flushing the burned area with a large amount of water. Flush continuously for up to 20 minutes, or until EMS personnel arrive if summoned **(Figure 13.11)**
- If the chemical is a dry power, brush the powder from the skin. Flush with water.
- If your job involves working with chemicals, follow the instructions provided on your Safety Data Sheets (SDS) for the proper care if an incident occurs

Figure 13.11 Flush chemical burns continuously with water.

Caring for Electrical Burns

Exposure to electric current can disrupt normal heart function and cause internal injuries as well as burns. A guest with an electrical burn may have more than one burn. This situation is known as an entrance and exit wound.
To care for electrical burns:

- Check responsiveness and breathing and provide CPR/AED if needed
- Look for entry and exit wounds. If found, cover the wounds loosely with dry, nonstick gauze pads and bandage loosely
- Call 9-1-1

Caution!

Always make sure the source of any electric burn has been controlled before you provide care for the guest. Disconnect any power to be sure that you will not be injured while providing care. If you are unable to verify that the power is off, wait until the appropriate safety personnel arrive.

Head Injuries

Head injuries can include damage to the skull and face and involve external or internal bleeding and injuries that affect the brain.

Skull Fracture

A ***Skull Fracture*** is any break in the cranial bone, also known as the skull, due to significant force. Signs of skull fracture can include:

- Loss of consciousness
- Pain
- Deformity of the skull, including sunken area or bone fragments
- Clear or bloody fluid from the ears or nose
- Heavy bleeding
- Exposed brain matter
- Penetrating injury from a gunshot or other significant force

To care for a guest with a skull fracture:

- Check responsiveness and breathing and provide care as needed
- Place a sterile dressing (gauze pad or other clean item) over the wound
- Apply pressure along the edges of the dressing, not directly over any weak area of the skull **(Figure 13.12)**
- Restrict movement of the guest's head
- Call 9-1-1

Figure 13.12 Apply pressure around the edges of the dressing to control bleeding from a skull fracture.

Concussion

Concussion is a brain injury, often caused by a blow to the head, that changes the way the brain functions. Most concussions are mild, and the guest will usually fully recover. But the time it takes a guest to recover can vary greatly depending on the extent of the injury.

Signs of concussion can include:

- Loss of consciousness
- Loss of memory
- Headache, dizziness, or nausea
- Problems with vision or balance
- Ringing in the ears

To care for a guest with a possible concussion, position the guest on his/her back and restrict movement of the head and neck. Call 9-1-1.

Scalp Wounds

The scalp has many blood vessels close to the surface, so even a small cut can produce the appearance of severe bleeding. The bleeding from the scalp does not affect the brain.

Figure 13.13 Apply a dressing and pressure bandage for a scalp wound.

Care for scalp wounds in the same way you would care for external bleeding elsewhere on the body:

- Place a sterile gauze pad (or other clean dressing) over the wound
- Apply direct pressure over the wound to stop the bleeding
- Bandage the wound whenever possible **(Figure 13.13)**
- Position the guest on his/her back with the head and shoulders slightly elevated
- Call 9-1-1 if bleeding cannot be controlled or the wound is large or deep

Loose Object in the Eye

Objects that enter the eye can be irritating, and in some cases, cause significant damage.

To care for a small, loose object in the eye, such as dirt or sand:

- Hold the eye open
- Rinse with water
- Seek medical care if you are unable to remove the loose object

Chemicals in the Eye

Chemicals in the eye, such as an acid or alkaline solution, can burn and cause blindness. These emergencies require immediate care. To care for a guest with a chemical in the eyes:

- Hold the eyes open and continuously flush with water. If only one eye is affected, close the unaffected eye during this process **(Figure 13.14)**
- Call 9-1-1 and continue to flush the eyes until EMS personnel arrive

Blow to the Eye

A blow to the eye can result in swelling and discoloration (black eye), or more severe damage that threatens eyesight. To care for a blow to the eye:

- Have the guest close the eye and then apply ice or a cold pack to reduce pain and swelling
- Seek medical care if there is significant pain, vision problems, or discoloration of the eyeball

Figure 13.14 To remove chemicals from the eyes, flush continuously until EMS personnel arrive.

Eye Avulsion

A significant blow to the eye can knock the eyeball from its socket. To care for an eye avulsion:

- Cover the injured eye loosely with a moist sterile dressing (gauze pad or other clean dressing). Do not place pressure on the eyeball or attempt to replace the eyeball in the socket
- A paper cup can be held in place over the dressing to further protect the eyeball from injury
- Have the guest close the uninjured eye
- Call 9-1-1

Penetrating Eye Injury

A sharp object can easily penetrate the eyeball. The object may have been withdrawn or remain in place (impaled) in the eye. To care for a penetrating eye injury:

- If the object remains in the eyeball, apply dressings around the object to movement, and hold the object still
- Have the guest close the uninjured eye
- Call 9-1-1

Cut of the Eye or Lid

A cut of the eye or lid can be serious. To care for a cut of the eye or lid:

- Do not apply any pressure to the eyeball
- If just the eyelid is cut, apply a gauze pad and light pressure
- Have the guest close the uninjured eye
- Call 9-1-1

Cheek Injuries

If an object has penetrated the cheek and the guest has bleeding into the mouth, follow these steps:

- Place a dressing and pressure on the outside and inside of the cheek
- If an object is impaled in the cheek, hold the object in place
- Call 9-1-1

Nosebleed

Nosebleeds are common injuries that occur when people are struck in the nose, or as the result of excessive heat drying mucous membranes.

To care for nosebleeds:

- Have the guest sit down and lean slightly forward
- Have the guest pinch the nostrils together for about 5 minutes **(Figure 13.15)**
- Call 9-1-1 if the bleeding cannot be controlled or if the guest has an associated medical condition such as high blood pressure that may be contributing to the bleeding

Figure 13.15 To care for a nosebleed, have the guest sit and lean slightly forward and apply pressure.

Mouth Injuries

Mouth injuries can involve injury to the tongue, teeth, or lips. To care for a wound to the tongue or lips:

- If a closed wound is present, apply ice or a cold pack to reduce swelling and pain
- If an open wound is present, control external bleeding by applying a dressing and direct pressure
- If the bleeding does not stop, seek medical care

To care for a knocked-out (avulsed) tooth **(Figure 13.16)**:

- Place a folded gauze pad in the socket to control bleeding
- Locate the missing tooth, hold it by the crown, and rinse it gently
- Keep the tooth moist until the guest can get to the dentist or to a hospital
- If reinsertion is not possible, place the tooth in an emergency tooth preservation kit (such as Save-a-Tooth®), Hanks Balanced Salt Solution, coconut water, milk, or a saltwater solution (1 teaspoon salt in 1 quart of water)
- If no other fluids are available, have the guest spit into a small cup or plastic bag. Place the tooth in the saliva. It does not matter if there is blood mixed with the saliva
- Get the guest to a dentist promptly so the tooth can be successfully replaced in its socket
- If more serious injuries exist, call 9-1-1

Figure 13.16 Care for a knocked-out tooth by controlling bleeding and saving the missing tooth.

Spinal Injuries

The spinal column, is comprised of 33 bones, commonly called vertebrae, stacked upon one another.

These bones make up five regions of the spine:

- Cervical (neck)
- Thoracic (chest/trunk)
- Lumbar (low back)
- Sacral (pelvic)
- Coccyx (tailbone)

The cervical spine has 7 vertebrae that function to support the weight of the head. The thoracic spine has 12 vertebrae attached to the ribs that help protect the organs of the chest, such as the heart and lungs. The lumbar spine has 5 vertebrae, which bear the weight of the body and absorb the stress of lifting and carrying heavy objects. The sacral spine, or sacrum, is formed by 5 vertebrae fused together connecting the spine to the hip bones. At the end of the spinal column is the coccyx or tailbone, comprised of 4 fused bones that provide attachment for ligaments and muscles of the pelvic floor.

Spinal injuries can involve the spinal column, or the bundle of spinal nerves known as the spinal cord. Recreational and sport activities are among the ways in which spinal injuries can occur. Additional movement of someone with a spinal injury could potentially damage the spinal cord, so precautions must be taken to prevent any excessive movement.

Recognizing Spinal Injuries

Signs of spinal injuries can include:

- Loss of consciousness
- Neck or back pain or tenderness
- Neck deformity
- Limb weakness, numbness, or tingling
- Paralysis

Care for Spinal Injuries

To care for possible spinal injuries:

- Tell the guest not to attempt to move
- Restrict movement of the head and neck with ***Spinal Motion Restriction (SMR)*** **(Figure 13.17)**
- Call 9-1-1

Figure 13.17 Spinal motion restriction (SMR) includes holding the head still and in-line with body when possible.

Pelvic and Hip Injuries

Pelvic injuries can range in severity from minor to life-threatening. A pelvic fracture can occur as a result of a high impact injury, such as a motor vehicle collision or fall from a height. But the same fracture could also occur from lower impact, such as an elderly guest slipping from a chair and striking the ground. Pelvic fractures have the potential for severe bleeding from blood vessels within the pelvis.

The hip joints are at the lower areas of the pelvis. These areas are susceptible to hip dislocation if the head of

the femur (large bone in the upper leg) is displaced out of the joint. This can compromise important nerves in the lower limbs.

Recognizing Pelvic and Hip Injuries

The signs of pelvic and hip injuries can include:

- Inability to stand or walk
- Hip or groin pain or tenderness
- Loss of feeling in the injured limb
- Knee drawn toward the chest and thigh rotated inward, or the leg extended and rotated outward
- Shock

Care for Pelvic and Hip Injuries

To care for pelvic and hip injuries:

- Support the guest in the most comfortable position. This may be with the legs bent or straight. Do not attempt to move the legs if the guest complains of pain
- Call 9-1-1

Chest Injuries

Chest injuries can be open or closed. Common closed chest injuries involve bruising, caused by blunt force trauma. More serious closed chest injuries can involve rib fractures. Open chest injury occurs when the chest wall is penetrated by an object such as a fractured rib, knife, or bullet. The object could also be impaled in the chest.

Closed Chest Injuries

Rib fractures can involve an individual rib or multiple ribs. If multiple ribs in the same area are each broken in multiple places, the condition is known as a flail chest.

The signs of rib fractures include:

- Pain, especially when breathing or coughing
- Difficulty breathing, including the inability to take a deep breath
- Tenderness

To care for closed chest injuries, such as rib fractures:

- Place the guest in the most comfortable position for breathing and pain relief. This is often a seated position
- To help stabilize the ribs, place a folded towel, blanket, or pillow against the injured side and have the guest hold it in place with his/her arm
- Call 9-1-1

Open Chest Injuries

Open chest injuries are those that penetrate the chest wall. An object causing the damage, such as a knife, can be withdrawn or remain embedded. A chest injury that allows air to pass into and out of the chest cavity is a sucking chest wound. This is recognized by the sound of air being sucked into and out of the chest wound, as well as bubbling blood at the site of the wound.

To care for open chest injuries:

- Control any significant bleeding present
- If a sucking chest wound is present and a dressing and direct pressure are required to stop bleeding, care must be taken to ensure that a blood saturated dressing does not inadvertently occlude the wound.
- If there is little bleeding with a sucking chest wound, leave the wound exposed.
- Call 9-1-1

Abdomen Injuries

Like injuries to the chest, abdomen injuries can also be closed or open, and can be minor or severe.

Closed Abdomen Injuries

Closed injuries to the abdomen occur from a direct blow from a blunt object. The injured area may appear bruised, painful, tender, or tight. To care for closed abdominal injuries:

- Place the guest in a comfortable position. This is often on the back or side, with the knees bent
- Care for shock by keeping the guest warm
- Seek medical care. Call 9-1-1 for incapacitating injuries

Open Abdomen Injuries

Though rare, injuries that penetrate the abdomen can result in organs protruding from the abdomen. This is a serious condition, known as an abdominal evisceration, that requires immediate care. To care for an abdominal evisceration:

- Place the guest on his/her back with knees bent
- Gently cover the protruding organs loosely with a moist, sterile dressing. Do not try to reinsert the organs
- Care for shock by keeping the guest warm
- Call 9-1-1

Joint, Bone, And Muscle Injuries

Joint Injuries

Injuries to joints can be ***sprains*** or ***dislocations***. A sprain occurs when the ligaments surrounding the joint are stretched or torn. The most common sprains involve the ankles, wrists, and knees. Dislocations are more serious injuries in which a bone end comes out of the joint, such as the shoulder, elbow, knee, ankle, finger, or toe **(Figure 13.18)**.

Figure 13.18 A dislocated little finger.

Signs of sprains and dislocations include:

- Pain
- Deformity
- Inability to use the affected limb normally

If you suspect the joint is only sprained, use **RICE (Figure 13.19)**. If you believe the joint is dislocated, splint the injured limb as you would a fracture. Call 9-1-1.

Figure 13.19 Use the RICE approach to care for joint injuries such as a sprained ankle.

Bone Injuries

Injuries to bones can involve simple bruising or a serious break in a bone, commonly called a ***fracture***. Most fractures are closed, where the bone does not break the skin **(Figure 13.20)**. A fewer number of bone injuries involve open fractures, where the bone end has broken through the skin.

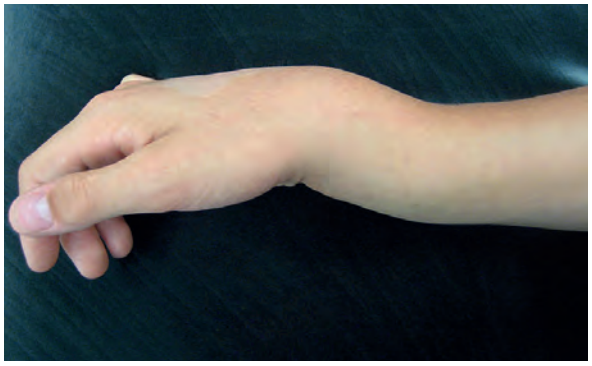


Figure 13.20 A closed fracture of the left wrist.

Use the mnemonic **DOTS**, as previously discussed, to help identify a possible serious bone injury such as a fracture. Another good indication that a bone is likely broken is the guest's inability to use the injured part normally. The guest may not be able to move the affected limb or bear weight or walk on an injured leg or foot. The guest may also complain of hearing or feeling the bone snap. The bone ends may also rub against each other creating a grating sensation that can be heard or felt.

Though rarely life-threatening, all serious bone injuries require further evaluation in a hospital to ensure proper care and a return to normal function. The initial care you provide can help reduce the guest's anxiety and keep the guest from moving the injured area.

To care for a possible fracture, splint the affected area. ***Splinting*** is the process of stabilizing a possible fracture to prevent further damage to bone, muscles, nerves, and blood vessels.

There are three common types of splints that can be used for a fracture:

- **Anatomic (self) splint** – The injured part of the body is secured to an uninjured part, such as an injured arm bound to the chest, or an injured finger taped to an adjacent finger **(Figure 13.21)**
- **Soft splint** – A soft splint is made from items such as a pillow, towel, blanket, or coat wrapped around the injured part and tied in place. This type of bulky material helps limit movement of the injured part **(Figure 13.22).**

Figure 13.21 Anatomic splint.

Figure 13.22 Soft splint.

- Rigid splint – A rigid splint can be made from rolled newspaper, magazines, heavy cardboard, or wood or metal strips. Any inflexible material tied in place can be used to support an injured limb **(Figure 13.23)**

Figure 13.23 Rigid splint.

Apply an ice or cold pack if possible, to help reduce the swelling and pain. If an open fracture is present, do not apply pressure to any protruding bone. Cover the area with a dressing and bandage loosely. Call 9-1-1 for any open fractures.

A sling is a device that can be used to support an injured hand, wrist, arm, or shoulder. Slings can be made from triangle bandages found in first aid kits. The guest's bent arm is splinted and rests in the sling, which can be further secured by tying a binder across the chest **(Figure 13.24)**. A sling can also be fashioned using the guest's clothing and a safety pin **(Figure 13.25)**.

Figure 13.24 Sling and binder made with triangle bandages.

Muscle Injuries

Common muscle injuries involve:

- ***Strain*** – An overstretched or partially torn muscle. This occurs to muscles such as the back when heavy objects are lifted improperly. Other common muscle strains involve the legs caused by running
- **Bruise** – A bruise that results from a direct blow to the muscle
- **Cramp** – Uncontrolled muscle spasm that can be quite painful

Provide initial care for muscle strains or bruises involving the limbs by following the mnemonic **RICE** previously discussed. Care for muscle cramps by having the guest apply pressure to the affected muscle until the cramp subsides.

Figure 13.25 Sling made using the guest's clothing.

Shock

Shock is a medical emergency in which the organs and tissues of the body are not receiving an adequate flow of blood. This deprives the organs and tissues of necessary oxygen and nutrients. Shock can occur as a result of injury or illness.

Types of Shock

There are several different types of shock including:

- **Anaphylactic shock** – Severe allergic reaction
- **Cardiogenic shock** – Heart attack with damage to the heart so severe it cannot pump blood effectively
- **Hypovolemic shock** – Severe blood loss from external or internal bleeding, or loss of body fluid from burns and dehydration
- **Metabolic shock** – When fluids and electrolytes are impaired, such as with a diabetic emergency
- **Neurogenic shock** – Injury to the nervous system (spinal cord, brain)
- **Psychogenic shock** – Shock resulting from overwhelming emotional factors such as fainting
- **Septic shock** – An acute infection that overwhelms the body resulting in poisonous substances accumulating in the blood

Recognizing Shock

The signs of shock can vary somewhat based on the type of shock. In general, the signs of shock associated with injuries include:

- Altered consciousness/confusion
- Anxiety and restlessness
- Pale, bluish, cool, moist skin
- Nausea or vomiting
- Rapid breathing and heart rate
- In neurogenic shock, the heart rate can be slow, and the skin warm, dry, and flushed

Care for Shock

To care for shock **(Figure 13.26)**:

- Position the guest on his/her back whenever possible. If breathing problems exist, the guest will likely need to be supported in a seated or slightly reclined position to make breathing easier
- Maintain normal body temperature
- Call 9-1-1

Figure 13.26 General shock position.

Emergency Moves

Injured guests are not normally moved until they can be adequately assessed and care provided. But there may be a time when a dangerous scene cannot be secured, requiring the guest to be moved immediately.

Before moving a guest consider the:

- Possible condition of the guest such as spinal injury or limb fracture
- Size and weight of the guest
- Your size and strength
- The surface upon which you must move the guest (e.g. flat and smooth, rugged, steps)
- Whether other responders are available to assist

There are three categories of ***emergency moves***:

- **Assists** - An assist can be used by one or two rescuers to support the guest to walk or hop to safety **(Figure 13.27, 13.28)**
- **Drags** – A drag can be used to move a guest over a flat smooth surface. Grasp the guest under the armpits and rest the guest's head on your forearms. Walk carefully backward while pulling the guest. An ankle drag can be used if the guest is too large to move in another manner
- **Carries** – A carry can be used by one or two rescuers to lift and move the guest. This could be a piggyback carry, cradle carry, or two-rescuer seat carry**.** If a backboard and additional rescuers are readily available, the guest can be placed on the backboard and carried to safety.

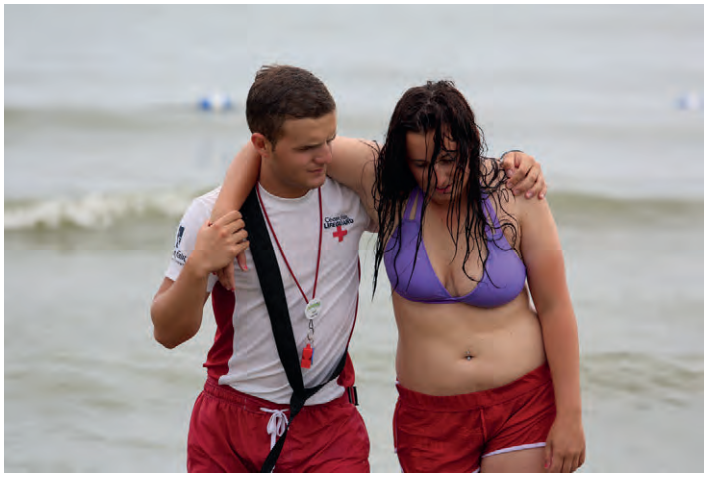


Figure 13.27 One rescuer walking assist.

Figure 13.28 Two rescuer walking assist.

Triage

Triage is the process of determining the priority of guest care based on the severity of the condition. It is used when the number of injured or ill guests exceeds the number of rescuers. This could occur in situations such as a disaster, an active shooter incident, or chemical poisoning. Triage requires you to decide the order of guest care once the scene is safe. If guests can walk, they rarely have immediately life-threatening conditions. These "walking wounded" can be told to quickly move away from the scene to designated safe area where they can care for one another until more rescuers arrive. Move quickly among the remaining guests. Spend about 30 seconds on each guest to quickly assess the conditions. Return and care for the most seriously injured or ill first. Once you have tended to the needs of the most severe conditions, move on to those with lesser conditions. By this time EMS personnel will likely take over.

During triage, classify guests according to these priorities:

- **Immediate** – Breathing difficulty, severe bleeding, severe burns, shock, or unresponsive
- **Delayed** – Less serious burns, bone or joint injuries, back injuries that restrict movement
- **Minor** – Minor wounds or bone or joint injuries
- **Deceased** – Obviously dead or unlikely to survive due to the extent of injury.

FOR YOUR REVIEW

Summary

As a lifeguard, you need to be able to determine when to activate the emergency action plan (EAP) and be aware of what care you need to provide to those injured until more advanced medical personnel arrive. Before you can provide emergency care to an injured guest, you must be certain the scene is safe. Assessment of a guest begins with the primary check, designed to locate and care for conditions that are immediately life-threatening. Once you have determined that there are no life-threatening conditions, you can do a secondary check.

There are three types of bleeding: capillary, venous, and arterial that may result from various types of wounds. Care for serious external bleeding by applying direct pressure with a dressing and bandage over the wound. Stabilize impaled objects to avoid further movement and tissue damage. To care for an amputation, stop the bleeding and save the severed part. Internal bleeding can occur as a result of blunt force. You should care for internal bleeding by following the RICE mnemonic.

There are four types of burns: thermal, chemical, electrical, and radiation. Burns are classified based on the depth of damage: first degree (superficial), second degree (partial thickness), and third degree (full thickness). Care for any burns is based on the type of burn, the highest level of severity, and the extent of the burn. Burn care should focus on stopping the burning process, minimizing further injury, and determining the need for more advanced care. Seek medical care for more serious burns, including calling 9-1-1 for the most serious burns.

- When you suspect a possible injury to the head or spine, apply spinal motion restriction (SMR) to keep the guest from moving until EMS personnel arrive. Injuries to the head and spine often result from falls and blunt trauma.
- For loose objects or chemicals in the eyes, hold the eyes open and continuously flush with water. If only one eye is affected, close the unaffected eye during this process.
- Injuries to the chest and abdomen can result in bruising, pain, tenderness, and difficulty breathing. Call 9-1-1 for serious conditions such as possible rib fractures, and open chest or abdominal injuries. You should carefully cover any protruding abdominal organs with a moist, sterile dressing.
- Muscle injuries include bruises, strains, and cramps. Joint injuries can include sprains or dislocations. Use RICE as general care for sprains and strains. Bones can be bruised or fractured. Care for possible fractures and dislocations by splinting the injured area. Call 9-1-1 for serious conditions.
- Shock is a condition in which organs and tissues of the body are not receiving an adequate flow of blood and oxygen, often resulting from various types of injuries. Signs of shock include altered consciousness, anxiety, restlessness, and pale, cool, moist skin. Care for shock by placing the guest on his or her back whenever possible and maintain normal body temperature.

Key Terms

→ Bandage
→ Closed wound
→ Concussion
→ Dislocation
→ DOTS
→ Dressing
→ Emergency moves
→ Fracture
→ Hemostatic gauze
→ Open wound
→ Primary check
→ RICE
→ Rule of the hand
→ Scene safety
→ Secondary check
→ Shock
→ Spinal motion restriction (SMR)
→ Splinting
→ Sprain
→ Strain
→ Tourniquet
→ Triage

Chapter 14
CARING FOR SUDDEN ILLNESSES

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Recognize the signs of sudden illnesses
- Describe how to care for sudden illnesses
- Using a training injector, demonstrate how to use an epinephrine auto injector
- Using a training injector and/or nasal device, demonstrate how to deliver naloxone

Chapter Overview

Allergic Reactions

Approximately one million people visit emergency departments each year as a result of severe ***allergic reactions***. Most of these reactions affect teens and young adults.

The immune system produces antibodies (protective proteins) to remove unwanted foreign substances. An allergen, which is a substance that causes an allergic reaction, produces an abnormally vigorous response from the immune system, causing it to fight off a perceived threat that would otherwise be harmless. Antibodies also bind to specialized cells that release inflammatory chemicals that include histamine.

This has several effects on the body:

- Constricting (narrowing) specialized smooth muscle, causing breathing difficulty
- Dilating (widening) blood vessels resulting in skin flushing (red)
- Inflammation resulting in swelling
- Movement of fluid normally found inside blood vessels (plasma) to spacing outside the blood vessels, causing a decrease in blood volume and dangerously low blood pressure

Causes of Allergic Reactions

There are many items that can cause allergic reactions. Food allergies including milk, eggs, nuts, soy, wheat, fish, and shellfish are the most common cause of allergic reactions, affecting nearly 15 million people annually.

Other items that can cause allergic reactions include:

- Insect bites and stings
- Medications such as antibiotics and pain medications
- Poisonous plants
- Latex
- Dyes used in medical procedures

Recognizing and Caring for Allergic Reactions

The signs of allergic reactions often appear shortly after an exposure to an allergen. Depending upon the substance, however, there could be a delay of more than an hour. In some individuals, the signs disappear and return a few hours later. Not everyone affected by allergic reactions will experience the same thing **(Figure 14.1)**.

Common, less serious signs include:

- Itching
- Red, watery eyes
- Runny nose
- Sneezing
- Mild swelling
- Hives

Figure 14.1 Rash from an allergic reaction.

The most serious form of allergic reaction is anaphylactic shock, commonly called ***anaphylaxis*** **(Figure 14.2)**.

It can occur suddenly following exposure and be life-threatening:

- Difficulty breathing
- Difficulty swallowing
- Swelling of the face, throat, or tongue
- Rapid heart rate
- Dizziness
- Loss of consciousness

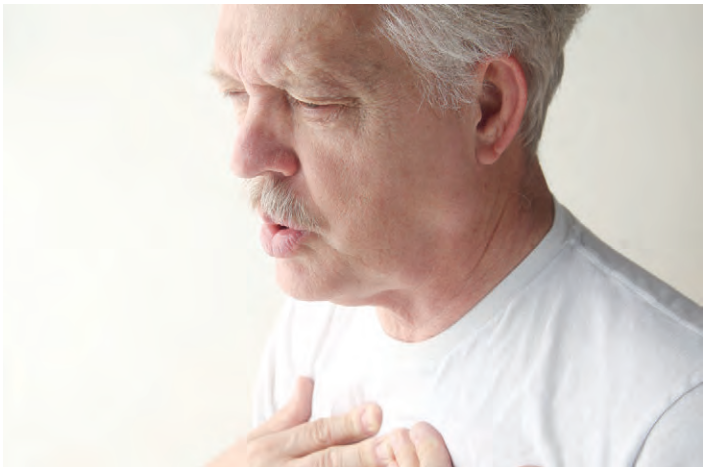


Figure 14.2 Signs of anaphylaxis include swelling of face, throat, or tongue and difficulty breathing.

To care for a guest experiencing a mild allergic reaction, an antihistamine, such as diphenhydramine (e.g. Benadryl), an be helpful.

To care for severe allergic reactions:

- Call 9-1-1
- Have the guest rest in the most comfortable position for breathing. This is often a seated position
- Remove any tight clothing that might restrict breathing
- If the guest has a prescribed epinephrine auto injector, assist with its use
- Provide supplemental oxygen support if available

Epinephrine Auto-Injectors

Epinephrine is a hormone that dilates bronchial tubes to make breathing easier. It also increases the heart rate, muscle strength, blood pressure, and sugar metabolism. An ***epinephrine auto-injector*** is a prescribed medical device that contains the proper amount of medication (epinephrine) for adults or children experiencing anaphylaxis. It is a single dose, disposal device that allows injection into the thigh. This injection will take a few minutes to begin to work and will provide temporary relief for about 20 minutes. The medication is often available in a "twin pack" with two auto-injectors. This helps if the first dose of the medication does not relieve the serious signs before EMS personnel arrive. Two common epinephrine auto-injectors are Epipen® and AuviQ® **(Figure 14.3)**.

Figure 14.3 Adult and pediatric epinephrine auto injectors.

Before administering epinephrine, examine the medication prior to use:

- Check the device to verify the expiration date is current and that the medication is clear, not discolored (brownish)
- For a guest greater than 66 lbs. (29 kg), use the adult device. For a guest less than 66 lbs. (29kg), use the pediatric device

Follow these steps to help a guest administer his/her prescribed epinephrine auto-injector while waiting for EMS personnel to arrive:

1. Hold the device firmly so that your fingers are not near the needle end of the device and remove the safety cap **(Figure 14.4)**
2. Place the guest in a seated position and hold the knee firmly so that the leg does not move during injection
3. Place the needle end near the outer thigh. The device will work through clothing, but it is best to administer it into the bare skin whenever possible
4. Press the device firmly in place and hold for 2-3 seconds (depending on the device) **(Figure 14.5)**
5. Massage the injected area for several seconds
6. Monitor the guest for improvement. If the guest does not improve in five minutes give a second dose if available

Following its use, the auto-injector must be properly discarded in a marked "sharps" container. This can be done by b providing the used device to arriving EMS personnel. The most common side effects of epinephrine include increased heart rate, stronger or irregular heartbeat, sweating, headache, nausea and vomiting, and nervousness or anxiety. These side effects usually go away quickly.

Figure 14.4 Hold the epinephrine injector safely and remove the safety cap.

Figure 14.5 Hold the leg still and press the injector firmly against the outer thigh.

Breathing Emergencies

A person can experience breathing problems for a variety of reasons, including respiratory infections, chest or head injury, heart attack, or asthma.

Recognizing and Caring for Breathing Emergencies

The signs of breathing emergencies include:

- Struggling to breathe
- Unusually fast (hyperventilation) or slow breathing
- Extensive coughing
- Noisy breathing, including gasping and wheezing
- Bluish lips
- Need to pause while speaking
- Fatigue

To care for breathing emergencies:

1. Call 9-1-1. Help the guest move into a comfortable breathing position, which is often a seated position.
2. If the condition involves a guest hyperventilating as a result of anxiety, attempt to calm the guest and have the guest hold his/her breath for several seconds and exhale slowly.
3. Guests experiencing breathing difficulty may have a condition such as asthma and have an inhaler for use. Assist the guest in using their prescribed inhaler
4. Provide supplemental oxygen support, if available, to any guest experiencing significant breathing problems

Recognizing and Caring for Asthma Attack

Asthma is a chronic lung disorder that affects over 24 million people in America, most of whom are adults. It occurs when inflammation causes the bronchi to swell and narrow the airways. This can create breathing difficulty that may range from mild to life-threatening. Signs of an asthma attack include shortness of breath, cough, chest tightness, and wheezing.

Causes of asthma attacks include:

- Infections
- Excessive exercise
- Allergies
- Drug sensitivity
- Cold weather
- Smoke
- Stress

Most asthmatics know how to avoid these factors and are used to dealing with their asthma effectively. Others, however, may be caught off-guard and unprepared.

If a guest has an inhaler, you can help the guest use the device:

1. Shake the inhaler and remove the cap
2. Have the guest exhale forcefully
3. Have the guest place the inhaler to their mouth, depress the button and breathe in deeply (**Figure 14.6**)
4. Remove the inhaler and have the guest hold their breath for several seconds, then exhale
5. Wait about 30 seconds and repeat steps 2-5

Figure 14.6 Assist the guest with any prescribed inhaler.

Cold Emergencies

There are two cold emergencies, hypothermia and frostbite. Hypothermia involves general cooling of the entire body, while frostbite is localized freezing of a body part.

Recognizing and Caring for Hypothermia

Hypothermia is a condition of abnormally low body temperature. It occurs when the body loses heat faster than it can be produced. Body temperature that is too low affects the brain, causing confusion and slowing movement.

The signs of hypothermia include:

- Shivering
- Confusion
- Drowsiness
- Exhaustion
- Cold skin, even under clothing

To care for hypothermia:

- Warm the guest gradually, replacing any wet, cold clothing with dry clothing and insulation, and cover the head
- If the guest is alert, provide a sugary, non-alcoholic beverage such as hot chocolate **(Figure 14.7)**
- Call 9-1-1 if the guest's condition is not improving

Figure 14.7 Slowly rewarm a guest experiencing hypothermia.

Recognizing and Caring for Frostbite

Frostbite occurs when an area of the body freezes and ice crystals cause damage at the cellular level. Frostbite commonly affects areas that are exposed or under-protected, such as the ears, nose, fingers, and toes.

The signs of frostbite include (Figure 14.8):

- Skin appears white, gray, and waxy
- Swelling
- Affected part is cold, painful, or becomes numb

Figure 14.8 Swelling and white, gray, waxy skin from frostbite.

To care for frostbite:

- Get the guest out of the cold
- Remove any cold or wet clothing, as well as any jewelry from the affected part, such as the hand
- Call 9-1-1. Frostbitten parts are best cared for when rewarmed under a controlled environment in a hospital
- If the guest is more than one hour from medical care, rewarm the frostbitten part in water of about 100° F for about 30 minutes. After thawing, do not let the parts refreeze. Place soft dry items such as gauze pads, between any fingers or toes. Provide a medication such as ibuprofen to help with the pain and swelling

Diabetic Emergencies

Diabetes is a disease in which the body's inability to produce adequate insulin causes an elevated blood sugar (glucose) level. Diabetics must regulate blood sugar and insulin levels through a combination of medication, diet, and exercise. Any significant imbalance can result in one of two types of diabetic conditions, hypoglycemia or hyperglycemia.

- ***Hypoglycemia*** occurs when the blood sugar level is too low, and the insulin level is too high. It can be caused by an overdose of insulin, failure to eat adequately, or heavy physical activity. Signs of hypoglycemia often develop rapidly. A hypoglycemic guest needs to get sugar into the bloodstream quickly to balance the effects of a high insulin level.
- ***Hyperglycemia*** occurs when the blood sugar level is too high, and the insulin level is too low. Unlike hypoglycemia, with its rapid onset, hyperglycemia usually takes days to become a significant medical problem.

Recognizing and Caring for Diabetic Emergencies

Signs of diabetic emergencies include:

- Diminished level of consciousness
- Weakness
- Hunger or thirst
- Vision difficulty
- Breathing difficulty
- Frequent urination
- Distinct fruity breath odor

Figure 14.9 Diabetics that are hypoglycemic need sugar.

If you are caring for a responsive diabetic, and you are not sure if the guest is hypoglycemic or hyperglycemic, give sugar. Glucose tablets or gel are often used by diabetics for such an emergency **(Figure 14.9)**. Other items, such as a can of fruit juice, soda, packets of sugar, or sugar candy can also be used. If hypoglycemia is present, and you have given sugar, the guest's condition often improves in a few minutes. In cases of hyperglycemia, the guest's condition will remain unchanged and the extra sugar will not be harmful. Call 9-1-1 for any unresponsive guest, or for any guest whose condition does not rapidly improve.

Drug Emergencies

Drug emergencies result from the misuse or abuse of medical and non-medical substances. These may be legal substances such as alcohol and pain killers, or illegal substances such as heroin and cocaine. Drug emergencies result from various substances and are classified by the effects they have on the body.

Hallucinogens

Hallucinogens are substances that cause changes in self-awareness, perception, sensation and thought. They may cause the guest to lose a sense of reality and have visual and auditory disturbances. Hallucinogens can be found in some plants and mushrooms (or their extracts) or can be produced by humans. Hallucinogens include lysergic acid diethylamide (LSD), phencyclidine (PCP), Peyote (mescaline), and "club drugs" such as MDMA (Ecstasy).

The signs of Hallucinogens include:

- Fear
- Panic
- Anxiety
- Tension
- Hallucinations
- Deep depression
- Paranoia

Depressants

Depressants are substances that depress the nervous system, causing sleepiness, muscle relaxation and slowed breathing. Alcohol and sleep aids are commonly used depressants. Alcohol is the most commonly abused drug in the United States. Binge drinking is a common cause of alcohol poisoning. According to the Centers for Disease Control (CDC), more than 88,000 people die from alcohol-related deaths each year in the United States. Those at highest risk of alcohol poisoning are college students, chronic alcoholics, those taking medications that should not be combined with alcohol, and children curious about the effects.

The signs of alcohol intoxication include:

- The odor of alcohol
- Slurred, slow, or incomprehensible speech
- Confusion
- Dizziness or loss of consciousness
- Slowed actions
- Staggering gait or falling
- Nausea or vomiting

Stimulants

Stimulants are substances that increase mental and physical activity. Common products such as energy drinks and power drinks contain stimulants that may have harmful effects. Cocaine, amphetamine, and methamphetamine are commonly abused stimulants.

Signs of stimulant overdose includes:

- Flush skin
- Sweating
- Nausea
- Fever
- Rapid pulse
- High blood pressure
- Chest pain

Opioid (Narcotic) Painkillers

Opioid drugs and medications, also generally referred to as narcotics, are substances that are powerful depressants often used to relieve pain. These substances include legally prescribed pain medications such as morphine, hydrocodone, and oxycodone. These are often sold under brand names such as OxyContin®, Percocet®, Vicodin®, and Demerol®. Heroin is an illegal opioid. Opioids depress the central nervous system resulting in loss of consciousness and depressed or absent breathing. The medication can be given through a muscle auto-injector similar to one used to deliver epinephrine for anaphylaxis, or through a nasal spray device. Most states have enacted laws making this medication available without prescription.

General Care for Drug Emergencies

To care for drug emergencies:

- Ensure that the scene is safe
- For intoxication in a responsive, breathing guest, call the Poison Control Centers help line for advice (800-222-1222)
- Calm and reassure the guest
- if the guest is preparing to sleep, have the guest sleep on his or her side, and stay with the guest. If the guest becomes hostile and cannot be easily controlled, leave the guest and call 9-1-1
- If the guest is unresponsive, place the guest in the recovery position and call 9-1-1. If the guest is unresponsive and not breathing, begin CPR
- If the guest is experiencing breathing difficulty provide supplemental oxygen support if available

Naloxone Auto-Injectors for Opioid Overdose

Naloxone is a medication **(Figure 14.10)** administered to those who overdose on opioid drug and are unresponsive and not breathing adequately (very slow, gasping or no breathing).

To use the nasal spray to assist a guest:

1. Position the guest face up
2. Insert the nozzle into a nostril and depress the plunger with your thumb **(Figure 14.11)**

To use the muscle auto injector to assist a guest:

1. Remove the safety guard
2. Place the black side of the injector near the outer thigh. Push firmly and hold in place for five seconds

Figure 14.10 Naloxone can be given through a muscle auto-injector or through a nasal spray device

Figure 14.11 Insert the nozzle of the naloxone device into a nostril and depress the plunger.

In all cases:

- ***Follow the Opioid Overdose Response Protocol, as described in chapter 10.***
- Maintain your safety
- Make sure EMS has been contacted and if available, naloxone (along with oxygen and an AED)
- Follow the instructions that come with the naloxone device for proper administration
- Follow local response protocols when required
- Monitor and maintain airway, breathing, circulation, and simulation of the central nervous system
- Provide basic life support care such as rescue breathing or CPR with supplemental oxygen support as needed

Fainting

Fainting (syncope) is a type of shock associated with a sudden, temporary loss of consciousness resulting from reduced blood flow and oxygen to the brain. Guests who faint often regain consciousness quickly after lying flat, which allows more blood and oxygen to return to the brain.

Causes of fainting can include:

- Exhaustion
- Hypoglycemia (low blood sugar)
- Heart problems
- Insufficient food or water
- Low blood pressure
- Blood loss
- Emotional upset
- Hyperventilation (rapid breathing)
- Standing too long in one place
- Psychological stress
- Environmental triggers
- No obvious cause

Caring for Fainting

To care for the faint (Pre-syncope):

1. Have the guest lie down or position the guest on their back on a flat surface. Encourage counter pressure maneuvers, such as leg crossing, gripping, muscle clenching in the legs, full body, etc.

After faining (Syncope):

2. Check responsiveness and breathing.
3. Check for any signs of injury if the guest fell when fainting
4. If the guest vomits, roll the guest into the recovery position to keep the airway clear
5. Loosen any restrictive clothing
6. Maintain normal body temperature
7. Provide supplemental oxygen support if available
8. Call 9-1-1 if the guest does not quickly regain consciousness, has repeat fainting episodes, the fainting is associated with another sudden illness, or if the guest fainted for no apparent reason

Heart Attack

A ***heart attack*** occurs when blood flow to a part of the heart is disrupted due to a blockage of one or more of the coronary arteries in the heart that supply the heart's oxygen needs. This lack of oxygen will cause death to part of the heart muscle. Discomfort often involves the chest, is persistent, not relieved by rest, and may spread to the shoulders, neck, jaw, or arms **(Figure 14.12)**.

Figure 14.12 Chest discomfort is a common sign of heart attack.

Chest discomfort is often accompanied by other signs, including:

- Breathing difficulty
- Sweating
- Nausea, or vomiting
- Dizziness
- Fatigue

Caring for Heart Attack

To care for a possible heart attack:

1. Call 9-1-1
2. Help the guest to rest in the most comfortable position
3. If the guest has prescribed heart medication, such as nitroglycerin, assist the guest with its use
4. If the guest is not allergic to aspirin and is not taking a blood thinner, provide one regular aspirin or two low dose aspirins if available **(Figure 14.13)**
5. Provide supplemental oxygen support if having trouble breathing

Figure 14.13 Aspirin can be helpful for a guest experiencing a heart attack.

Heat Emergencies

Physical activity in a hot environment can lead to three types of heat emergencies:

- Heat cramps
- Heat exhaustion
- Heatstroke

Recognizing and Caring for Heat Cramps

Heat cramps are the least serious of the three heat emergencies. Heat cramps are sudden, painful muscle cramps most often occurring in calf or hamstring muscles of the legs.

To care for heat cramps:

1. Have the guest stop any strenuous activity
2. Stretch the affected muscle
3. Provide water or an electrolyte drink

Recognizing and Caring for Heat Exhaustion

Heat exhaustion is a warning that the body is getting too warm and its' ability to cool itself is starting to fail. This often results from loss of salt and water from heavy sweating,

The signs of heat exhaustion include:

- Heavy sweating
- Fatigue
- Thirst
- Weakness
- Dizziness
- Nausea and vomiting
- Headache

Figure 14.14 Cool the guest by applying water-soaked towels.

Care for heat exhaustion is aimed at cooling the body and replacing lost water and electrolytes.

Follow these steps:

1. Have the guest rest in a cool environment
2. Provide water or a commercial sports drink if the guest is not nauseated
3. Cool the guest by applying water-soaked towels and a fan if available **(Figure 14.14)**
4. Call 9-1-1 if the guest's condition is not improving

Recognizing and Caring for Heatstroke

Heatstroke occurs when the sweat mechanism of the body fails, and the body becomes dangerously overheated. Heatstroke can occur quickly if working in a hot environment in heavy clothing, such as a firefighter working in building fire. But it can also build up over time, as with elderly persons without air conditioning during a prolonged dangerous heat wave.

The signs of heatstroke include:

- Very high temperature (104°F or higher)
- Hot, flushed (red) skin
- Little or no sweating
- Confusion
- Seizures
- Loss of consciousness
- Cardiac arrest

To care for heatstroke:

1. Rapidly cool the guest by any means possible. This can include immersing the guest up to the neck in cold water, such as in pool or applying cold packs to large blood vessels located at the sides of the neck, armpits, and groin
2. Call 9-1-1
3. If the guest is unresponsive and not breathing (or only occasionally gasping), begin CPR. Provide supplemental oxygen support if available

Poisoning

Poisoning occurs when any substance interferes with normal body functions after it enters the body. A poison can be ingested, inhaled, injected, or absorbed. Each year, approximately 10 million cases of poisoning occur in the United States, most accidental, but some intentional. Most poisoning incidents involve children under five years of age. The effects of poisons vary. They can interfere with metabolism, destroy organs such as the liver or kidneys, and depress the nervous system, which can lead to loss of consciousness, breathing difficulty, and cardiac arrest.

General Poison Care

The American Association of Poison Control Centers supports 55 Poison Control Centers in the United States. These centers provide care advice for poisoning incidents and help reduce costly hospital visits through proper in-home care. Poison centers offer free, confidential advice 24 hours a day, 7 days a week, through the Poison Help line at 800-222-1222.

Call the Poison Help line if the guest is responsive and not experiencing breathing problems. Otherwise call 9-1-1. When you call the Poison Help line, be prepared to answer questions that include:

- What poison was the guest exposed to?
- How much poison was the guest exposed to?
- In what manner was the guest poisoned?
- What is the age and approximate weight of the guest?
- What care has been provided?

Recognizing and Caring for Ingested Poisons

Ingested poisons are the most common type of poisoning. Poisoning by ingestion occurs anytime a person swallows a toxic substance.

Commonly ingested poisons include:

- Pain medications such as acetaminophen (Tylenol) and ibuprofen (Advil or Motrin)
- Home cleaning products such as dish washing liquids and drain openers
- Personal care products such as hand sanitizer, shampoo, and nail polish
- Laundry detergents
- Pesticides
- Plants
- Alcohol and other drugs

The signs of ingested poisons can include:

- Nausea and vomiting
- Abdominal cramps and pain
- Burns of the moth, lips, tongue, and throat
- Diminished consciousness
- Seizures

For responsive guests without breathing problems, call the Poison Help line and follow the advice provided. This might include diluting the ingested poison with milk or water or inducing vomiting. Acids, alkalis, alcohol, and gasoline are examples of some products for which different care is needed. Call 9-1-1 if the guest is unresponsive or having difficulty breathing.

Recognizing and Caring for Inhaled Poisons

Carbon monoxide is the most common form of inhaled poison. It is colorless and odorless, and produced by the incomplete burning of wood, gasoline, charcoal, and natural gas.

Other toxic inhaled substances include:

- Insecticides
- Gasoline
- Paint thinner
- Insect repellent

The signs associated with inhaled poisons include:

- Headache
- Dizziness
- Altered consciousness
- Breathing difficulty

To care for a guest who has inhaled a poison, get the guest out of any toxic environment if it is safe for you to enter. Check responsiveness and breathing. Provide supplemental oxygen support if available. Provide CPR if the guest is unresponsive and not breathing normally. Call 9-1-1.

Recognizing and Caring for Absorbed Poisons

Poisons that can be absorbed through the skin include chemicals such as cleaning solutions like bleach, as well as poisonous plants. Poison ivy, oak, and sumac are the most common types of poisonous plants, and often lead to allergic reaction **(Figure 14.15)**. The allergic reaction is caused from the oily resin called urushiol in the leaves, stems and roots of these plants. The reaction usually develops one to two days after exposure and can last for a few weeks. The severity of the rash depends on the amount of urushiol that gets on the skin.

Figure 14.15 Poison Ivy is one type of common poisonous plant.

The signs of plant poisoning include:

- Dermatitis (swollen red skin with an itchy rash) **(Figure 14.16)**
- Blisters
- Difficulty breathing, if burning poison ivy smoke has been inhaled

Figure 14.16 Dermatitis caused by exposure to a poisonous plant such as poison ivy.

Follow these steps to care for plant poisoning:

Upon initial contact with the plant:

1. Wash the affected area thoroughly with soap and water
2. If available, apply a commercial product such as Cortaid™, Technu™, or Zanfel™

If the dermatitis is already present:

1. Apply a corticosteroid cream, calamine lotion, or commercial product such as ZanfelTM
2. Use oral antihistamines, such as diphenhydramine (BenadrylTM)
3. Soak in a cool-water bath containing an oatmeal-based bath product (AveenoTM)
4. Place cool, wet compresses on the affected area for 15 to 30 minutes several times a day
5. Seek medical care if the dermatitis is widespread, affects areas such as face, neck, or genitals, or appears to be infected
6. Corticosteroids such as prednisone, and/or antibiotics may be prescribed to reduce the swelling and irritation

Recognizing and Caring for Injected Poisons

Injected poisons can result from a toxic substance in a needle or as a result of bites or stings from:

- Insects
- Spiders
- Ticks
- Scorpions
- Marine life
- Snakes
- Animals
- Humans

Chemical Poisons and Safety Data Sheets (SDS)

Employers are required by law to maintain a copy of ***Safety Data Sheets (SDS)*** that document the presence of, and care for, any hazardous materials in the workplace. The Occupational Safety and Health Administration's (OSHA) Hazard Communication Standard requires this information to be provided to you along with training on handling any chemicals, and proper chemical safety labeling. Safety Data Sheets contain helpful information about product identification, accidental release response measures, exposure control, personal protection, and poisoning treatment.

Insect Bites and Stings

Insects that bite or sting include bees, wasps, hornets,yellow jackets, mosquitoes, and fire ants. Ticks and spiders are arachnids that bite. Bees are the only stinging insects that leave behind part of their bodies, the venom sack, when they sting. Most of these bites or stings occur outdoors during warm months. Bites and stings often result in an envenomation mark, swelling, and itching **(Figure 14.17)**.

Figure 14.17 Envenomation mark, swelling, and rash associated with bites and stings.

To care for insect bites and stings:

1. For a bee sting, remove the stinger as quickly as possible. This can be done by scraping away the stinger with a fingernail or edge of a plastic card or removing it with tweezers
2. Wash any affected area with soap and water
3. Apply a cold pack to reduce pain and swelling
4. Provide an over-the-counter pain reliever such as ibuprofen
5. Reduce itching and swelling by using hydro cortisone cream or an oral antihistamine
6. Monitor the guest for signs of any severe allergic reaction
7. Call 9-1-1 if anaphylaxis occurs and assist the guest with his/her prescribed epinephrine auto-injector if available

Spider Bites

Most spider fangs are too small to penetrate human skin, or their venom is not potent enough to cause harm. But two spiders of concern in the United States are the black widow and the brown spider, such as the brown recluse **(Figure 14.18)**. A guest bitten by a black widow spider may feel a pinprick at the time of the bite. Shortly after being bitten the guest will feel a dull, numbing pain at the site of the bite. Small fang marks may be noticeable. This is usually followed by muscle cramps and severe pain, fever, chills, headache, dizziness, and nausea. A guest bitten by a brown recluse spider often does not feel the bite. Hours later, pain, swelling, itching, and redness will develop at the site of the bite. A blister develops days later that takes weeks or months to heal.

Figure 14.18 Two spiders of concern in the United States are the black widow and the brown recluse

To care for a black widow or brown recluse spider bite:

1. Wash the site with soap and water and clean it further with an alcohol swab
2. Apply ice to control swelling and provide some relief from the pain
3. Provide an over-the-counter pain medication
4. Call 9-1-1

Tick Bites

Ticks carry diseases such as Lyme disease, Rocky Mountain spotted fever, and tick paralysis. Because tick bites can go unrecognized for days, the chance of transmitting a disease is increased. The signs of tick bite can include swelling and a rash. Sometimes the tick can be embedded in the skin **(Figure 14.19)**.

Figure 14.19 Embedded tick and rash.

To care for an embedded tick:

1. Grasp the tick as close to the skin as possible with tweezers. Lift gently and hold with the skin tented until the tick releases
2. Wash the area with soap and water and disinfect the site with alcohol
3. Apply an ice pack for any swelling or pain
4. Apply hydro-cortisone cream for any itching
5. Advise the guest to watch for rashes, flu-like signs, or joint discomfort over the next 30 days. Seek medical care if these signs occur. Treatment for tick diseases involves prescribed antibiotics

Scorpion Stings

Scorpions are closely related to spiders and ticks. The scorpion's tail contains the stinger that injects a toxin. Though most scorpions in the United States are harmless, the bark scorpion found in the southwest is dangerous. Scorpion stings can be painful, but rarely fatal.

To care for a scorpion sting:

1. Wash the site with soap and water
2. Apply a cold pack
3. Seek medical care.

Human Bites

Human bites can deliver high levels of bacteria and different types of viruses contained in human mouths. A minor wound from a human bite can become infected and can sometimes be difficult to treat due to complications.

To care for human bites:

1. Clean a minor wound with soap and water, apply antibiotic ointment, and cover the wound with a clean dressing
2. If the area is bleeding heavily, apply direct pressure with a clean dressing until the bleeding is controlled
3. Seek medical attention for any deep bites

Animal Bites

Most animal bites are from domestic dogs and cats that produce puncture and crushing-type wounds. ***Rabies*** is a virus transmitted from the saliva of an infected animal through a bite or scrape. The rabies virus infects the central nervous system, ultimately causing disease in the brain and death. Most rabies cases occur in wild animals like raccoons, skunks, bats, and foxes. Domestic animals are usually infected by wild animals when the domestic pets are not vaccinated against rabies. Human rabies cases in the United States are very rare. In unvacuolated humans, rabies is almost always fatal after serious signs have developed. Vaccination after exposure is highly successful in preventing the disease if administered within a few days of infection. Care for animal bites is the same as for human bites. Seek medical assistance for any serious wounds from any animal that could be rabid. Report bites to local law enforcement personnel.

Marine Animal Bites, Stings, and Punctures

Marine animals can cause sting, bite, and puncture injuries. Jellyfish and Portuguese men-of-war account for the greatest number of injuries each year **(Figure 14.20)**. The signs of stinging marine animals include redness, swelling, and burning pain. In some cases, more severe allergic reactions can occur. Most stings can be treated by rinsing the area initially with sea water, carefully removing any remaining tentacles, applying vinegar, and taking a pain reliever. Call 9-1-1 at the first signs of anaphylaxis. Stingrays are marine animals that often bury themselves in sand. Unsuspecting guests accidentally step on them, resulting in a laceration, puncture or impaled object wound as the stingray flicks its barbed tail. Most wounds are inflicted to the feet and ankles of guests.

Figure 14.20 The tentacles of a jellyfish can deliver a powerful sting.

To care for injuries caused by stingrays:

1. Flush the injured area to help remove any debris
2. Immerse the injured part in hot water to neutralize the venom and reduce pain
3. Seek medical care. The wound of a stingray can have pieces of barb and become infected. The wound may also need sutures

Injuries from sharks, barracudas, and eels are rare, but when they occur the bite can cause lacerations or punctures. Control bleeding, care for shock, and call 9-1-1.

Snakebites

There are 4 venomous snakes in the United States **(Figure 14.21)**:

- Rattlesnake
- Copperhead
- Water moccasin
- Coral snake

The first three snakes are pit vipers, getting their name from the pit between their eyes and nostrils that acts as a heat seeking system.

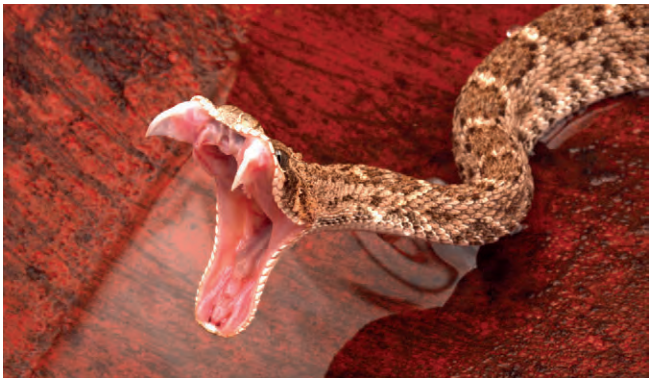


Figure 14.21 A rattlesnake is one of the four venomous snakes found in the United States.

They inject their venom through two fangs **(Figure 14.22)**. The coral snake is not a pit viper and does not have large fangs. The bite of these snakes can cause severe burning, pain, and swelling, and blood-filled blisters.

To care for these venomous snakebites:

1. Get the guest away from the snake. Do not try to capture or kill the snake
2. Limit movement of the guest
3. Wash the wound and cover with a clean dressing.
4. Immobilize any bitten limb
5. Apply an elastic bandage over an affected limb to help slow the spread of the venom
6. Call 9-1-1

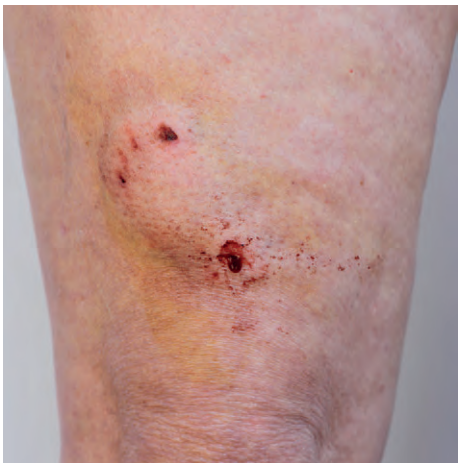


Figure 14.22 Pit viper bite.

Pregnancy Complications

While most pregnancies occur without complications, some unforeseen problems can arise. Some problems during pregnancy are minor and expected, while others are more serious. Pregnancy complications requiring medical care include guests experiencing:

- Severe abdominal pain or cramps
- Heavy vaginal bleeding
- Severe nausea and vomiting
- Significant decline in the activity of the baby
- Persistent, severe headache
- Visual disturbances

Pregnancy complications require the attention of medical professionals. Call 9-1-1. For vaginal bleeding or severe abdominal pain or cramps, place the guest on her left side. If vaginal bleeding is present, have the guest place a sanitary napkin or other sterile dressing over the opening of the vagina. Do not discard any blood-soaked dressings or tissue that is passed. Save these for EMS personnel to take with the guest to the hospital for further evaluation.

Seizure

A ***Seizure*** is uncontrolled electrical activity in the brain, which may produce convulsions (shaking), muscle rigidity, altered levels of consciousness, or thought disturbances **(Figure 14.23)**. The type of seizure and the signs that are exhibited depend on where the abnormal electrical activity takes place in the brain, its cause, and factors such as a guest's general state of health. A seizure can be caused by head injury, brain tumor, hypoglycemia, drug overdose, poisoning, infectious illnesses, and fever. A guest may have early warning signs (aura) of an impending event.

Figure 14.23 Seizure.

To care for seizures:

1. Protect the guest from injury by moving any items away that might cause harm, such as sharp objects
2. Roll the guest onto one side (recovery position) to help keep the airway clear
3. Protect the head from injury if convulsions are present by placing a soft object, such as a folded towel, under the guest's head
4. Call 9-1-1
5. Provide supplemental oxygen support if available

Stroke

A ***stroke*** occurs when blood flow to a part of the brain is disrupted due to blocked or ruptured arteries in the brain **(Figure 14.24)**. Signs of stroke include weakness or numbness on one side of the body, vision problems, problems speaking, dizziness or loss of balance, confusion, and sudden severe headache.

Use the *FAST* protocol to help recognize the need to get care to a guest experiencing a stroke:

F = Facial droop. Ask the guest to smile and see if one side of the face is drooping (Figure 14.25)
A = Arm weakness. Ask the guest to raise both arms
S = Speech difficulty. Listen to the guest speaking
T = Time to call 9-1-1

To care for a guest with a possible stroke:

- Call 9-1-1
- Have the guest rest in the most comfortable position. This position is often lying on the back with head and shoulders elevated
- If vomiting occurs, roll the guest onto his/her side (recovery position) to keep the airway clear

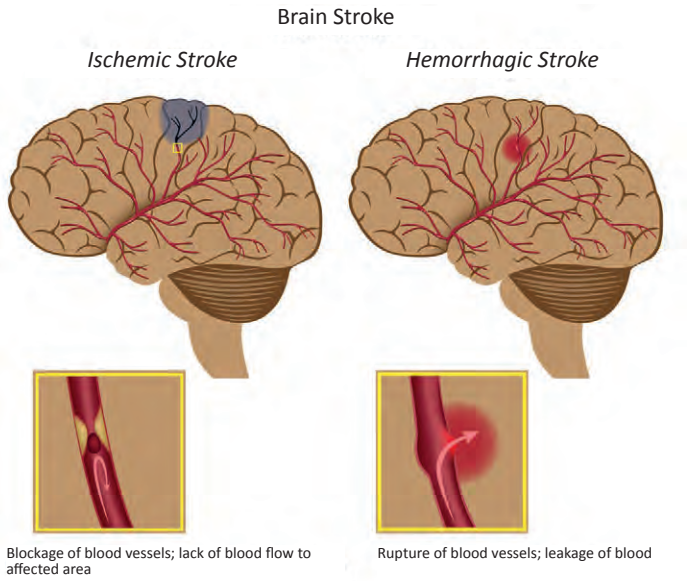


Figure 14.24 There are two forms of stroke.

Figure 14.25 Partial facial droop (paralysis) of the face is one sign of stroke.

The *First Aid Recognition & Care Matrix* on the next 3 pages provides a summary of how to recognize and care for the injuries and illnesses discussed in Chapters 13 and 14.

First Aid Recognition & Care Matrix

Condition	Recognition	Care
Allergic Reaction	Red eyes, runny nose. Sneezing, coughing. Hives, rash, swelling. Breathing difficulty. Dizziness.	Determine and remove the allergen (if possible). If anaphylaxis present, assist with epinephrine auto-injector if available. Call 9-1-1. Loosen any restrictive clothing. Provide supplemental oxygen. If unresponsive but is breathing/pulse, place in the Recovery Position. Monitor and be ready to begin CPR with an AED if needed.
Bites (Animal or Human)	Bleeding from open wound.	Get guest to safety (maintain your own safety). Stop bleeding. Flush the wound if possible. Call 9-1-1 for animal bites or serious bleeding. Seek medical attention as soon as possible if 9-1-1 was not called.
Bites (Snake)	Puncture wound. Bleeding. Pain, burning.	Get the guest to safety (maintain your own safety). Wash gently. Immobilize bitten extremities. Call 9-1-1.
Bites / Stings (Insect or spider)	Redness. Swelling. Pain, cramping. Itching. Embedded tick.	Remove any embedded tick or stinger. Clean the site. Cool the site to reduce pain. Apply hydrocortisone ointment for itching. Call 9-1-1 for black widow or brown recluse spider bites.
Bites / Stings (Marine life)	Redness. Swelling. Pain. Bleeding.	Jellyfish: Remove tentacles; rinse immediately in sea water; immerse in hot water. Stingray: Control any bleeding; immerse in hot water. Shark/barracuda: Control bleeding. Call 9-1-1 / Seek medical care as soon as possible.
Burns	Red, swollen skin: 1st Degree. With blistering: 2nd Degree. Charred: 3rd Degree.	Stop the burning process: Brush off any dry chemicals and apply cool water; 1st Degree: Apply skin moisturize with aloe or similar product. 2nd & 3Rd Degree: Call 9-1-1, loosely bandage with sterile dressing.
Closed Wounds	Tender, painful, swelling. Bruising, discoloration. Stiffness, reduced mobility.	R – Rest the injured area, avoiding all unnecessary movement. I – Ice or use cold packs applied for up to 20 minutes. C – Compress with elastic bandage to help control swelling for 2 hours. E – Elevate the injured body part above the heart, if possible.
Cold Emergency (Hypothermia or frostbite)	Shivering, goose bumps. Cold, bluish skin, lips. Confusion, Exhaustion. Waxy, white fingers, toes, ears, nose.	Move guest to a warm environment. Replace any wet or cold clothing with dry, warm items. Provide a warm, sweet beverage (if able to swallow). If the guest does not improve quickly call 9-1-1. Call 9-1-1 for all frostbite.
Diabetic Event	Anxious, Confusion, loss of consciousness. Weakness, Fatigue, Hunger, thirst Abnormal breathing. Fruity breath odor.	Place the guest in a comfortable position and loosen restrictive clothing. If low blood sugar, or uncertain, provide food/drink that contains sugar. If the guest does not improve quickly or becomes unresponsive, call 9-1-1.

First Aid Recognition & Care Matrix

Condition	Recognition	Care
Emergency Moves	Guests who are unable to walk without assistance to safety in a dangerous environment.	Assist guest to walk to safety. Carry guest (piggyback, 2-person) to safety. Drag guest to safety over smooth surfaces - Drag by ankles or grasp under should blades and cradle head in arms.
Eye injuries	Vision difficulty. Burning. Bleeding.	Chemical exposure: Call 9-1-1; Flush any chemicals continuously with water until EMS personnel arrive. Loose object: Flush with water to wash object out. Blunt trauma: Close eye and apply ice to control swelling.
Fainting	Light headed, dizziness, Nausea, vomiting. Unresponsive, Injuries sustained from falling.	At onset (presyncope), encourage counter-pressure maneuvers Have the guest lie down, loosen restrictive clothing. If the situation does not self-correct quickly, call 9-1-1. Place in the Recovery Position if vomiting. Check for signs of head, neck or back injuries.
Fractures or Joint Injuries	Pain, swelling, bruising Limb immobility. Deformity, Bone visible.	Splint the injured part to minimize movement. Call 9-1-1. Use R.I.C.E. Cover any bone protruding through the skin and attempt to control bleeding around the bone.
Heart Attack	Chest discomfort that may radiate to the arms, neck, or jaw. Difficulty breathing. Fatigue.	Have guest rest in most comfortable position. Loosen restrictive clothing. Call 9-1-1. Assist guest with his/her heart medication. Provide supplemental oxygen if breathing is labored. If available, provide two chewable low dose aspirins or one regular aspirin if the guest is not taking blood thinners or allergic to aspirin. Monitor and be ready to begin CPR and attach an AED if needed.
Heat Emergency	Cramps, Fatigue, Dehydration / Extreme thirst. Pale, moist or dry skin. Seizure, Unresponsiveness. Abnormal pulse and /or breathing.	Move guest to a cool area. Remove any heavy clothing and cool the guest (fanning, wet towels, ice). If responsive, provide water or sports drink. If heat stroke and responsive, consider a cool (not freezing) bath if it can be safely done. Call 9-1-1 if unresolved or if guest is unresponsive. Place the guest in the recovery position if vomiting.
Head, Neck or Back Injury	Pain, swelling, bruising. Open wound, bleeding. Confusion, unresponsive. Immobility, deformity.	Minimize head/neck movement with spinal motion restriction (SMR). Control bleeding from open wounds. Call 9-1-1 for any injury.
Mouth Injuries	Bleeding. Swelling. Broken/lost teeth.	Control bleeding with direct pressure. Save any broken or lost teeth and get guest to dentist or call 9–1-1. Place tooth in liquid, such as: balanced salt solution, milk, guest's saliva.
Nose Bleed	Bleeding from nostrils.	Have guest sit down and lean slightly forward. Pinch the nose close to the face for about 5 minutes. If bleeding continues, re-pinch the nose. If bleeding is heavy or cannot be controlled call 9-1-1.

First Aid Recognition & Care Matrix

Condition	Recognition	Care
Open Wound Bleeding	Wounds including: ▪ Abrasion ▪ Laceration ▪ Puncture ▪ Avulsion ▪ Amputation ▪ Impaled object	Call 9-1-1- for serious wounds (e.g. amputation) or uncontrolled bleeding. Apply direct pressure to the wound with a sterile dressing. Apply a pressure bandage (apply additional if blood soaks through). If wound includes an impaled object: Hold the object still until EMS arrives. If an amputation: Control bleeding and secure the severed part. Keep part dry and cool. Catastrophic injuries (amputations, gun shots, blast injury, etc.) may require hemostatic gauze or tourniquet (extremities) to prevent excessive blood loss.
Opioid (Narcotic) Overdose	Confusion, drowsiness, unresponsive. Agitation, aggressive behavior. Slow, irregular, gasping or absent breathing. Constricted pupils.	Keep the victim of the overdose responsive with stimulus. Call 9-1-1. Assist with Naloxone nasal spray or muscle auto-injector if available. Monitor and provide rescue breathing or CPR with an AED if needed. Be prepared for aggressive or violent behavior as they come down.
Poisoning (Ingested)	Confusion, lethargic, Unresponsive. Burns on or near mouth. Nausea, vomiting.	Try to determine what was ingested. Follow your Safety Data Sheets (SDS)for any work-related chemicals. Call Poison Control (800-222-1222) for responsive guest. Call 9-1-1 first if unresponsive. Place the guest in the recovery position.
Poisoning (Inhaled)	Confusion, lethargic. Unresponsive. Nausea, vomiting. Burning sensations in airway Weak, labored breathing.	Move the guest to fresh air and try to determine what was inhaled. Follow your Safety Data Sheets (SDS)for any work-related chemicals. Call Poison Control (800-222-1222) for responsive guest. Call 9-1-1 first if unresponsive. Place the guest in the recovery position if vomiting. Provide supplemental oxygen if labored breathing.
Seizure	Muscle rigidity. Unresponsive. Convulsions.	If in the water: Open the airway and extricate as quickly as possible. If on land: Protect the guest's head with placement of towels or padding. Call 9-1-1. Place the guest in the Recovery Position and monitor once seizure ends. Protect guest privacy.
Shock	Anxious, Confusion, dizziness, unresponsive. Pale/blue, cool/moist skin. Nausea or vomiting. Abnormal breathing.	Control any bleeding from serious open wound. Position the guest on his/her back. Maintain normal body temperature. If the guest is nauseated or vomiting place in the Recovery Position.
Stroke	Severe headache. Facial droop, Slurred speech. Blurred vision. F.A.S.T.	Place in most comfortable position and loosen any restrictive clothing. Call 9-1-1.
Triage	The number of injured/ill guests is far greater than the number of rescuers (e.g. explosion, tornado).	Classify guests rapidly by priority for EMS: Immediate (Red)- Breathing difficulty; severe bleeding, unresponsive Delayed 1 hr (Yellow) - Bone and joint injuries without bleeding Walking Wounded (Green) - Can walk to safety; minor conditions Dead (Black) - No signs of life

FOR YOUR REVIEW

Summary

Medical emergencies may occur at any time and for many reasons. It is important that you recognize signs of common emergencies and provide the necessary care, including summoning EMS professionals when necessary

- The signs of allergic reactions often appear shortly after an exposure to an allergen. The most serious is anaphylaxis, a type of shock. For severe allergic reactions, call 9-1-1, and assist the guest with an epinephrine auto-injector if the guest has one available.
- The signs of breathing problems include breathing that is excessively fast, slow, or noisy. Asthma is a breathing problem that afflicts millions of people. Care for an asthma attack by having the guest use his or her inhaler whenever available. Provide supplemental oxygen support, if available, for guests experiencing breathing difficulty and monitor the guest's condition until EMS personnel arrive.
- There are two types of cold emergencies. Hypothermia is a condition of abnormally low body temperature. Warm the guest gradually, replacing any wet clothing. Call 9-1-1 if the guest's condition doesn't improve. Frostbite involves the freezing of body parts. Get to a warmer area. Call 9-1-1.
- There are two types of diabetic emergencies, hypoglycemia (low blood sugar), and hyperglycemia (high blood sugar). Care for diabetic conditions by providing sugar. Call 9-1-1 if the guest's condition does not improve in a few minutes.
- If a guest is suffering from a drug overdose, call 9-1-1. If the drug is an opioid, administer Naloxone if it is available and you are trained to do so.
- Fainting is a form of shock associated with a sudden, temporary loss of consciousness as a result of reduced blood flow and oxygen to the brain. There are several causes of fainting, but the care is the same. Encourage Counter Pressure Maneuvers. Position the guest on his or her back and call 9-1-1 if the condition does now quickly resolve itself.
- Chest discomfort unrelieved by rest is a common sign of heart attack. Call 9-1-1. Administer aspirin if the guest is not allergic. Provide supplemental oxygen support if available.
- Provide rapid cooling to a guest that is experiencing a serious heat emergency such as heat exhaustion or heatstroke. Call 9-1-1 if the condition does not rapidly improve.
- Ingested poisons are the most common type of poisoning. Poisoning by ingestion occurs anytime a person swallows a toxic substance. For responsive guests without breathing problems, call the Poison Help line and follow the advice provided. Call 9-1-1 if the guest is unresponsive or having difficulty breathing.
- Some problems during pregnancy are minor and expected, but others require advanced medical care such as abdominal pain and heavy vaginal bleeding.
- To care for marine stings such as that from a stingray, flush the injured area, and immerse the injured part in hot water, and seek medical care. Injuries from marine animals such as sharks, barracudas, can result in lacerations or punctures. Control bleeding, care for shock, and call 9-1-1.
- There are different types and causes of seizures, but the care is generally the same. Keep the guest safe from injury, keep the airway clear, and call 9-1-1.
- Use the FAST mnemonic to recognize stroke. Call 9-1-1 and have the guest rest in the most comfortable position until EMS professionals arrive.

Key Terms

→ Allergic reaction
→ Anaphylaxis
→ Asthma
→ Counter Pressure Maneuvers
→ Depressants
→ Heat exhaustion
→ Heatstroke
→ Epinephrine auto-injector
→ Fainting
→ Frostbite
→ Hallucinogenics
→ Heart attack
→ Heat cramps
→ Hyperglycemia
→ Hypoglycemia
→ Hypothermia
→ Naloxone
→ Opioid
→ Poisoning
→ Safety data sheets (SDS)
→ Seizure
→ Stimulants
→ Stroke

Chapter 15
WATER RESCUES FOR RESPONSIVE GUESTS

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Differentiate between an assist and a rescue
- Demonstrate an assist
- List the general procedures for water rescues
- Demonstrate safe water entry techniques
- Demonstrate the approach strokes to use when rescuing a guest in distress
- Demonstrate rescues for responsive guests in distress who are on the water surface, below the surface within arm's reach, and below the surface beyond arm's reach
- Describe how to make adjustments during challenging rescues

Chapter Overview

Introduction

An active guest in distress may remain conscious for only a short period of time. It is critical that you recognize the event and respond promptly. You must quickly assess the situation and perform the appropriate rescue. Once you have rescued the guest, move the guest to the closest safe point, provide any additional care and document the incident.

The skills presented in this chapter will provide you with the necessary tools to safely provide rescues in a variety of aquatic environments.

Assists

Sometimes you can help an active guest in distress without entering the water, while still maintaining your 10/20 Protection™ standard. This is known as providing an ***assist***.

There are various situations in which you might be required to provide an assist to guests:

- Help guests exit an attraction
- Aid small children who need help standing or reaching the attraction's edge
- Assist weak swimmers who are being pulled backwards while trying to swim out of a current
- Support guests who lose their footing in an attraction
- Help guests who are disoriented when exiting a water slide
- Aid physically disabled or elderly guests needing assistance

When conducting an ***assist***, you do not necessarily have to activate your emergency action plan (EAP) or complete a rescue report because you are not leaving your zone unattended. However, if you're attempting to assist the guest and are unable to maintain the 10/20 Protection™ standard, you must activate the EAP and make a rescue.

Extension Assists

Figure 15.1 The rescue tube can be extended from the deck to a guest in distress.

Extension assists can be performed from the deck if the guest in the water is within reach. Extend your rescue tube to the guest and pull the guest to safety. If a rescue tube is not available, reach out and grasp the guest's arm and pull the guest to safety.

To perform an arm extension assist:

1. Lay flat on the deck near the edge
2. Extend your hand and grasp the guest's arm or wrist
3. Pull the guest to safety
4. Assist the guest out of the water if needed

To perform a rescue tube extension (Figure 15.1):

1. Extend the rescue tube toward the guest
2. After the guest grasps the tube, move the guest to safety
3. Assist the guest out of the water if needed

Water Entries

A ***rescue*** is when you must enter the water, leaving your zone unprotected, to help a guest in distress. When entering the water, your personal safety is just as important as the safety of your guest in distress. Choose a safe entry approach that is appropriate for the situation.

The three most common types of safe entries are:

- **Compact jump entry (Entry from the pool deck or elevated chair)**
- **High step entry (Entry from a zero-depth area into waves or deeper water)**
- **Ease-in entry (Entry if a guest with suspected spinal injury is near you)**

The Compact Jump

Of the three types of entries, ***the compact jump entry*** is the most common entry. The compact jump entry is designed to be used in various depths of water and from various heights into the water.

To perform a compact jump entry (Figure 15.2):

1. Identify the guest in distress and the water area in front of you and activate the EAP before you jump
2. Hold the rescue tube against your chest with the excess line secure
3. Jump into the water with your legs together, knees bent, and feet flat (if you submerge, the buoyancy of the tube will bring you quickly to the surface)
4. Approach the guest

Figure 15.2 Hold the tube securely along with any excess line as you prepare to do a compact jump. Jump into the water with legs together, knees bent, and feet flat.

High Step Entry

If you are working in a zero-depth entry area, such as a wave pool or beach, enter the water using the ***high step entry*** to help navigate any waves, speeding your access to the guest in distress **(Figure 15.3)**.

Carry the rescue tube beside you and run into the shallow water with high steps so that you can step over waves as they are rolling past you. After you reach a water depth that slows you down (e.g. above your knees), release the rescue tube and let it trail behind you as you begin your approach swim.

Figure 15.3 Use a high step entry when entering sloped areas such as wave pools and beaches.

Ease-In Entry

The ***ease-in entry*** is used to enter shallow water or when a nearby guest has a suspected spinal injury. Climbing or sliding down a ladder or pool wall into the water causes little water movement **(Figure 15.4)** and can help to prevent further harm to a guest with suspected spinal injury.

Figure 15.4 Use the ease-in entry if you suspect a nearby guest has a possible spinal injury.

Approach Strokes

After safely entering the water, your objective is to reach the distressed guest as quickly as possible. With the rescue tube under your arms, swim towards the guest in distress. This can be done by modifying the breaststroke or front crawl stroke so that your head remains out of the water allowing you to see the guest during your approach **(Figure 15.5)**.

In open-water situations, where the distance to the guest may be greater than in a pool, use the front crawl stroke with the rescue tube trailing behind you. When you get close to the distressed guest, slow down and place the rescue tube in front of you and finish your approach. This will put you in the correct position to perform the water rescue.

As you near the guest, communicate clearly with simple instructions, such as “Grab the tube.” A guest in distress may change position as you approach. A guest on the surface may slip below the surface requiring a different rescue.

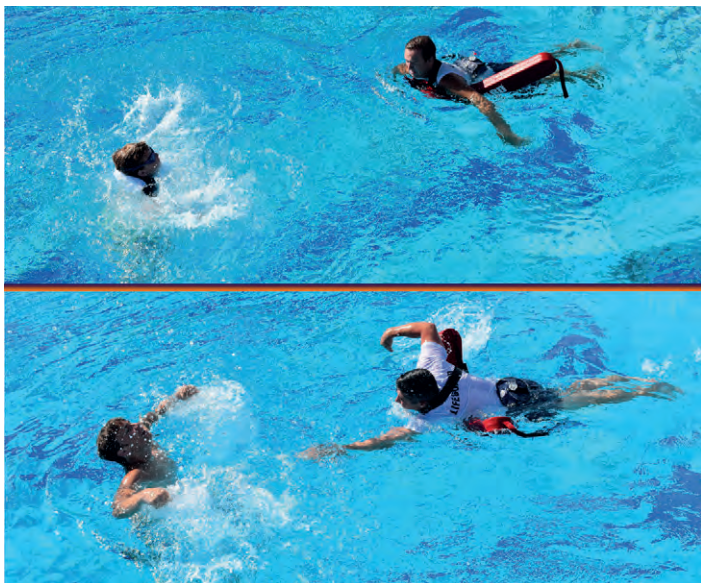


Figure 15.5 Approach stroke options include the modified breaststroke and modified front crawl stroke.

General Water Rescue Procedures

There are 10 general steps to follow when making a rescue:

1. Activate your EAP by blowing your whistle and pointing in the direction of the guest in distress. This alerts others there is an emergency in the water and that your zone will need to be covered as required by your facility specific zone plan
2. Depress the emergency stop (E-Stop) button if your duty station has one to stop operation of the attraction such as waves at a wave pool
3. Enter the water safely
4. Quickly approach the guest
5. Perform the appropriate rescue
6. Move the guest to safety while providing any necessary care
7. Remove the guest from the water
8. Provide any additional emergency care needed
9. Complete a rescue report
10. Release the guest, or transfer the guest to EMS personnel.

When making a rescue, you must also quickly determine some critical information before you reach the guest:

- Does the guest appear to be active (responsive) or passive (unresponsive)
- What is the fastest way to get to the guest
- How do you safely enter the water
- What rescue technique will you need to use
- How many guests are involved
- Is it likely that assistance from other lifeguards may be needed

The 5 R's of a Response

- **Rescue.** Rescue the guest in distress by using one of several techniques that enable the guest's face to be above the surface of the water
- **Removal.** Remove (extricate) the guest in distress from the water. Move the guest to the nearest safe area to exit the water. This might be as simple as helping a guest walk out of the water. The assistance of other lifeguards may be required if equipment such as a backboard is needed
- **Render aid:** Render any additional care when necessary. This could include helping calm a guest who is distraught over the need to be rescued. It could be more complex, including performing CPR or rescue breathing for an unresponsive guest
- **Report:** Complete a rescue report. If you provided additional care such as first aid, you may need to complete a separate incident form as well. Documenting rescues serves as legal supportive data and tracks statistical trends for your facility to evaluate.
- **Release:** Once the incident is documented, the guest can be released. Depending on the situation, you may release the guest to a higher trained healthcare personnel, another lifeguard, a supervisor, or an adult supervising the guest. Document when and to whom you released the guest.

Responsive Guests On The Surface

A guest in distress can be in any depth of water anywhere in your zone **(Figure 15.6)**. There are different rescues to use depending on the actions of the guest as you approach. Once you identify a guest in distress, activate your EAP, enter the water safely, approach the guest quickly, and perform the appropriate rescue based on the situation. Following any rescue, provide additional care as needed, release the guest if appropriate, and complete a rescue report.

Figure 15.6 A responsive guest in distress needs prompt recognition and rescue.

Grab and Lift Rescue

The ***grab and lift rescue*** is used with responsive children in shallow water and does not require the use of a rescue tube.

Follow these steps when using this rescue:

1. When you reach the guest, grab the guest under the arms and lift so that the guest's head is out of the water **(Figure 15.7)**
2. Calm the guest while moving the guest to safety

Figure 15.7 The grab and lift rescue is ideal for small children in shallow water.

Front Drive Rescue

The ***front drive rescue*** is used when a responsive guest of any size is on the surface of deep water and facing you as you approach.

Follow these steps when using this rescue:

1. Extend the rescue tube, pushing it slightly under water and into the guest's chest **(Figure 15.8)**. Shout at the guest to grab the tube
2. With the guest holding the tube and your arms extended, push and kick to move the guest to safety **(Figure 15.9)**
3. Calm the guest while moving the guest to safety

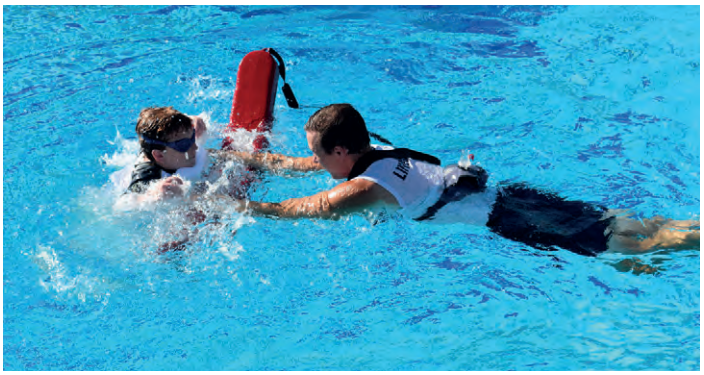


Figure 15.8 With the front drive rescue extend the rescue tube into the guest's chest.

Figure 15.9 Push and kick to move the guest to safety.

Front Hug Rescue

The ***front hug rescue*** can be used when a small, responsive guest is on the surface of deep water and facing you as you approach.

Follow these steps when using this rescue:

1. With the rescue tube under your arms, extend your arms and reach under the guest's arms
2. Move your head to the side to avoid colliding with the guest as you lift and hug the guest **(Figure 15.10)**
3. Calm the guest while moving the guest to safety

Figure 15.10 With the front hug rescue, reach under the guest's arms and lift and hug the guest.

Rear Hug Rescue

The ***rear hug rescue*** can be used when a responsive guest of any size is on the surface of deep water and facing away from you as you approach.

Follow these steps when using this rescue:

1. With the rescue tube under your arms, extend your arms and reach under the guest's arms
2. Move your head to the side to avoid colliding with the guest as you wrap your arms around the guest's chest or stomach and lift the guest **(Figure 15.11)**
3. Calm the guest while moving the guest to safety

Figure 15.11 With your head to one side, wrap your arms around the chest or stomach and lift the guest.

Responsive Guests Beneath The Surface

Sometimes a guest in distress is responsive but is beneath the surface of the water. The guest may be within arm's reach from the surface, or deeper under the water requiring you to submerge to perform the rescue.

The Duck Pluck Rescue

The ***duck pluck rescue*** can be used when a responsive guest of any size is beneath the surface of the water but within arm's reach.

Follow these steps when using this rescue:

1. Once you are above the submerged guest, hold the center of your rescue tube with one hand and reach over the tube with your other hand
2. Grab the guest's arm or hand, lean back, and pull the guest to the surface **(Figure 15.12)**

Figure 15.12 With the duck pluck rescue, hold the center of your rescue tube with one hand and reach over the tube with your other hand and grasp the guest's arm.

3. Push the tube into the guest's chest as the guest nears the surface. Shout at the guest to grab the tube **(Figure 15.13).** Keep your arm extended to keep the guest at a safe distance

4. Calm the guest while moving the guest to safety

Figure 15.13 Push the rescue tube into the guest's chest as the guest nears the surface.

Deep Water Submerged Rescue

The ***deep water submerged rescue*** is used when a guest of any size is under water beyond your reach from the surface. In this case, you must submerge to reach the guest.

Follow these steps to execute a deep-water rescue:

1. Once you are above the submerged guest, release your rescue tube but keep the strap on. Submerge and surface dive to a position behind the guest **(Figure 15.14)**

2. Grasp the guest across the chest with one arm and grab the rescue tube strap with your free hand pull the strap and feed the excess line to your other hand. The buoyancy of the tube will help you rise quickly to the surface with the guest **(Figure 15.15)**

3. Once you reach the surface, continue to hold the guest across the chest. Using your free hand, place the tube against the guest's chest and shout at the guest to grab the tube **(Figure 15.16)**

4. Calm the guest while moving the guest to safety

Figure 15.14 With the deep water submerged rescue, surface-dive to a position behind the guest.

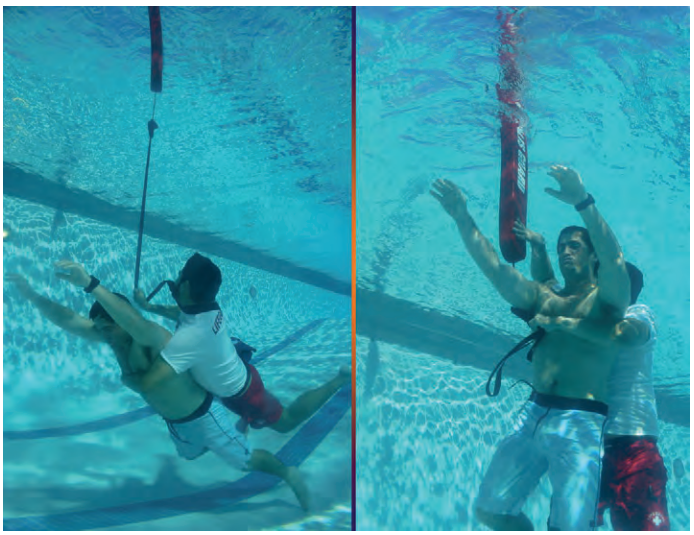


Figure 15.15 Grasp the guest across the chest with one arm and the rescue tube strap with your free hand. Pull down on the strap so that the buoyancy of the tube can help bring you to the surface.

Figure 15.16 When you reach the surface place the rescue tube against the guest's chest.

Challenging Rescue Situations

Guests can be unpredictable. A guest in distress is often frightened or disoriented and might not behave as you might expect as you make your approach. A guest may panic and try to grab you. Fortunately, you have a rescue tube capable of supporting the weight of several people. Try to calm the guest. But if the guest is too aggressive, your safety comes first, and you need to adjust to the situation.

Aggressive Guests

If you are unable to control an aggressive responsive guest, separate from the guest momentarily. The ***push away technique*** is an effective means of moving away from a guest briefly so that you can attempt another rescue or seek assistance from other lifeguards.

Follow these steps to o perform the push-away technique when a guest is forcing you under water:

1. Take in a breath, tuck your chin and submerge.
2. Push yourself down and away from the guest.
3. Resurface a few feet out of reach.
4. Recover your rescue tube if the guest is not holding it.
5. Signal for help from another lifeguard if needed.
6. Re-attempt your rescue.

Multiple Responsive Guests in Distress

When multiple guests are in distress at the same time, you may need help from another lifeguard.

Follow these steps to handle this special situation:

1. Sometimes two guests in distress can be rescued at the same time. For example, if one small child has grasped another, you may be able to use the rescue tube to support both guests. Calm the guests and move to safety.

2. If this is not the case and you need help, raise a clinched fist above your head to notify other lifeguards **(Figure 15.17)**.

3. Rescue one guest and move the guest to safety.

4. The additional lifeguard responding to your signal will rescue the second guest and move the guest to safety. If you are in a facility where you are the only lifeguard, you will need to rescue the second guest.

Figure 15.17 Raising a clinched fist overhead notifies other lifeguards that assistance is needed.

Two - Lifeguard Rescue

If a guest in distress is too difficult for you to rescue due to the guest's large size or aggressive behavior, and you are in a multi-lifeguard facility, you can perform a ***two-lifeguard rescue***. In this situation, lifeguards approach the guest from the front and back and simultaneously execute a front drive and rear hug front drive and rear hug **(Figure 15.18, Figure 15.19)**. Instead of grasping the guest's chest or stomach, the lifeguard performing the rear hug grasps the rescue tube that has been extended into the guest's chest. This enables the two lifeguards to lock the guest between two rescue tubes providing significant support. Calm the guest while moving the guest to safety.

Figure 15.18 Lifeguards approach the guest from the front and rear.

Figure 15.19 The front drive and rear hug used simultaneously.

FOR YOUR REVIEW

Summary

You can use assist instead of a rescue to help a guest in distress if you can maintain the 10/20 Protection™ standard. If you cannot maintain this standard when performing a rescue, you must activate your EAP to notify others that your zone is unprotected.

There are several different methods for entering the water safely and efficiently including the compact jump, high step entry, and ease-in entry. Use a high step entry when entering sloped areas such as wave pools and beaches.

When a responsive guest is in distress on the surface of the water, you have several rescue options based on the size, location, and position of the guest. These options include the grab and lift rescue, front drive rescue, and front or rear hug rescues.

If a responsive guest in distress is below the surface but within your arm's reach, you can use the duck pluck rescue. If a guest is beyond your reach from the surface, perform the deep-water submerged rescue to bring the guest to the surface and render aid.

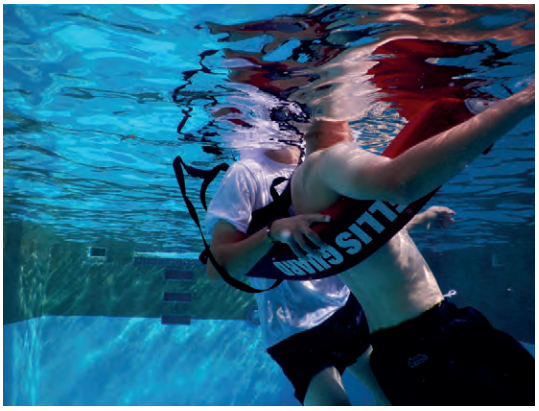
As a lifeguard, your main objective is to get the guest's head above water so that the guest can breathe. Calm the guest while moving to safety. Render any additional care required, document the incident and release the guest.

If you find yourself in trouble while making a rescue, use the push away technique and then reattempt the rescue. When multiple guests are in distress at the same time, you may need help from another lifeguard using the two-lifeguard rescue. Be sure to signal for help from another lifeguard for rescue situations with multiple guests or if a guest is too large or too aggressive. If you are in a single lifeguard facility, you will need to make the second rescue.

Key Terms

- → Assist
- → Compact Jump Entry
- → Deep Water Submerged Rescue
- → Duck Pluck Rescue
- → Ease-In Entry
- → Front Drive Rescue
- → Front Hug Rescue
- → Grab and Lift Rescue
- → High Step Entry
- → Push Away Technique
- → Rapid extrication
- → Rear Hug Rescue
- → Rescue
- → Two-Lifeguard Rescue

Chapter 16
WATER RESCUE FOR UNRESPONSIVE GUESTS



Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Recognize, respond and care for an unresponsive guest in the water
- Demonstrate how to perform a rescue for an unresponsive guest in distress on the water surface, and below the surface within reach, and beyond arm's reach
- Demonstrate how to perform rescue breathing in the water for an unresponsive guest
- Demonstrate how to extricate (remove) an unresponsive guest from the water and provide appropriate care

Chapter Overview

Unresponsive Guest In Distress

An unresponsive (unconscious) guest in the water is one who is passively drowning. The guest is generally face down in the water. Sometimes, the unresponsive guest is floating on or near the surface of the water.

An unresponsive guest can be found in any depth of water:

- **On the surface**
- **Below the surface within arm's reach**
- **Below the surface beyond arm's reach**

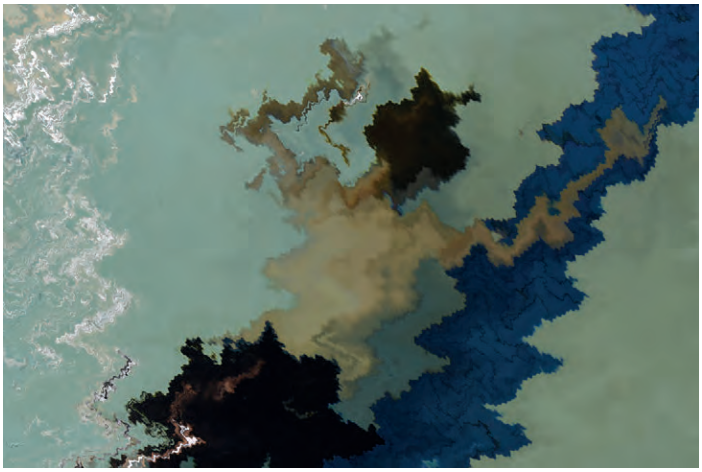


Figure 16.1 An unresponsive guest below the surface may appear as a shadow or blurry spot.

An unresponsive guest can also be in flotation devices such as life jackets and inner tubes. An unresponsive guest below the surface may be difficult to recognize due to water turbidity (cloudiness) and clarity issues. The guest may appear as a dark shadow, object, or spot on the bottom **(Figure 16.1)**. Anything that appears abnormal requires you to investigate the situation immediately. Activate your EAP, enter the water, and respond. **Remember, "If you don't know, go!"**

Unresponsive Guest Rescues

Your priorities with an unresponsive guest in the water are to:

- Get the guest's face out of the water
- Open the guest's airway to facilitate spontaneous breathing
- Provide in-water rescue breathing care if necessary
- Move the guest to the closest point to rapidly extricate the guest from the water

There are 3 different rescues that can be used for an unresponsive guest, based on where the guest is found in the water:

- Surface – Rear hug rescue for an unresponsive guest
- Submerged within arm's reach – Duck puck rescue for an unresponsive guest
- Submerged beyond arm's reach – Deep water submerged rescue for an unresponsive guest

These rescues are similar to those you previously learned for responsive guests. The modifications involve the placement of the rescue tube.

Unresponsive Guest on the Surface

The ***rear hug rescue for an unresponsive guest*** can be used for an unresponsive guest on the surface of the water.

Follow these steps when using this rescue:

1. With the rescue tube under your arms, extend your arms and reach under the guest's arms **(Figure 16.2)**
2. Move your head to the side to avoid colliding with the guest as you wrap your arms around the guest's chest or stomach and lift and pull backward **(Figure 16.3)**
3. As you pull backward, position the rescue tube below the guest's shoulder blades. The guest's head will fall backward with the face out of the water enabling you to assess whether the guest is breathing
4. If the guest is not breathing, signal for assistance, provide in-water care, and move the guest to the closest point for extrication

Figure 16.2 With the rear hug rescue, extend your arms and reach under the guest's arms.

Figure 16.3 With your head to one side, wrap your arms around the chest or stomach and lift and pull the guest backward.

Unresponsive Guest Below the Surface Within Arm's Reach

You may be able to reach a submerged, unresponsive guest who is within arm's reach without completely going underwater yourself by using the ***duck pluck rescue for unresponsive guests***. This rescue allows you to remain on the surface of the water, keeping the rescue tube between you and the guest, and bringing the guest to the surface.

Follow these steps when using this rescue:

1. Once you are above the submerged guest, hold the center of your rescue tube with one hand and reach over the tube with your other hand **(Figure 16.4)**

Figure 16.4 Hold the center of your rescue tube with one hand and reach over the tube with your other hand.

2. Grab the guest's arm or hand, lean back, and pull the guest to the surface **(Figure 16.5)**
3. Rotate the guest and place the tube against the guest's back, below the shoulder blades. The guest's head will fall backward with the face out of the water making assessment of breathing possible **(Figure 16.6)**
4. If the guest is not breathing, signal for assistance, provide in-water care, and move the guest to the closest point for extrication

Figure 16.5 Grasp the guest's arm, lean back and pull the guest to the surface.

Figure 16.6 Place guest on the rescue tube and assess breathing.

Unresponsive Guest in Deep Water Beyond Reach

When a guest is submerged, unresponsive, and beyond arm's reach, you will perform the ***submerged deep-water rescue for an unresponsive guest***.

Follow these steps when using this rescue:

1. Once you are above the submerged guest, release your rescue tube but keep the strap on
2. Submerge and surface dive to a position behind the guest **(Figure 16.7)**
3. Grasp the guest across the chest with one arm and grab the rescue tube strap with your free hand **(Figure 16.8)**

Figure 16.7 Surface dive to a position behind the guest.

Figure 16.8 Grasp the guest across the chest with one arm and grab the rescue tube strap with your free hand.

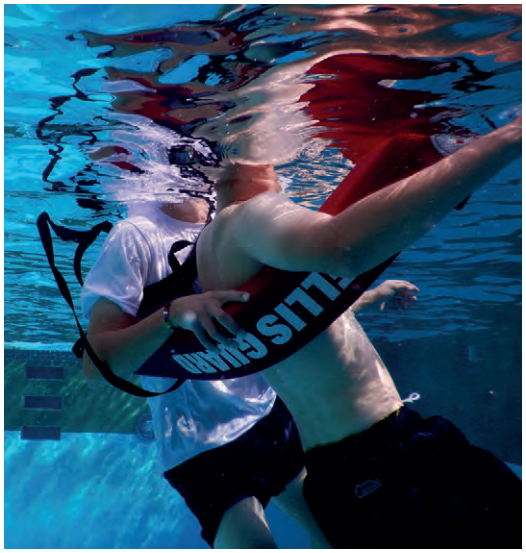


Figure 16.9 Position the guest on the rescue tube.

4. Pull the strap and feed the excess line to your other hand. The buoyancy of the tube will help you rise quickly to the surface with the guest

5. Once you reach the surface, continue to hold the guest across the chest. Using your free hand, place the tube against the guest's back, below the shoulder blades **(Figure 16.9)**. The guest's head will fall backward with the face out of the water making assessment of breathing possible

6. If the guest is not breathing, signal for assistance, provide in-water care, and move the guest to the closest point for extrication

Caring For An Unresponsive Guest In The Water

Once you have the guest safely on the rescue tube, you will need to act quickly to determine if the guest is breathing and provide any needed in-water care - all while quickly moving the guest to a point to be safely extricated. When that point is reached, safely remove the guest from the water to facilitate further BLS care.

In-Water Rescue Breathing

To provide ***in-water rescue breathing*** for an unresponsive guest, position the guest face up on the rescue tube and follow these steps:

- Open the guest's airway using a jaw thrust with head-tilt and quickly check for signs of breathing. This may be all that is needed for the guest to start spontaneous breathing **(Figure 16.10).**
- If the guest is not breathing, apply your resuscitation mask - seal the mask, combined with a jaw thrust with head-tilt. Deliver 2 initial ventilations. **(Figure 16.11).**
- If the guest does not respond to these ventilations, continue rescue breathing:
  - Adults: 1 breath every 6 seconds.
  - Children: 1 breath every 2-3 seconds.
- Continue rescue breathing while moving the guest to a safe point for extrication. **(Figure 16.12).**

Figure 16.10 Open the guest's airway using a jaw thrust with head-tilt and check for breathing.

- Remove the guest from the water as soon as possible so that better care can be provided on land.

Figure 16.11 If the guest is not breathing, seal the mask on the guest's face, keeping the airway open, and provide 2 ventilations.

Figure 16.12 Provide rescue breathing while quickly moving the guest toward the extrication point.

In-water Rescue of an Unresponsive Infant

If an unresponsive infant is rescued in the water, in-water care may not be practical (due to equipment size in relation to the infant, among other reasons). The objective with any unresponsive guest is to open the airway as soon as possible and initiate needed care. Rapidly and safely, move the infant to the nearest exit point and perform all appropriate care out of the water.

Rapid Extrication Of An Unresponsive Guest

Rapid extrication is a technique used to quickly and safely remove an unresponsive guest from the water. The technique requires multiple lifeguards or supplemental responders and a backboard. There are two methods of rapid extrication:

- **Carry-out technique**
- **Pool edge technique**

Rapid Extrication: Carry-Out Technique

The ***carry-out technique*** is a team effort using the backboard to rapidly remove an unresponsive guest from the water with a zero-depth entry area such as a beach or wave pool. There are several versions of this technique based on the number of responders available to assist. Your facility is responsible for the extrication EAP you will use.

To complete the carry-out technique for rapid extrication, perform the following steps:

1. As the primary lifeguard moves with the guest toward the extrication point, at least one other lifeguard enters the water with a backboard **(Figure 16.13).**
2. Submerge and position the backboard under the guest. Remove the rescue tube as the backboard rises against the guest's back **(Figure 16.14).**
3. If the distance to the zero-depth area is short and the guest is small, grasp the handholds under the guest's armpits and drag the guest onto land **(Figure 16.15).**
4. If the distance to land is greater, the guest is large, or you have steps to navigate that require lifting and carrying the guest on the backboard, secure a chest strap for additional support .
5. Move the guest at least six feet from the water's edge, lower the backboard, and begin on-land care.

Figure 16.13 One or more lifeguards enter the water with a backboard to assist the primary lifeguard.

Figure 16.14 Position the backboard under the guest and remove the rescue tube.

Figure 16.15 Grasp the handholds under the guest's armpits and drag the guest onto land.

Rapid Extrication: Pool Edge Technique

The ***pool edge technique*** for extrication requires a backboard and at least one other responder. The rapid extrication is used in facilities with a perimeter edge or gutter near the water line.

Follow these steps when using this technique:

1. As the primary lifeguard moves with the guest toward the extrication point, the lifeguard on-deck positions the backboard vertically in the water along the wall **(Figure 16.16).**

2. The primary lifeguard hands the guest's arm to the on-deck lifeguard who grasps it while still holding the backboard in position with the other hand **(Figure 16.17).**

Figure 16.16 As the primary lifeguard moves with the guest toward the extrication point, the lifeguard on deck positions the backboard.

Figure 16.17 The primary lifeguard hands the guest's arm to the on-deck lifeguard who grasps it while still holding the backboard in position with the other hand.

3. The primary lifeguard removes the rescue tube. With the guest centered on the backboard, the two lifeguards communicate their readiness to remove the guest from the water **(Figure 16.18).**

4. The on-deck lifeguard pulls the backboard while supporting the guest's arm. At the same time, the primary lifeguard pushes the backboard onto the deck. The backboard will move smoothly along the edge as the lifeguards work together **(Figure 16.19).**

5. Once out of the water, the lifeguards work together to position the guest at least 6 feet (1.8m) away from the water's edge to safely begin care on land.

Figure 16.18 The primary lifeguard removes the rescue tube and the lifeguards prepare to slide the guest out of the water using the backboard.

Figure 16.19 The on-deck lifeguard holds the guest's arm and pulls the board as the primary lifeguard pushes the board.

Care After Extrication

Once the unresponsive guest is removed from the water, follow these steps for care:

1. Assess the presence of a pulse and breathing for up to 10 seconds **(Figure 16.20).**
2. If the guest has a pulse but is not showing signs of normal breathing, begin rescue breathing using a resuscitation mask or a bag-valve-mask (BVM) attached to supplemental oxygen **(Figure 16.21).**
3. If there is no pulse detected or if there is any uncertainty about a pulse, begin cardiopulmonary resuscitation (CPR), incorporating an automated external defibrillator (AED), when it is ready **(Figure 16.22).**

Figure 16.20 Open the airway and assess for pulse and breathing for up to 10 seconds.

Figure 16.21 Provide rescue breathing using either a resuscitation mask or BVM attached to supplemental oxygen, when it becomes available.

Figure 16.22 Begin CPR If the pulse is absent, and apply the AED as soon as it is available.

4. If the guest begins to vomit, place the guest in the recovery (side) position. Clear any vomit and manage any airway obstructions encountered, returning to the care that was interrupted **(Figure 16.23).**

If the guest shows signs of life (responsiveness, breathing, crying, conscious movement), place the guest in the recovery position and provide supplemental oxygen while monitoring vitals until care can be transferred to EMS.

Figure 16.23 If the guest vomits - roll the guest to the side, clear the airway, and resume care.

Important points to remember during post extrication care of an unresponsive guest:

- Upon extrication, someone on the response team needs to be ready to provide immediate care, beginning with the assessment of pulse and breathing.
- Once care has begun, pauses in continuous care must be kept to a minimum (≤ 10 seconds).
- Utilize appropriate PPE when confronted with body substances.
- Include supplemental oxygen during all resuscitation efforts.
- As these become available, apply the best equipment options without interrupting care.
- Use good teamwork, clear communication, and anticipatory problem solving.

Supplemental Responders

Supplemental responders are those designated and properly trained to assist lifeguards in an emergency when there are not enough lifeguards available to perform to the standard of care the situation requires. Supplemental responder procedures should be documented in your facility's Emergency Action Plan (EAP). If you are working in a single lifeguard facility where your EAP requires you to work with supplemental responders, you should practice with these responders so that you are able to work together to extricate a guest from the water and provide additional care as part of a team.

FOR YOUR REVIEW

Summary

An unresponsive guest in distress may be located on the surface, below the surface within arm's reach, or submerged beyond arm's reach.

An unresponsive guest below the surface may be difficult to recognize due to water turbidity and glare and may appear as a shadow, object, or spot on the bottom of the water. If you are unsure of what you are seeing, treat it as an emergency. Activate your EAP and respond immediately.

There are three types of rescues used to respond to unresponsive guests. These are rescues you previously learned but with some modifications due to the unresponsive condition of the guest. The rescues are the rear hug, duck pluck, and submerged deep-water rescue.

When delivering rescue breathing in the water, place the unresponsive guest face up on the rescue tube and quickly check for breathing. If the guest is not breathing, provide rescue breathing by giving 2 initial ventilations. If there is no response, give 1 ventilation every 6 seconds for an adult or every 2-3 seconds for a child, while quickly moving the unresponsive guest to an extrication point. If the unresponsive guest is an infant, quickly remove the infant from the water, open the airway, and provide care.

The Carry - out technique and the Pool-edge technique are options used for rapid extrication. Both require the use of a backboard. Rapid extrications are completed by multiple lifeguards.

When extricated from the water, the guest should be placed at least six (6) feet from the water's edge for safety to begin on-land care. Assess breathing and pulse. If the guest is unresponsive, not breathing, and pulseless, begin CPR until an AED is available. If the unresponsive guest is not breathing but does have a pulse, provide rescue breathing.

If the distressed guest shows signs of life or begins to vomit, place the guest in the recovery (side) position.

Key Terms

→ Carry-out technique
→ Duck pluck rescue for unresponsive guests
→ Pool edge technique
→ Rapid extrication
→ Rear hug rescue for unresponsive guests
→ Submerged deep water rescue for unresponsive guests

Chapter 17
SUSPECTED SPINAL INJURY

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Identify where spinal injuries are most likely to occur in an aquatic facility
- List signs of a spinal injury
- Demonstrate how to provide spinal injury care in the water
- Describe how to provide spinal injury care on land

Chapter Overview

About The Spine

The spine is made up of 33 vertebrae that form the spinal column, extending from the base of the skull to the tip of the tailbone. The vertebrae are separated by cushions of cartilage called discs. Within the center of the spinal column is a bundle of nerves that comprises the spinal cord **(Figure 17.1)**. The spine is divided into several regions:

- Neck (Cervical)
- Middle back (Thoracic)
- Lower back (Lumbar)
- Pelvis (Sacral)
- Tailbone (Coccyx)

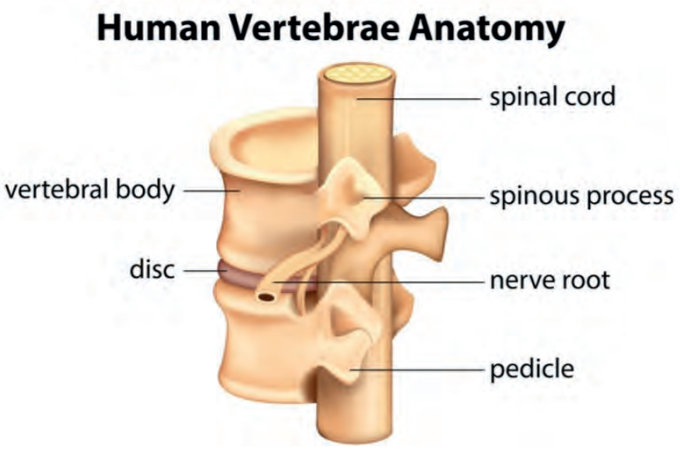


Figure 17.1 The vertebrae of the spine.

Injury to the spine can damage the vertebrae, discs, or nerves. The most common aquatic spinal injuries involve injury to the neck from impact with a structure such as diving board, slide, or surface sides or bottom.

Recognizing Spinal Injuries

The cause, also known as the ***mechanism of injury (MOI)***, is used to consider the potential for spinal injury. For example, seeing or hearing a firsthand account of a guest entering shallow water head first and striking the bottom indicates the potential for spinal injury. But this is only one item to consider. If the guest is responsive, ask about pain and the ability to move body parts normally. Look for signs of spinal injury. Your observations and questioning provide guidance when deciding how to proceed with these types of potential spinal injuries.

Signs of Spinal Injury

Most spinal injuries that occur in the water involve conscious, breathing guests. Guests suffering from a spinal injury may exhibit one or more of these signs **(Figure 17.2)**:

- Neck or back pain that is made worse by movement
- Numbness, tingling, burning, weakness, or inability to move limbs, neck, or back normally
- Deformity of the neck
- Altered level of consciousness
- Bruising of the head, neck, or back
- Blood or bloody fluid in the ears or nose

Figure 17.2 You need to recognize the mechanism (cause) and signs of spinal injury.

Areas where spinal injuries are likely to occur include:

- Shallow depth areas
- Water slides
- Diving board areas
- Surf & stand up paddle board areas
- Watercraft sport areas

Possible Causes of Spinal Injury

The following high impact/high risk activities could result in spinal injury:

- Head-first entry into shallow water
- Colliding with another guest, pool or attraction walls, submerged object, or bottom
- Receiving a significant blow to the head, neck or back
- Entering the water from an elevated height, such as a high diving board
- Striking the water's surface at high speed from a water craft or surf board

Caring For Spinal Injuries In The Water

If you suspect a guest has suffered a spinal injury in the water, care for the injury by minimizing movement of the guest's head, neck and back. This is known as ***Spinal Motion Restriction (SMR)***. Your initial SMR involves holding the guest in a position that keeps the guest's head in-line with the body. When additional lifeguards arrive, SMR is continued by securing the guest to a backboard for removal from the water.

The specific care you provide for a guest with suspected spinal injury will depend on:

- The guest's condition, including whether the guest is responsive and breathing. If the guest stops breathing while in the water, follow your procedures for rapid extrication. Care priority is given to breathing over spinal care
- The location of the guest (on the surface or submerged, in shallow or deep water, in a slide, or on land)
- The availability of other lifeguards or responders, and EMS personnel
- Your facility's specific procedures based on the attractions

Water Entry and Approach

Enter the water in a manner that will not cause further movement to the guest. Use an ***ease-in entry*** to approach a nearby guest with suspected spinal injury. This technique minimizes water movement **(Figure 17.3)**.

Figure 17.3 Use an ease-in entry to approach a nearby guest with suspected spinal injury.

Vise Grip Technique

The ***vise grip technique*** is the spinal motion restriction (SMR) maneuver used when you reach the guest. It involves positioning the guest's arms alongside the head and holding the arms firmly to keep the head in-line with the body. The vise grip can be used for:

- Responsive or unresponsive guests
- Guests found face up or face down
- Guests on the surface or submerged in any depth water

Vise Grip: Guest in Shallow Water

If you are in water that is waist deep or less, you can release your rescue tube as you reach the guest and prepare to apply SMR.

Follow these steps to perform the ***underarm vise grip*** for a guest found face up in shallow water:

1. Position yourself near the guest's head
2. Grasp the guest's upper arms. Hold the guest's right arm with your right hand and left arm with your left hand
3. Place the guest on the back and slowly move the arms alongside the guest's head
4. Press the arms firmly against the guest's ears to hold the head in-line with the body (Figure 17.4)
5. Lower yourself in the water and check responsiveness and breathing

Figure 17.4 For guests face up in the water use the underarm vise grip, pressing the arms firmly against the guest's ears.

If the guest is face down in the water, you will need to roll the guest face up so that the guest can breathe. This is done while maintaining SMR.

Follow these steps to perform the underarm vise grip for a guest found face down in shallow water:

1. Position yourself near the guest's head
2. Grasp the guest's upper arms. Hold the guest's right arm with your right hand and left arm with your left hand
3. Slowly move the arms alongside the guest's head
4. Press the arms firmly against the guest's ears to hold the head in-line with the body **(Figure 17.5)**

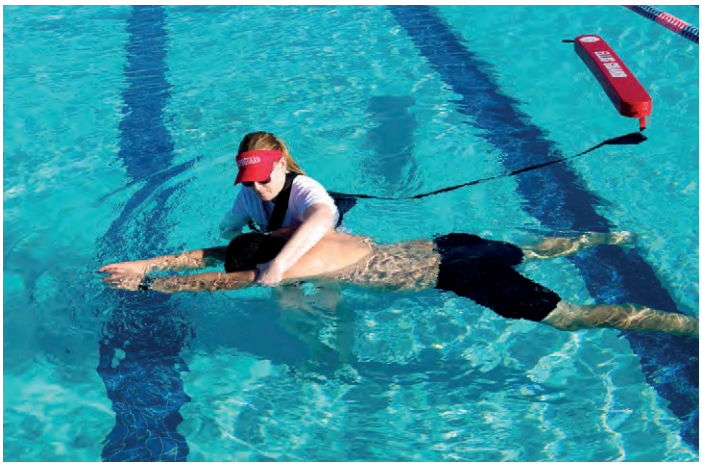


Figure 17.5 For a face down guest begin by pressing the arms firmly against the guest's ears.

5. Walk forward and slowly roll the guest face up into the underarm vise grip position **(Figure 17.6)**
6. Lower yourself in the water and check responsiveness and breathing

Figure 17.6 Move forward and slowly roll the guest face up into the underarm vise grip position.

Vise Grip: Guest on the Surface in Deep Water

The underarm vise grip technique used in shallow water is also used in deep water. The only difference is that you will keep the rescue tube under your arms to support yourself and the guest found on the surface **(Figure 17.7)**. Follow these guidelines to care for a guest with a possible spinal injury on the surface in deep water:

- Approach the guest with the rescue tube under your arms
- If the guest is face up, use the underarm vise grip technique
- If the guest is face down, roll the guest face up into the underarm vise grip
- Check responsiveness and breathing

Figure 17.7 Use the rescue tube for support while caring for a guest on the surface in deep water.

Vise Grip: Submerged Guest

Spinal injuries involving submerged guests are rare. When a guest has a spinal injury and is submerged but within reach from the surface, you can use the vise grip to provide SMR. In these situations, you may be able to keep the rescue tube under your arms to support yourself as you apply the vise grip technique.

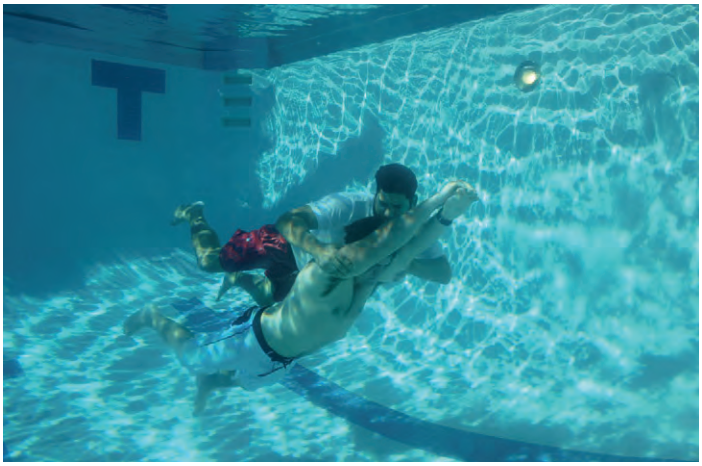


Figure 17.8 Position yourself alongside and just above the guest and apply the vise grip.

If the guest is submerged beyond your reach you will need to submerge without your rescue tube and bring the guest to the surface while maintaining SMR. Follow these steps to perform the underarm vise grip for a guest with a suspected spinal injury submerged beyond your reach:

1. When you are above the submerged guest, remove your rescue tube and surface dive
2. Position yourself alongside and just above the guest and apply the vise grip **(Figure 17.8)**

3. Move forward and upward as you firmly hold the arms against the guest's ears **(Figure 17.9)**
4. As you break the surface, roll the guest face up into the underarm vise grip position **(Figure 17.10)**
5. Kick to keep the guest afloat and move toward shallow water **(Figure 17.11)**
6. A second lifeguard can provide support with the rescue tube for you and the guest in deep water. This can be done by performing a rear hug on the primary lifeguard. While supported, the primary lifeguard can check responsiveness and breathing and move the guest to shallow water if possible **(Figure 17.12)**

If the guest is not breathing at the surface, alert other rescuers and perform a rapid extrication.

Figure 17.9 Move forward and upward while maintaining the vise grip.

Figure 17.10 Roll the guest face up into the underarm vise grip position.

Figure 17.11 Kick to keep the guest afloat and move toward shallow water while maintaining SMR.

Figure 17.12 A second lifeguard can provide support with the rescue tube in deep water.

Overarm Vise Grip

Before a guest can be removed from the water the guest must be placed on a backboard. To accomplish this skill, you must switch from the underarm vise grip to the ***overarm vise grip***. This technique will enable you to remove your arm from beneath the guest without disrupting SMR. Then the guest can be placed on the backboard.

Figure 17.13 Using an underam vise grip, pull the guest firmly against your chest.

To switch to the overarm vise grip, follow these steps:

1. Hold the guest firmly against your chest with the hand that is furthest away from you **(Figure 17.13)**
2. Release the grip of the hand that is closest to your chest, reach across the guest's chest and grasp the guest's arm furthest from you **(Figure 17.14)**
3. Remove your hand that is under the guest and move it to the arm that is against your chest **(Figure 17.15)**
4. Continue squeezing the guest's arms to maintain SMR

Figure 17.14 Reach across the guest's chest and grasp the guest's arm furthest from you.

Figure 17.15 Remove your arm under the guest and grasp the guest's arm that is against your chest.

Backboarding And Extrication

A guest with a possible spinal injury in the water will need to be removed carefully to avoid the possibility of further injury. This process is known as ***backboarding***, and it requires the use of a board, straps, and head immobilizer to secure the guest to the board prior to removal from the water **(Figure 17.16)**. There are three methods used to backboard a guest depending on the guest's location in the attraction and the number of responders available to help:

- Pool edge backboarding
- Team carry out backboarding
- Slide run-out / zero-depth area backboarding

Lifeguards need to communicate with each other during backboarding to ensure the guest's safety.

Figure 17.16 16 Backboard, straps, and head immobilizer.

Pool Edge Backboarding

A minimum of two lifeguards can maintain SMR and use a backboard to remove a guest at the pool edge by following these steps:

1. The primary lifeguard maintains the overarm vise grip as the second lifeguard positions the backboard in the water. The lifeguards work to safely slide the guest onto the backboard **(Figure 17.17)**
2. With the guest centered on the backboard and the guest's head in the middle of the head immobilization pad, SMR is transferred to the second lifeguard **(Figure 17.18)**

Figure 17.17 Work as a team to slide the guest onto the backboard.

Figure 17.18 Transfer SMR to the second lifeguard.

3. The primary lifeguard uses straps to secure the guest to the backboard in this order **(Figure 17.19)**:
   - Chest – Over the chest and under the armpits
   - Hips
   - Legs
4. Once the body is secured to the backboard the guest's head must be secured using the ***head immobilizer***. Before this can be done, SMR must be transferred back to the primary lifeguard. The ***squeeze play*** is a technique used to accomplish this. The primary lifeguard places one hand under the backboard and the other hand on the guest's cheekbones. The second lifeguard lowers the guest's arms **(Figure 17.20**)
5. The second lifeguard applies the head immobilizer blocks to the sides the guest's head and secures the head with a forehead strap **(Figure 17.21)**
6. The primary rescuer rechecks straps and moves to the foot of the backboard. The lifeguards work together to slide the backboard along the pool edge and onto the deck **(Figure 17.22)**
7. The lifeguards monitor the guest's condition, maintain normal body temperature, and provide any additional care until EMS personnel arrive. If the guest vomits the lifeguards must tilt the board onto its side while supporting the guest's head

Figure 17.19 Secure the guest's body to the backboard

Figure 17.20 Use the squeeze play to transfer SMR back to the primary lifeguard.

Figure 17.21 Use the head immobilizer to secure the guest's head to the backboard.

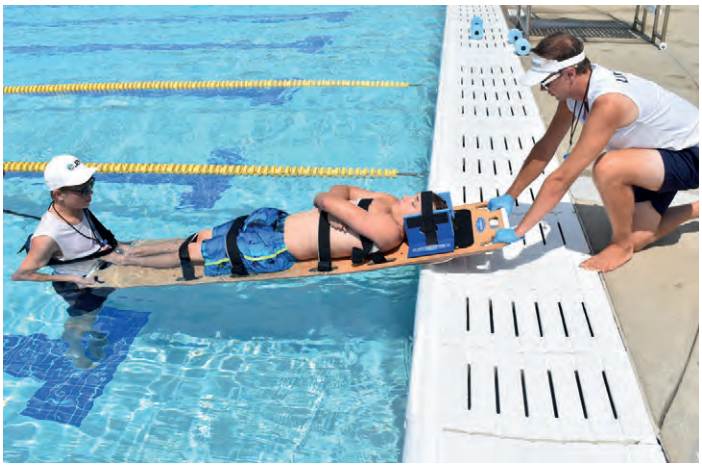


Figure 17.22 Work together to slide the backboard from the water.

Team Carry Out Backboarding

When more than two lifeguards are available, they can work as a team to enter the water, secure the guest to the backboard, and carry the guest out of shallow water such as a zero-depth facility.

Follow these steps when performing team carry out backboarding:

1. The primary lifeguard maintains SMR as additional lifeguards submerge the backboard and raise it under the guest **(Figure 17.23).**
2. A second lifeguard takes over SMR while others hold the backboard and secure the body straps **(Figure 17.24).**
3. SMR is transferred and the head immobilizer is applied **(Figure 17.25).**
4. Lifeguards carry the guest from the water and provide care on land **(Figure 17.26).**

Figure 17.23 Lifeguards submerge the backboard and raise it under the guest.

Figure 17.24 The team works to transfer SMR and apply the body straps.

Figure 17.25 SMR is transferred and the head immobilizer is applied.

Figure 17.26 The lifeguard team removes the guest from the water.

Slide Run-out Backboarding

Slide run-outs provide limited space for backboarding. Since facilities differ regarding the type of slide run out that may be available your facility will have a specific EAP for removing a guest from a slide run-out.

Follow these general steps for backboarding and extricating a guest from a slide run out:

1. The primary lifeguard maintains SMR at the head of the guest by simply holding the head in line with the guest's body **(Figure 17.27).**
2. Additional lifeguards assist to log roll the guest to the side. The primary lifeguard gives the command to roll and moves guest's head with the body **(Figure 17.28).**
3. Another lifeguard positions the backboard properly so the guest's head will rest on the immobilization pad when rolled onto the backboard **(Figure 17.29).**
4. Roll the guest onto the backboard and secure the body straps **(Figure 17.30)**

Figure 17.27 The primary lifeguard maintains SMR at the head of the guest.

Figure 17.28 Logroll the guest onto the side.

Figure 17.29 Position the backboard.

Figure 17.30 Roll the guest onto the backboard and secure the body straps.

5. The primary lifeguard transfers SMR to another lifeguard and applies the head immobilizer **(Figure 17.31).**
6. Work as a team to safely lift and remove the guest from the slide run-out **(Figure 17.32).**

Figure 17.31 Transfer SMR and apply the head immobilizer.

Figure 17.32 Work as a team to lift and remove the guest from the slide run out.

Special Situations

Seated or Standing Guests

Guests with possible spinal injury found sitting on the steps of an attraction or a chair on land do not need to be placed on a backboard. In these situations, apply SMR by holding the head and neck in a neutral position to prevent further injury until EMS personnel arrive **(Figure 17.33)**.

If a guest with a possible spinal injury is standing in shallow water or on land apply SMR in the same manner as seated guests to prevent further injury until EMS personnel arrive **(Figure 17.34)**.

If the guest feels weak or dizzy, additional lifeguards can assist you to lower the guest slowly onto his/her back. In the water the guest can be lowered onto a backboard. On land the guest can be lowered to the ground.

Figure 17.33 SMR for a seated guest.

Figure 17.34 SMR for a standing guest.

FOR YOUR REVIEW

Summary

Spinal injuries can occur in any depth of water and are often caused by high-impact/high-risk activities. Areas where spinal injuries are more likely to occur include shallow depth areas, attraction walls and bottom, diving boards, water slides, surfing & paddle board areas and water craft locations.

A guest with a suspected spinal injury exhibits signs that include neck or back pain made worse by movement, numbness, tingling, burning, weakness, or an inability to move normally. There may also be deformity of the neck, bruising or blood or bloody fluid in the ears or nose.

If the cause (mechanism of injury) suggests possible spinal injury, and the guest has signs of possible spinal injury you should care for the guest by using spinal motion restriction (SMR).

The vise grip is the primary SMR technique used to care for a guest in the water. This technique requires you to restrict movement of the head and neck.

While the rescue tube will not be necessary when performing SMR in shallow water, it is a necessity when the guest is on the surface in deep water. If the guest is submerged, you must remove your rescue tube, surface dive, apply the vise grip and swim to the surface with the guest.

Backboarding is the process of placing and securing a guest suspected of having a spinal injury onto a backboard to maintain SMR so that you can remove the guest from the water. Backboarding and extrication can be performed in select facilities with as few as two lifeguards. Once the guest is placed on the backboard fasten the body straps first, then secure the head using the head immobilizer.

You can care for a guest with a suspected spinal injury found seated or standing in shallow water or on land by providing SMR that simply holds the guest's head and neck in alignment with the rest of the body, minimizing movement until EMS personnel arrive.

Key Terms

- → Head immobilizer
- → Mechanism of Injury (MOI)
- → Overarm vise grip
- → Spinal Motion Restriction (SMR)
- → Squeeze play
- → Underarm vise grip

Chapter 18
OPEN WATER LIFEGUARDING

Learning Outcomes

After reading this chapter and completing any related course work, you should be able to:

- Apply general lifeguarding knowledge and skills to an open water environment
- Explain the purpose of a designated swim area and how individual zones within the swim area are determined
- Explain the 10/3-Minute Protection™ Standard of open water lifeguarding
- Describe how to provide guest safety in an open water environment
- Demonstrate how to use lifeguarding equipment specific to open water facilities
- Safely enter and move effectively through open water in response to an emergency
- Modify standard lifeguard rescues and responses for use in open water
- Describe how to conduct a Missing Guest Search

Chapter Overview

Introduction To Open Water Lifeguarding

The concepts and skills you have acquired so far in this course can be effectively modified for use in open water environments. The key to making these modifications work begins with your ability to understand the unique operating challenges an open water facility presents and how your facility accounts for these challenges.

You must become familiar with the unique characteristics of your facility and master the skills required to maintain safety at the facility. This chapter and the next chapter will provide direction on how to accomplish those goals. As part of your training, you will learn site-specific techniques and procedures. This will include hands-on practice sessions at your open water facility using the equipment and devices your facility has determined to be most effective.

The Designated Swimming Area

Open water facilities will have a prepared area of water and beach marked as the ***designated swimming area***. This identifies the safe area for guests to swim **(Figure 18.1)**. Your facility may mark the boundaries of the designated swimming area by using:

- Ropes and Floats
- Flags and signs
- Buoys
- Piers, docks, floating platforms
- Physical landmarks

Figure 18.1 Swimming areas have clearly designated boundaries.

The designated swimming area is subdivided into Zones of Protection similar to what is used by large swimming pools and attraction facilities. However, the standard for protecting open water facilities is different than the standard protection for larger facilities. Here, you will be required to follow the ***10/3-Minute Protection™ Standard*** which allows a lifeguard 10 seconds to recognize an aquatic emergency and 3 minutes to perform a rescue and begin care. Each zone will have the following characteristics:

- The entire surface area of a zone can be seen by a lifeguard at the designated duty station within 10 seconds
- Following a pre-determined search and rescue, the entire bottom of each zone can be searched in 3-minutes or less, utilizing a minimum number of facility staff trained in the procedure

Open water facilities will validate their swimming zones periodically to confirm that the *10*/3-Minute Protection Standard can be applied whenever the facility is in operation. This regular validation also allows you to frequently practice your facility's bottom search procedure, which will enhance your confidence and effectiveness in a real emergency.

The 10/3-Minute Protection Standard requires you to be vigilant, recognize a guest in distress, and be responsive **(Table 18.1)**.

Table 18.1 10/3-Minute Protection Standard

Vigilance	Recognition	Response
Surveillance of your zone utilizing scanning strategies	Recognition of a guest in distress	Readiness to immediately perform a rescue or missing guest search
Attentiveness to both the water and the beach in your zone	Awareness of guest behavior and characteristics before they enter the water	Enforcement of facility rules and policies and issuing lifejackets. Opportunity for positive interactions
Being alert to the needs of other lifeguards	Understanding when others need help, and your role in the EAP	When the EAP is activated, clearing your zone or transferring supervision to another and providing needed assistance

"10 Seconds to See"

Water clarity is critical to the success of a pool or waterpark lifeguard's guest surveillance. In open water, clarity is rarely adequate to allow visibility below the water surface. In open water facilities, you are not expected to scan from the bottom up. Instead, you will scan guests on the surface, focusing on guest behavior. When an open water facility adheres to the 10/3-minute protection standard, lifeguards are positioned to allow you see everything on the surface within 10 seconds. You may assume responsibility on elevated guard stations or as a roving lifeguard along the beach. Your facility may also use water craft to position lifeguards in key locations of the designated swim area, to allow for complete coverage **(Figure 18.2)**.

Figure 18.2 At open water facilities lifeguards may be stationed at a variety of locations, including water craft.

3-Minute Missing Guest Search

If a guest in distress is submerged or is reported as missing and believed to have been in the water, you will activate your EAP and begin a coordinated search starting with the zone where the guest was believed to be. The objective is to search the entire bottom of the zone and locate the guest within 3 minutes. Your facility will have a specific search procedure for you to follow. This procedure will rely on equipment that will allow for a rapid search and rescue.

Managing Guest Safety

Like lifeguards in other environments, you will also need to be proactive, taking steps to prevent problems before they occur. In an open water environment, this includes being familiar with the characteristics of all areas of the designated swimming area. You must be aware when conditions change and alert guests to emerging dangers that come with these changes. If changes occur that would compromise guest safety, you must act to return the facility to normal operation. If it is not possible, the facility may need to be closed until it can be made safe.

Water and Bottom Conditions

Water conditions in open water facilities are something you have little, if any, control over. Performing daily pre-opening 10/3-Minute Protection Standard validations of each zone is an excellent way to determine the conditions of the water and the bottom.

Being able to recognize various water conditions will help you and your team keep your facility safe. **Table 18.2** describes some water conditions you may encounter and ways you may manage the condition to keep guests safe.

Table 18.2 Water Conditions

Condition	Recognition	Actions
Higher than normal waves	Wave action is unusual for your swimming area affecting ability of guests to swim/move comfortably in the water	Adjust warning flags for changing conditions. Advise caution for younger guests and weak swimmers, confirm lifejackets in use. If it appears to be unsafe, a temporary closure may be needed
Rip current	Channel of discolored water (bottom sand is often churned), area on either side of channel has strong waves breaking, clear outward movement of the water away from shore	If suspected, warn swimmers to avoid the area. Temporarily close the zone affected until current dissipates. If guests are caught in the current but do not need rescuing, coach them to swim parallel to the shore to escape the current

High tide / Low tide	High tide results in sea water extending to its maximum non-storm extent on shore. Low tide results in the sea reseeding out past the normal shore line	Anticipate high and low tide, making necessary adjustments to the designated swimming area as needed
Water temperature	Water may be warmer or colder than the surrounding air, as reported by guests or experienced by staff in the water	Cold water may limit how long guests can be in the water. Care for guests with hypothermia. To safely facilitate a rescue or a missing guest search, a wet suit may need to be worn
Water contamination	Unusual discoloration and/or smell of the water. Tests confirm contamination	Follow state and local regulations regarding closure, clean up, and retesting
Wildlife	Unusual or dangerous wildlife activity. Excessive bird life may lead to contamination	Enforce rules like "Do not feed the geese." Keeping the facility clean may reduce wildlife in the area
Beach and bottom debris	Glass, sharp objects, vegetation present on the beach or bottom of the swim area	Enforce rules concerning glass and depositing items in trash cans. Regularly comb the beach and shallow areas

Inclement Weather

You will need to be able to recognize when weather might become dangerous. Facilities have numerous weather monitoring systems to watch for adverse weather in advance so that you will have time to direct guests to safety. **Table 18.3** details various weather conditions and actions to take to manage guest safety in the event of inclement weather.

Table 18.3 Weather Conditions

Condition	Recognition	What this may mean
Large clouds in the distance	Tall fluffy white and gray clouds, thunderheads. Monitor lightning detection devices and / or weather radio	A possible thunderstorm is on its way. May need to change condition flags to Red/Yellow and plan to clear the area
Thunder / Lightning	If thunder is heard, look for lightning. Estimate distance of lightning and thunder through a count. Monitor lightning detection devices and / or weather radio	If lightning is determined to be in the area (or within an unacceptable distance from the facility), clear the water and beach area until conditions are safe

High wind	Higher waves, white caps, sand and debris blown into the air	Wind gusts may pass quickly, but sustained high wind may require temporary facility closure, especially if it is affecting your ability to maintain vigilance
Light rain /Fog	Gentle shower or foggy conditions may limit visibility of the swimming area	Visibility of the full extent of the swim area may be compromised. Weather may worsen making conditions dangerous. Closures may be considered for these reasons
Heavy rain	Downpour, which may be accompanied by high wind and lightning	Visibility will be compromised. Heavy rain often results in facility closure even if lightning has not been detected

Equipment For Open Water Lifeguarding

Your personal equipment such as the rescue tube, hip pack and rescue breathing mask will be the same as that used in other facilities. Emergency response equipment, such as the backboard, AED, supplemental oxygen, and related BLS supplies are the same. There is, however, additional equipment that you may use in order perform your duties. **Table 18.4** provides examples of equipment you may use at your facility.

Table 18.4 Open Water Lifeguarding Equipment

Equipment	How It is Used
Binoculars	To provide a closer look at the zone extremes, check on the status of a guest, or evaluate approaching weather.
Fins	Used for added speed during water rescue emergency procedures and for underwater searches in deeper water. Fins should be placed on your feet upon entering the water.
Drag Nets	Drag nets are used to help search for a missing guest in shallow water. These devices are created by modifying a volleyball net or similar netting with weights, secured between two poles. Each pole is handled by a designated lifeguard to allow for the sweep of the bottom of a zone being searched. If the net encounters a submerged guest, the resistance will alert you.

Flags	Communicate operating conditions to guests: Green – Swimming area is open Yellow - Swimming area is open, but caution is recommended Yellow and Red combined – Swimming area is open, but water and/or weather conditions are expected to change which may result in closure Purple – Dangerous marine life has been spotted nearby (may be combined with red) Red – Swimming area is closed
Masks and Snorkels	Masks are worn to provide you with a clearer and possibly extended view under water. Snorkels are extended tubes with a mouth piece on one end and an open end on the other. Masks and snorkels must be properly fitted and require practice to become proficient in their use during underwater searches.
Kayaks	Kayaks are used at some facilities as a means of patrolling the water farthest from the beach. The kayak acts as a mobile lifeguard platform, allowing you to quickly navigate to guests in distress or those who have wandered too far from the beach. Kayaks require specific training and should not be utilized unless you have completed adequate practice in maneuvers, including safe entry and exit, effective paddling, rolls and recovery, and how to balance with a guest using the kayak for support.
Rescue Boards	Rescue boards represent a fast way for a lifeguard on the beach to reach guests in distress. Like other specialized equipment, rescue boards require specific training and regular practice to become proficient in launching, paddling, maneuvering, and placing a guest on the board.
Scuba	The ability to use scuba equipment for extended underwater searches or other work may be required. However, scuba training and certification are required before you should attempt to use this equipment. Once formal training is completed, additional site-specific training will need to be completed, in accordance with your facility's emergency response protocols.
Powered Watercraft	In addition to kayaks, powered water craft such as jet skis, and motor boats may be used by your facility. Watercraft such as these may patrol the perimeter of the swimming area, allow for additional surveillance, and provide quick response. Never operate power watercraft without specific training and only in an official, authorized capacity.

Open Water Rescues

Much like a swimming pool, entering open water in response to an emergency needs to be done safely. How you enter may directly contribute to the outcome of the response, so appropriate care and consideration is required. When you spot a guest in distress from your duty station, activate the EAP and begin quickly moving toward the guest.

Responding from the Beach

If your duty station is on the beach, you may need to run a short distance to enter the water. It is recommended to keep paths to the water from your duty station clear of guests and other obstructions to accommodate your safe response, but this is not always possible. Grab your rescue tube and secure the excess strap so that it does not dangle as you run. These measures will help prevent the tube from accidentally hitting guests, getting caught on objects, or tripping you as you run.

As you move, alternate your gaze between the location of the guest in distress and your running path. Give equal attention to both so that you do not lose sight of the guest and can maintain your own safety. Lift your knees as you run into the water with high steps **(Figure 18.3)**. Once you are in waist deep water, release the rescue tube and allow it to trail behind you so that it does not impede your movement. Reconfirm the location of the guest in distress and swim quickly to the guest.

Figure 18.3 Lift your knees, using high steps as you run into the water.

If you lose sight of the guest, continue making progress to the location where the guest was last spotted. Signal to other lifeguards if the guest has submerged so that they can alter their EAP response accordingly. Depending upon water depth and current, you may attempt to locate the guest below the surface using a deep-water rescue similar to what is utilized in a swimming pool. However, visibility may be variable, so having goggles or a mask may be needed. If the guest cannot be immediately located by the responding lifeguard, then a missing guest search will be required.

Dolphin Diving

If you encounter waves and/or currents, you may choose to use a ***dolphin dive*** technique. This technique will help you move through oncoming waves with minimum impact on your progress toward the guest in distress. Start by arching your body and diving forward, timing the dive so that you enter the water under the wave.

Take care to keep your dive shallow with arms extended to avoid contact with the bottom. Your momentum will enable you to glide under the wave, minimizing its impact. Surface when the glide stops. Confirm the location of the guest and the next wave and repeat the process as you move to the guest. When the water becomes too deep for the technique to be effective, swim toward the guest **(Figure 18.4)**.

Figure 18.4 Dolphin diving helps you move through oncoming waves with minimum impact on your progress.

Responding with a Rescue Board

A ***Rescue Board*** is an oversized surfboard that enables you to quickly paddle to any area of the facility. Enter the water with the rescue board and allow the rescue tube to drag behind you **(Figure 18.5)**. When the water is above knee height, climb onto the board in a prone or kneeling position. Paddle using crawl stroke or butterfly stroke **(Figure 18.6)**. As you approach the guest, allow the guest to hang onto the board, or extend the rescue tube to the guest. If the guest cannot grasp the board or tube, get off the board and execute the appropriate rescue.

Figure 18.5 Enter the water with the rescue board and allow the rescue tube to drag behind you.

Responding with Water Craft

Each type of water craft will have specific steps to follow for safe emergency response. The following general steps apply when responding to a guest in distress:

- Activate your EAP
- Maneuver your craft alongside the guest, but not so close that the craft may accidentally injure the guest
- Turn off the engine, if using a powered water craft
- Extend the rescue tube to the guest
- If the guest is unable to grab the tube, enter the water and complete the rescue
- If the water craft can hold multiple people, assist the guest into or onto it and make your way toward safety

Figure 18.6 Climb onto the rescue board in a prone or kneeling position and paddle using crawl stroke or butterfly stroke.

Rescuing Responsive Guests

For responsive guests, the rescue techniques described previously in this manual will be effective in open water. The rescue tube will be critical in maintaining your safety and the safety of the guest. Communicate with the guest during the rescue. The time it takes you to reach the guest, and the water temperature, may affect the guest's ability to cooperate during the rescue. Communicate with other lifeguards if you need assistance. If a second lifeguard arrives, he or she can help tow you and the guest toward the beach.

Figure 18.7 Assist guests to walk out of the water whenever possible.

Once you reach a depth that is shallow enough to stand, release the tube and assist the guest to walk out of the water if possible **(Figure 18.7)**. Seat the guest on the ground and evaluate the guest. Contact EMS if needed.

Rescuing Unresponsive Guests

If the guest is unresponsive, it is critical that you alert other lifeguards and begin the appropriate care:

- Position the guest face up on the rescue tube so that the guest's head is out of the water
- Move toward the beach
- Open the airway and check for breathing
  - If not breathing, begin rescue breathing using your resuscitation mask

If you are in the surf with waves rolling, it is not likely that you will be able to effectively perform rescue breathing. Move quickly toward the beach keeping the guest's head out of the water. Once in shallow water, additional lifeguards should be ready to assist with the extrication. The ***Carry out technique*** can be used, placing the guest on a backboard and moving away from the water.

If you arrive at the beach before the team arrives with the backboard, you can use the ***shoulder drag*** to remove the guest from the water:

- Place your arms underneath the guest and grasp the armpits
- Rest the guest's head on your forearms
- Walk backwards, dragging the guest from the water. The rescue tube will slide out from under the guest
- Lay the guest down, reassess, and provide care

If a second lifeguard is available, work together on each side of the guest to drag the guest from the water.

Suspected Spinal Injuries

The Spinal Motion Restriction (SMR) and backboarding techniques learned earlier in the course work well in relatively calm open water. But in the surf, with breaking waves or strong currents, it may not be possible to maintain SMR or perform in-water backboarding. In such cases you should do what you can to keep the head and body in line and extricate the guest. Your facility will have specific procedures for the conditions you will encounter.

Missing Guest Search

If a guest is reported missing, staff immediately begin performing the facility's ***Missing Guest Search*** EAP. Each facility will have specific communication, equipment, and plans to effectively execute the search. The following principles apply for any Missing Guest Search:

- Call 911
- Clear the entire designated swimming area
- Determine the location where the guest was last seen
- Immediately search the zone nearest where the guest was last seen in 3 minutes or less
- If needed, repeat the search in the remaining zones

Other staff, and even guests may be used to search for the missing guest on land, including:

- Restrooms
- Restrooms and locker rooms
- Buildings and structures adjacent to the open water area
- Park or open space adjacent to the open water area
- Parking lots, walking paths, trails
- Beach area away from the designated swim area

If non-staff are used to assist in the non-aquatic portion of the search, they should be coordinated and led by a staff member who can direct an orderly search, following a pre-determined protocol.

Shallow Water Search

Your facility EAP for shallow water searches may include a specially prepared drag net operated by several lifeguards **(Figure 18.8)**. Once the team is in place, the ***net drag search*** will begin following these steps:

- The net is opened and pulled tight by multiple lifeguards
- When pulled tight, the net is lowered into the water with the weighted portion on the bottom
- The lifeguard team moves in a straight line, at an established pace toward the opposite side of the zone

Figure 18.8 Use a net drag to conduct a rapid shallow water search.

- Once at the opposite side, the lifeguards reposition themselves deeper, overlapping the previously searched area by a few feet
- The team moves in a straight line, at an established pace toward the opposite side of the zone

This procedure is repeated until the shallow area of the zone is completely searched or the guest is found.

Deep Water Search

Performing a deep-water search is best accomplished by using a mask, snorkel, and fins **(Figure 18.9)**. Along with other lifeguards you need to quickly proceed to the designated starting point in the zone to be searched. Your lifeguard team should have a rescue tube to rescue the guest if found. Once the team is in place, the search can begin following these steps:

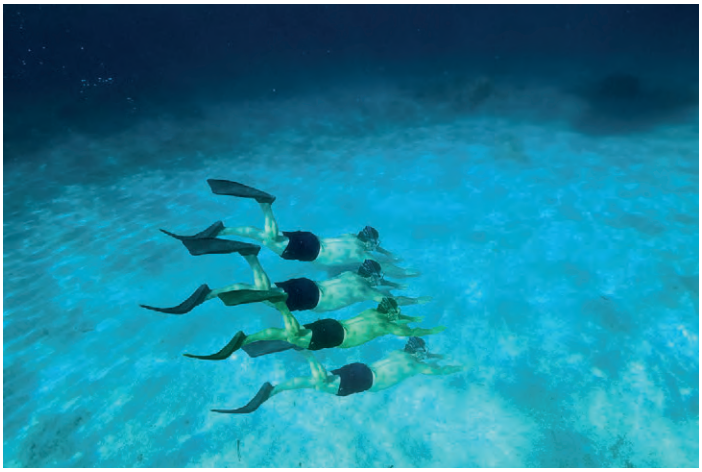


Figure 18.9 A deep water search is best accomplished by using a mask, snorkel, and fins

- Searchers should be arranged in a straight line on the zone's edge no more than an arm's length away from the searcher next to them
- Searchers surface dive to the bottom
- Searchers sweep their hands along the bottom and in front as they begin to move forward, trying not to disturb the sediment which may further compromise visibility
- After a pre-determined number of strokes, the search team surfaces and realigns a few feet back from where they emerged
- The team performs another surface dive, bottom search and surfaces after the designated number of strokes
- This is repeated until the team locates the guest or reaches the other side of the zone
- Once at the other side of the zone, the team will shift the search line deeper, while over lapping the area previously covered by a few feet

This will continue until the entire deep area of the zone is searched or the guest is found.

If it is known that the guest was last seen in the deeper area of the zone, the search should begin near that last known location. The center of the line of searchers should correspond to the point last seen before the guest submerged. If a current is present, the direction of the search should follow the direction of the current.

FOR YOUR REVIEW

Summary

Open water facilities will have a prepared area of water and beach marked as the designated swimming area. The standard for protecting open water facilities is known as the 10/3-Minute Protection™ Standard which allows a lifeguard 10 seconds to recognize an aquatic emergency and 3 minutes to perform a rescue and begin care. Water conditions in open water facilities are something you have little, if any, control over. Performing daily pre-opening 10/3-Minute validations of each zone is an excellent way to determine the conditions of the water and the bottom.

You will need to be able to recognize when weather might become dangerous. Facilities have numerous reporting systems to watch for adverse weather in advance so that you will have time to direct guests to safety. Additional equipment that you may use in order to perform your open water duties includes binoculars, masks, snorkels, fins, flags, rescue boards, water craft, and scuba.

Lift your knees as you run into the water with high steps. Once you are in waist deep water, release the rescue tube and allow it to trail behind you so that it does not impede your movement. Dolphin diving is a technique that will help you move through oncoming waves with minimum impact on your progress toward a guest in distress.

A Rescue Board is an oversized surfboard that enables you to quickly paddle to any area of the open water facility. Enter the water with the rescue board and allow the rescue tube to drag behind you. When the water is over knee height, climb onto the board in a prone or kneeling position. Paddle using crawl stroke or butterfly stroke.

Spinal Motion Restriction (SMR) and backboarding techniques work well in relatively calm open water. But in the surf, with breaking waves or strong currents, it may not be possible to maintain SMR or perform in-water backboarding. In such cases, you should do what you can to minimize head movement and extricate the guest.

Drag nets are used to help search for a missing guest in shallow water. These devices are created by modifying a volleyball net or similar netting with weights, secured between two poles. Each pole is handled by a designated lifeguard to allow for the sweep of the bottom of a shallow water area being searched. Performing a deep-water search is best accomplished by using a mask, snorkel, and fins. Along with other lifeguards, you need to quickly proceed to the designated starting point in the zone to be searched. Your lifeguard team should have a rescue tube to rescue the guest if found.

Key Terms

- → 10/3-Minute Protection™ standard
- → Carry out technique
- → Designated swimming area
- → Dolphin diving
- → Net drag search
- → Rescue board
- → Shoulder drag

Appendix A
SAMPLE FIRST AID KIT

The contents of a first-aid kit can vary based on the size of the group for which the kit will be used. First-aid kits should be readily accessible, and the contents periodically checked to maintain the necessary items. A sample workplace first aid kit can include:

- 4” x 4” gauze pads
- Box of adhesive bandages (Band-aids)
- Roller gauze bandages (> 2 inches wide)
- Triangular bandages
- Antiseptic wipes
- Antibiotic ointment
- Burn gel
- Disposable emergency blanket
- Scissors
- Tweezers
- Adhesive tape
- Disposable gloves (non-latex)
- Breathing device (face shield or pocket mask)
- Elastic bandage
- Splint material
- Cold pack
- Biohazard waste bag
- Medications
  - o Ibuprofen / Acetaminophen
  - o Low dose aspirin
  - o Diphenhydramine (Benadryl)
- Note pad and writing tool

Appendix B

SAMPLE BLOODBORNE PATHOGENS EXPOSURE CONTROL PLAN (ECP)
FOR EMPLOYEES OF _____
Effective Date: _____

The management of _____ is committed to preventing incidents which result in employee injury and illness, and to comply with the OSHA Bloodborne Pathogens Standard 1910.1030. Through this written exposure control plan, we share assigned responsibility and hereby adopt this plan as an element of our program provided for safety of our employees. A copy of this plan is available to all employees.

A. Purpose

The purpose of this exposure control plan is to:

1. Eliminate or minimize employee occupational exposure to blood or other potentially infectious materials (OPIM) including all body fluids.
2. Identify employees occupationally exposed to blood or OPIM in the performance of their regular job duties.
3. Provide employees with educational and operational material and training relative to blood and OPIM.
4. Comply with the OSHA Bloodborne Pathogens Standard.

B. Exposure Determination

_____ has performed an exposure determination for all common job classifications that may be reasonably anticipated to incur occupational exposure to blood or OPIM at this facility. This exposure determination is made without regard to the use of personal protective equipment (PPE). The following job classifications may be reasonably anticipated to incur occupational exposures to blood or OPIM:

_____

C. Implementation Schedule and Methodology

1. Standard Precautions

_____ embraces “standard precautions,” a defined method of infection control that requires the employer and employee to assume that all human blood and specified human body fluids are infected with bloodborne pathogens. Where it’s difficult or impossible to identify body fluids, all are to be considered potentially infectious.

2. Engineering and work practice controls

The following engineering and work practice controls will be used by all employees to eliminate or minimize occupational exposures at this facility:

a) Contaminated disposable sharps will be disposed of in an appropriate "sharps" container.
b) Any contaminated materials (i.e. towels, uniforms, paper products, re-usable equipment) will be disposed of appropriately for appropriate cleaning or in a red biohazard bag for regulated waste.
c) Employees will wash hands with soap and water or alcohol wipe disinfectants after contact with any blood or OPIM.
d) Flush eyes and mucous membranes immediately after potential contamination with blood or OPIM.
e) Clean surfaces with an appropriate disinfectant if contaminated.
f) Utilize personal protective equipment (PPE) that is provided in all trauma bags and located _____ _____:

- Gloves – hypoallergenic gloves are used when providing emergency care, handling any items contaminated with blood or OPIM, or when cleaning surfaces contaminated with blood or OPIM.
- Goggles – used for eye protection when providing emergency care or cleaning up spills that have potential for splashing.
- Resuscitation Masks – used when providing emergency care.

_____ are responsible for training employees and issuing of appropriate, readily accessible PPE without cost to employees.

3. Housekeeping

Work surfaces shall be cleaned and appropriately decontaminated with an appropriate disinfectant in the following instances:

a) When surfaces are overtly contaminated.
b) Immediately when blood or OPIM is spilled.

4. Contaminated laundry

a) Laundry that is or may be soiled with blood or OPIM shall be treated as if it were contaminated.
b) The _____ will ensure that all contaminated laundry is cleaned and laundered in such a way that any bloodborne pathogens present are inactivated or destroyed. If this is not possible then items will be disposed of appropriately.
c) The _____shall ensure that all employees use PPE while handling contaminated laundry.
d) Contaminated laundry will be placed and transported in bags as appropriate.

5. Regulated Waste

a) Regulated waste that is being disposed of shall be placed in closable, leakproof containers or bags that are labeled or color-coded. If outside contamination is likely to occur, a second leakproof container or bag that is closable and labeled or color-coded shall be placed over the outside of the first bag and closed to prevent leakage during handling, storage, and transport.
b) Contaminated sharps, regardless of where they were used or found, shall be placed in closable, leakproof, puncture-resistant, disposable containers that are labeled or color-coded. These containers shall be located in the immediate area of use or where sharps are likely to be found.

6. Hepatitis B Vaccine

_____ will offer the Hepatitis B vaccination series at no cost to employees who may be reasonably anticipated to have the potential for occupational exposure. _____ _____are responsible for the Hepatitis B vaccination program. All medical evaluations and procedures shall be performed at _____ located close to the facility in which the employees work. _____ _____shall make the following available to those employees that have been determined to be at risk:

a) Hepatitis B vaccination

b) HBV antibody testing if desired

Participation in pre-screening is not a prerequisite. If an employee declines vaccination, a waiver statement is signed. If in the future the employee desires the vaccination it will be provided at no charge.

7. Post-Exposure Evaluation/Follow-up

If an employee has an exposure incident, it is to be reported to _____. _____ will offer post-exposure follow-up at no cost to exposed employees. _____ shall provide the exposed employee with an opportunity to have a confidential medical evaluation and follow-up subsequent to a reported occupational exposure incident to blood or OPIM. This process includes:

a) Documentation of an exposure incident.

b) Identification and documentation of the individuals involved in the incident unless infeasible or prohibited by law.

c) Collection & testing of blood for HBV and HIV serological status that include both of the following:

- The exposed employee's blood shall be collected as soon as feasible and tested after consent is obtained.
- If the exposed employee consents to baseline blood collection, but not to HIV testing, the sample shall be preserved for not less than 90 days. If within 90 days the employee elects to have the baseline sample tested, such testing shall be done as soon as feasible.

d) Postexposure prophylaxis provided when medically indicated, as recommended by the US Public Health Service.

e) Counseling on risk reduction and the risks & benefits of HIV testing.

f)_____ shall ensure that the health care professional who is responsible for the vaccination is provided with a copy of the process described above as well as the:

- Description of the affected employee's duties
- Documentation of circumstances leading to the exposure
- Results of the source individual's blood testing
- Medical records relevant to the treatment of the exposed employee.
- Description of the PPE used or what should have been used.

g) _____ shall provide the employee with a copy of the evaluating health care professional's written opinion within 15 working days of the completion of the evaluation. This report is limited to:

- The health care professional's recommended limitations upon the employee's use of personal protective clothing or equipment.
- If the Hepatitis B Vaccine is indicated and if the employee has received the vaccine.

- A statement that the employee has been informed of the results of the medical evaluation and that the employee has been told about any medical conditions which have resulted from the exposure that require further evaluation or treatment. The written opinion shall not reveal specific findings or diagnoses that are unrelated to the employee's ability to wear protective clothing, use protective equipment, and receive vaccinations. Such findings and diagnoses shall remain confidential.

8. Labels & Signs

_____ shall ensure that biohazard labels are on each container of regulated waste. The labels shall be fluorescent orange or orange-red, and include the universal biohazard symbol. Red bags or containers with the universal biohazard symbol may be substituted for labels. Regulated waste disposal must be handled in accordance with the regulations of the local Health Department.

9. Training

_____ shall ensure that training is provided prior to the initial assignment where tasks could present occupational exposure to blood or OPIM. Training shall be repeated every 12 months, or when there are any changes to tasks, PPE, or procedures affecting an employee's occupational exposure. Training shall be tailored to the education level and language of the affected employees. Training shall be through traditional classroom-based instruction or blended learning instruction and include the following:

a) Overview of the OSHA Bloodborne Pathogen Standard.
b) Epidemiology (Incidence and control) and signs/symptoms of bloodborne diseases.
c) Modes of transmission of bloodborne pathogens.
d) Description of tasks that may involve exposure.
e) Explanation of the use and limitations of the methods used at the facility to reduce exposure.
- Engineering controls
- Work practice controls
- Personal protective equipment

f) information about the types, use, location, removal, handling, decontamination, and disposal of personal protective equipment.
g) Explanation of how the personal protective equipment was selected.
h) Information about the Hepatitis B vaccination (including efficacy, safety, method of administration, and benefits), as well as an explanation that the vaccination will be provided at no charge to the employee
i) Explanation of the procedures to follow if an exposure incident occurs, including the method of reporting and medical follow up
j) Information on the post-incident evaluation and follow up required for all exposure incidents

10. Recordkeeping

a) ***Medical Records*** - Medical records shall be retained by _____ in its' employee files in accordance with 29 CFR 1910.1030. All records shall be kept confidential and shall be retained from the first day of employment plus 30 years.
b) _____shall ensure that all contracts with _____ for Hepatitis B vaccinations and post-exposure evaluations and follow ups stipulate OSHA recordkeeping and retention requirements.

c) To comply with OSHA requirements all medical records shall include:
- Employee name
- Social security number
- Copy of the employee's HBV vaccination status, including the dates of the vaccination
- Copy of all results of examinations, medical testing, and follow-up procedures
- Copy of the information provided to the healthcare professional, including a description of the employee's duties as they relate to an exposure incident, and documentation of the routes and circumstance of an exposure.

d) ***Training Records*** - Training records shall be retained by _____ in its' employee files for three years from the date of training and shall include:
- Dates of the training sessions.
- Outline describing the material presented.
- Name and qualification of person(s) conducting the training.
- Names and job titles of those attending the training sessions.

e) ***Availability of Records*** – If an employee requests access to his or her personal medical or training records _____ shall provide such access in a reasonable time, place, and manner in accordance with 29 CFR 1910.1030.

f) Transfer of Records - If _____ ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, the _____ shall contact the Director of the National Institute for Occupational Safety and Health (NIOSH) prior to cessation of business for instruction on the final disposition of the records.

g) _____ shall review this Bloodborne Exposure Control Plan for effectiveness annually, or sooner if needed to incorporate changes to the standard or changes in the workplace.

By signing below, I acknowledge that I have read and understand the Employee Control Plan provided by _____ _____.

_____ _____
Print First Name Print Last Name

_____ _____
Signature Date

_____
Facility

HEPATITIS B VACCINE STATEMENT

___ ATTESTMENT STATEMENT:

I have already received the Hepatitis B Vaccine Series.

Date of vaccine (if known): _____

___ DECLINATION STATEMENT:

I understand that due to my occupational exposure to blood or other potentially infectious materials (OPIM) I may be at risk of acquiring Hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with the Hepatitis B vaccine, at no charge to myself. However, I decline the Hepatitis vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or OPIM and I want to be vaccinated with Hepatitis B vaccine, I can receive the vaccination series at no charge to me.

___ ACCEPTANCE STATEMENT:

I understand that due to my potential occupational exposure to blood or other potentially infectious materials (OPIM), I may be at risk of acquiring hepatitis B virus (HBV) infection. I accept this opportunity to receive the HBV vaccine series. If you choose to obtain the vaccination you will be given the opportunity to discuss the benefits and potential side effects of the vaccine with a Licensed Health Care Professional. Vaccination is at no charge to you and done at a time that is convenient for you.

_____ _____ _____

Employee's Printed Name Employee's Signature Date

If declining the vaccine, the statement should be witnessed:

_____ _____ _____

Witness Printed Name Witness Signature Date