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Standard FIRST AID

Meets the most current
CPR, ECC, and First Aid Guidelines

AUTHORIZED IACET PROVIDER

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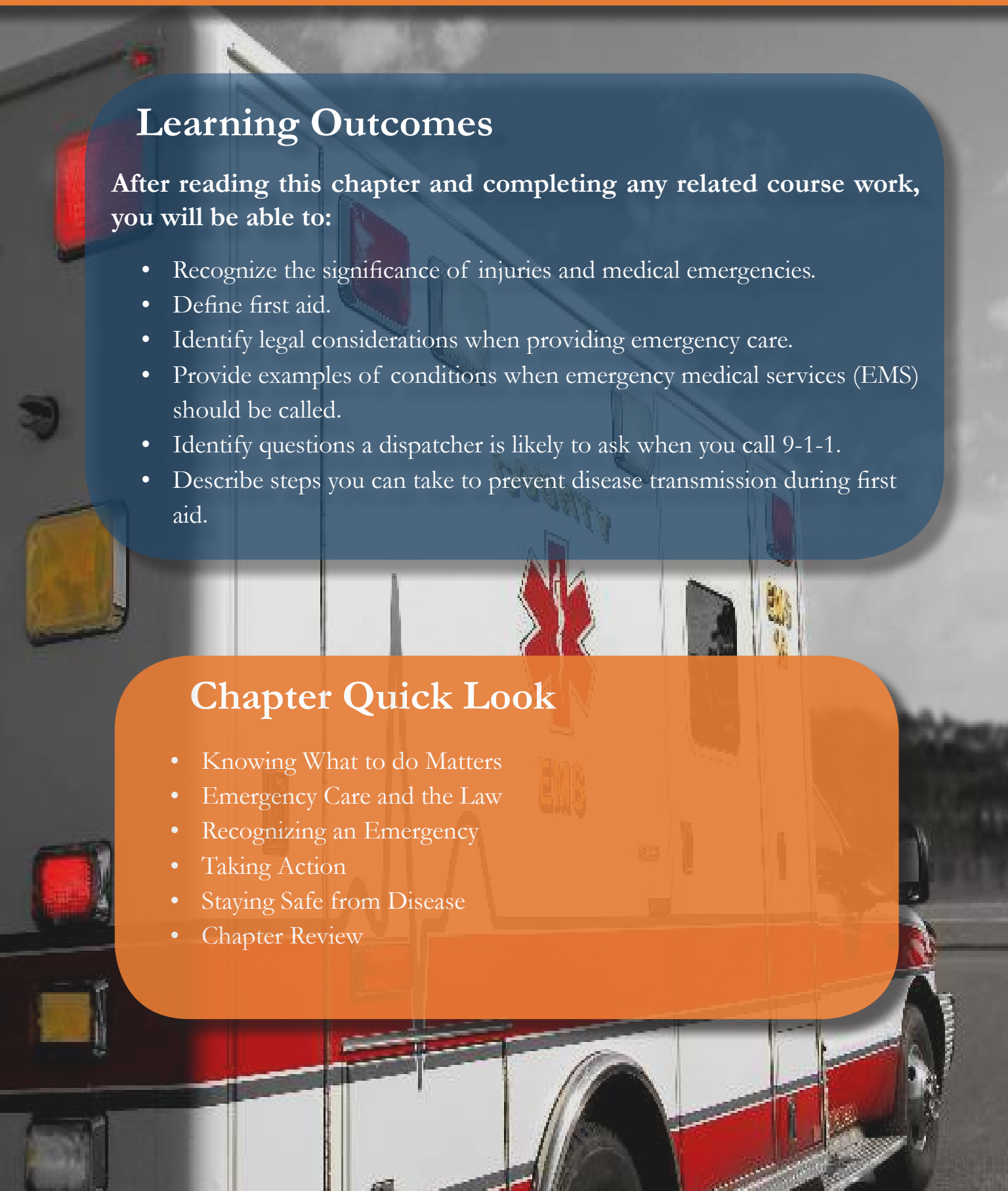
Chapter 1

Introduction to Emergency Care



Learning Outcomes

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

- Recognize the significance of injuries and medical emergencies.
- Define first aid.
- Identify legal considerations when providing emergency care.
- Provide examples of conditions when emergency medical services (EMS) should be called.
- Identify questions a dispatcher is likely to ask when you call 9-1-1.
- Describe steps you can take to prevent disease transmission during first aid.

Chapter Quick Look

Knowing What to do Matters

Emergencies can happen anywhere, and at any time. Knowing what to do can save lives and reduce the consequences of injuries and medical emergencies. Each year more than 800,000 people in the United States die from heart disease, making it the number one killer in America. More than 300,000 of these deaths occur from sudden cardiac death (arrest). Unintentional injury is another significant cause of death, claiming more than 130,000 lives annually.

First Aid is the immediate care provided to an ill or injured victim. This care may be as minimal as washing a wound and applying a bandage, with no further need for assistance. But it could also involve more extensive care for serious conditions requiring **Emergency Medical Services (EMS)** and hospital care.

In serious situations you need to know how to summon more advance medical personnel, what care to give immediately, and how to provide continued care until more qualified help arrives.

Emergency Care & the Law

Though laws vary somewhat from state to state, there are several basic legal considerations that you should be aware of when rendering emergency care:

Good Samaritan Laws. State laws enacted to protect responders from legal actions that might arise from emergency care provided while not in the line of duty. These laws vary from state to state.

Duty to act. Most laypersons do not have a legal duty to act. But this could apply to you in these situations:

- Your job requires you to render care, such as designated company responder established to meet Occupational Safety and Health Administration (OSHA) requirements for a safe workplace.
- A pre-existing relationship to others makes you responsible for their well being, such as a parent's responsibility to his or her child.

Consent. To provide care you must first obtain consent from an ill or injured victim, either verbally or as a gesture. If a victim is unable to grant consent due to mental impairment, confusion, or loss of consciousness, then consent is implied. In this case, the law assumes that the victim would grant consent if he or she were able to do so.

Abandonment. Abandonment involves leaving a victim after you started to give care without ensuring the victim continues to receive care at an equal or higher level.

Negligence. Negligence is the failure to follow a reasonable standard of care, which causes or contributes to injury or damage.

Recognizing an Emergency

The EMS system is a network of local public safety professionals and community resources. Police, fire and medical personnel respond to calls for help, most often through a call to 9-1-1 from bystanders first on the scene. Calling promptly enables valuable resources to be brought to your aid; resources that can save lives if provided early. Some indications that an emergency exists include unusual sights, sounds, odors, appearances, and actions. Examples of possible emergencies include:

- Smoke or fire
- Screaming
- Screeching tires
- Sounds of a collision
- Collapsing structure
- Downed electrical wires
- Strong odors
- A victim collapsing

Taking Action

As a bystander, you will be the first person to encounter an emergency, so it will be up to you to take action. Everyone acts differently when confronted with an emergency, and training helps individuals act more appropriately.

Some people worry about taking action. They must first overcome concerns that may delay their actions. Common factors that keep people from acting include:

- Assuming others will act
- Fear of making a mistake / lawsuit
- Fear of disease transmission

- Uncertainty about the care to provide or need to call for professional help (e.g. 9-1-1)

Do not assume that other bystanders will help. You may be the best trained person at the scene of the emergency. While others may panic, you can keep a cooler head. Recruit others to assist you in providing care.

The care steps you will need to remember are few and simple. And providing first aid is also common sense. So do not fear doing anything wrong.

It is extremely unlikely that a disease will be transmitted while providing any type of first aid. Following a few standard precautions described later in this chapter will keep you safe while providing first aid.

If you are uncertain about the need for EMS or about the care to provide, it is still better to call. Dispatchers will provide you with instructions for care. Follow the steps of care that you learn in this manual and course and you will be providing appropriate care until higher level care can be provided.

When to Call for Medical Help

9-1-1 is the emergency number to call in most parts of the United States **(Figure 1.1).** Call for medical help if the victim is experiencing any of these conditions:

- Loss of consciousness
- Seizure
- Difficulty breathing
- Chest pain / pressure
- Abdominal pain/ pressure
- Serious bleeding
- Vomiting blood
- Serious burns
- Serious head, neck, or back injury
- Stroke
- Broken bones (e.g. fractured arm or leg)

Figure 1.1

Call 9-1-1 for police, fire, and emergency medical services.

When you call 9-1-1 the dispatcher will ask a few questions to gather important information or to confirm what information appears on the dispatcher's screen. Do not hang up the phone until the dispatcher advises to do so. Dispatchers can give specific instructions for care until EMS personnel arrive. When you call 9-1-1 dispatchers often ask:

- Your name
- Your phone number
- The location of the victim
- What happened
- How many people need help
- The condition of the victim(s)
- Whether any care is being provided / If you need instructions for providing care

Staying Safe from Disease

The risk to a first aider of acquiring an infectious disease is extremely low. But you can take **Standard Precautions** to further reduce the chance of contracting any disease. Diseases of concern include hepatitis B virus (HBV), hepatitis C virus (HCV), or human immunodeficiency virus (HIV) , transmitted through bodily fluids. Diseases such as tuberculosis and measles are transmitted through the air. Some diseases, like the flu, can create some discomfort but are rarely serious for otherwise healthy adults.

Bodily fluids that might contain hepatitis B virus (HBV), hepatitis C virus (HCV), or human immunodeficiency virus (HIV) include blood, body fluids, secretions, and excretions excluding sweat. Blood contains the greatest threat of transmission when providing first aid. If blood is not visible, it is still likely that very small quantities of blood are present in other fluids, such as saliva, but the risk for transmitting HBV, HCV, or HIV is extremely low.

Measles, once thought to be eliminated in the United States, has unfortunately returned as a result of communities in the U.S. with unvaccinated people. It is considered a highly communicable disease. The disease resides in the nose and throat and is transmitted by air through coughing and sneezing.

See **Table 1.1** for information on more common diseases of concern.

Table 1.1 Diseases of Concern

Disease	Overview	Vaccination
Hepatitis B	A bloodborne virus causing serious disease of the liver. Hepatitis B infection can lead to long term liver disease, including cirrhosis and cancer.	An effective vaccine is available and must be offered to employees within a few days following new employment.
Hepatitis C	A bloodborne virus causing serious disease of the liver. Hepatitis C infection can lead to long term liver disease, including cirrhosis and cancer.	None
Human Immunodeficiency Virus (HIV)	A bloodborne virus that attacks white blood cells, destroying the body's ability to fight infection, and leading to AIDS in most cases.	None
Tuberculosis	An airborne bacterial infection primarily affecting the lungs.	Bacille Calmette-Guérin (BCG) is a vaccine for tuberculosis, but is rarely needed.
Measles	A highly contagious airborne virus resulting in a high fever lasting numerous days, characteristic rash, cough, and conjunctivitis.	The measles vaccine is effective at preventing the disease.

Standard Precautions

Standard Precautions are measures put in place to reduce the risk of disease transmission. Such measures include hygiene practices, such as proper hand washing. Other measures include the use of engineering controls in the workplace that isolate or remove a particular danger, reducing the risk of disease transmission. Additional measures include work practice controls that involve proper storage, use, and cleaning of equipment, as well as clean up procedures in the event that a surface becomes contaminated.

The last of these measures involves the use of **personal protective equipment (PPE)** to ensure an effective barrier can be maintained between the first aider and an ill or injured victim **(Figure. 1.2)**

Figure 1.2

Personal protective equipment includes items such as gloves and breathing masks.

PPE includes:

- Medical exam gloves to avoid contact with bodily fluids.
- Breathing devices to avoid contact with bodily fluids and airborne disease.
- Goggles or eye glasses with side shields to protect against fluid splatter.
- Gowns that can cover the entire body.
- Antiseptic solution for washing immediately after providing care.

To prevent disease transmission when providing first aid:

- Use barriers, such as disposable gloves, to avoid contact with blood or body fluids.
- Use protective CPR breathing devices if available, and if needed.
- Do not eat, drink or touch your mouth, nose or eyes when giving care.
- Wash your hands thoroughly with warm water and soap, or use a hand sanitizer, after giving care.
- Do not touch any items soiled with bodily fluids.
- Clean and disinfect any surfaces where bodily fluids such as blood have spilled. The Centers for Disease Control (CDC) recommend a mixture of 1 part bleach to 9 parts cool water. Let this sit for 20 minutes and then wipe it up.

- Dispose of all soiled items properly **(Figure 1.3).**

If you come in contact with an injured or ill victim's bodily fluids while providing first aid in a workplace setting, follow your company's exposure control plan for reporting the incident and follow-up (post-exposure) evaluation **(Figure 1.4**).

Figure 1.3

Dispose of soiled items properly.

Figure 1.4

Follow your employer's exposure control plan if you suffer an exposure at work.

Chapter 1 REVIEW

Key Terms

- Abandonment
- Consent
- Duty to act
- Emergency medical Services (EMS)
- First Aid
- Good Samaritan Laws
- Negligence
- Personal protective equipment (PPE)
- Standard Precautions

Key Points

- ✓ Bystanders are often the first on the scene capable of rendering basic care for a victim medical emergency or injury.
- ✓ First aid providers should understand the risks of disease transmission when providing care, and take proper precautions at all times.
- ✓ Using personal protective equipment (PPE) ensures an effective barrier while providing care.

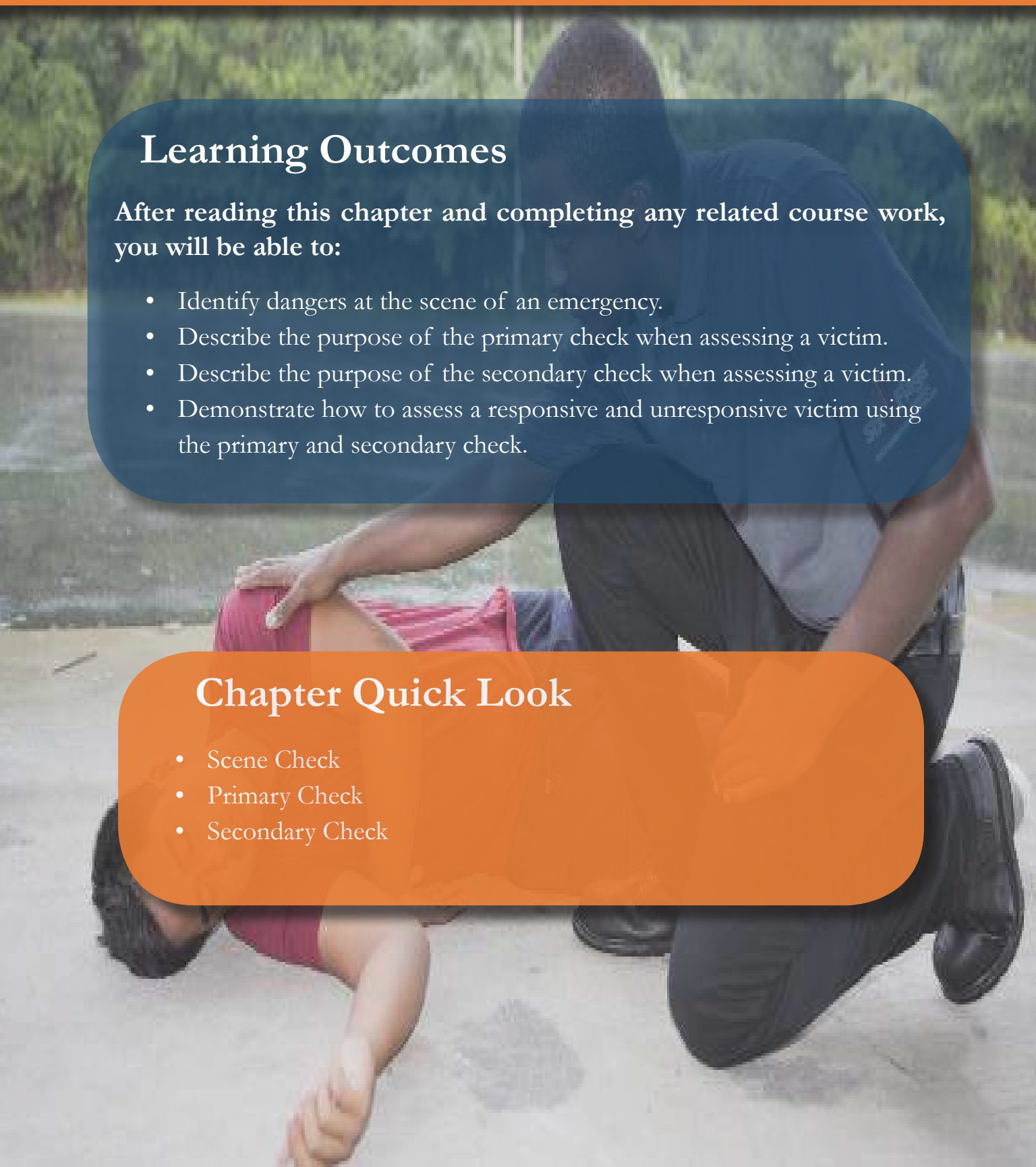
Check Your Progress

Now that you have read this chapter and completed any accompanying class activities, answer the following questions:

- ✓ What are some basic legal considerations that apply to emergency care? (Pg 2-3)
- ✓ Can you identify examples of emergency situations? (Pg 3)
- ✓ Can you provide examples of when to call for medical care? (Pg 4)
- ✓ Can you name several diseases that pose a risk of transmission during first aid? (Pg 5-6)
- ✓ What precautions can you take to prevent disease transmission during first aid? (Pg 7-8)

Chapter 2

Assessing the Scene and the Victim



Learning Outcomes

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

- Identify dangers at the scene of an emergency.
- Describe the purpose of the primary check when assessing a victim.
- Describe the purpose of the secondary check when assessing a victim.
- Demonstrate how to assess a responsive and unresponsive victim using the primary and secondary check.

Chapter Quick Look

- Scene Check
- Primary Check
- Secondary Check

Scene Check

Before you can assess a victim and provide care you must make sure the scene is safe to enter. Check the scene for anything unsafe so that you do not become a victim while providing care **(Figure 2.1)**. Unsafe scenes can include:

- Traffic
- Fire/Smoke
- Downed electrical wires
- Unsafe structures
- Chemical spills / Poisonous gas
- Active assailant

If you are unable to make the scene safe, stay at a safe distance and call 9-1-1. Advise other bystanders not to enter until the scene can be made safe.

Figure 2.1

Make sure the scene is safe before approaching the victim.

Primary Check

With the scene safe, begin to assess the victim. The **primary check** is designed to quickly determine if the victim has any immediate life threats. The primary check is used to determine if a victim:

- Is responsive (conscious)
- Is breathing normally
- Has a heartbeat
- Is bleeding severely

Checking Responsive Victims

For an obviously responsive (conscious) victim, ask what is wrong **(Figure 2.2)**. A victim who is able to answer questions is alert, breathing, has a heartbeat, and is not choking. Complete the primary check by quickly scanning up and down the victim's body to make sure there is no severe bleeding. Look for blood-soaked clothing and blood on the surrounding area. If serious bleeding is present, apply pressure directly over the wound with your hand and a barrier device, such as medical exam gloves, gauze pads or folded towel to stop the bleeding. Identify the problems and call 9-1-1 if needed.

Figure 2.2

Speak with a responsive victim as part of the primary check.

Checking Unresponsive Victims

If you find a person motionless, you still begin with the primary check. The appropriate care is provided based on what is found during this assessment.

Check for responsiveness in a motionless person by tapping the shoulder of the victim, and asking, "Are you OK?" **(Figure 2.3)**. If the victim does not respond, he or she is said to be unresponsive. This is an emergency that requires professional care. Have a bystander call 9-1-1, or call 9-1-1 yourself (cell phone or local phone).

Look at the chest for movement (rising and falling) that would indicate breathing. Listen for sounds such as gasping, gurgling, wheezing, or others that would indicate abnormal breathing (**Figure 2.4)**. If the victim is unresponsive, but still breathing normally, keep monitoring the victim's condition watching for any changes while awaiting EMS personnel.

If an unresponsive victim begins to vomit, roll the victim onto his or her side, a position known as the **recovery position (Figure 2.5).**

If the victim is not breathing (or only has occasional gasps), the victim needs CPR promptly. This is covered in the Community CPR & AED course.

Figure 2.3

Check for responsiveness in a motionless victim.

Figure 2.4

Check for breathing by looking for movement of the chest.

Figure 2.5

The recovery position helps keep the airway clear in an unresponsive victim.

Secondary Check

A secondary check should only be done once the primary check is completed and any immediate life-threatening conditions are cared for. The **secondary check** has two parts:

- Gathering information about the victim's condition that could help you provide care, including deciding about the need to call 9-1-1. Pass on any information you gather to arriving EMS personnel
- Quick physical exam of the body for conditions that could need care or become more serious if left uncared for.

During the secondary check, you will search for signs and symptoms. A **sign** is a condition that you can see or feel, such as a deformed limb or bleeding wound. A **symptom** is what the victim is able to describe to you, such as chest tightness, pain, and dizziness.

Gathering Information

Some people wear medical identification in the form of a bracelet or necklace that notes the wearer's medical conditions. It may also provide a phone number that can be called to get more information, or to alert a person, such as a parent, if needed. You can gather information directly from a responsive victim, bystanders who may have witnessed the incident, or family or friends who are present and know the medical background of the victim. The mnemonic **SAMPLE** can be used to help you remember what information to gather (**Table 2.1)**.

Table 2.1 SAMPLE

Letter Descriptions	Questions
Signs and Symptoms	"What is wrong?"
Allergies	"Are you allergic to anything?"
Medication	"Are you taking any medications for this condition?"
Past medical history	"Do you have any medical problems?"
Last intake	"When did you last eat or drink?
Events leading up to the problem	"What were you doing before the problem started?" or " How did you get hurt?"

Physical Exam

A victim may have a condition that can be pointed out, so you can focus your attention on that area of the body. A victim may also have problems in multiple areas of the body, requiring a more thorough physical check of the entire body. The acronym **DOTS** can help you remember what signs and symptoms of injury or illness to look for as your check the victim. DOTS stands for:

- **D**eformity
- **O**pen wound
- **T**enderness (or pain)
- **S**welling

Start your physical exam at the head and quickly work downward along the victim's body **(Figures 2.6-2.10).** Use DOTS, and look, feel, and listen as you progress. Speak with the victim. Ask what happened so that you can determine the cause of the incident. Ask the victim to describe any pain and the location of the pain and what makes it feel better or worse. See **Table 2.2** for detailed information on conducting a physical exam.

Figure 2.6

Conduct a physical exam of the head and neck.

Figure 2.7

Conduct a physical exam of the chest

Figure 2.8

Conduct a physical exam of the abdomen

Figure 2.9

Conduct a physical check of the pelvis.

Figure 2.10

Conduct a physical exam of the legs.

Table 2.2 Physical Exam

Part of the Body to Check	What to Check For
Head	DOTS Skin temperature, color, moisture Pupils (should be the same size and both react to light) Clear or blood tinged fluid in the ears or nose Injury to the teeth or tongue
Neck	DOTS
Chest	DOTS Symmetry during breathing
Abdomen	DOTS (Push gently to determine tenderness)
Pelvis	DOTS (push inward on the sides of the hips for tenderness)
Limbs	DOTS (Check arms/hands and legs/feet) Have victim wiggle fingers and toes
Back	DOTS If the victim is lying on the back and you do not suspect a spine injury, roll the victim onto the side. Do not move the victim if already complaining of back pain.

Skin Conditions

Skin should be normal in color, temperature and moisture. Flushed (red) skin can be an indication of conditions such as high blood pressure, excitement, or being overheated. Pale/blue/gray skin can result from blood loss, insufficient oxygen, and shock.

If skin is hot and moist or dry, it could be a high fever or exposure to heat. Cool and moist skin often reflects poor blood circulation and shock. Cold skin, especially areas such as the abdomen under clothing, could indicate hypothermia.

Medical ID

Some victims have conditions that are identified on medical identification bracelets or necklaces. In addition to the victim's medical condition, the item may also have a phone number to call for more information in the event the victim is unable to communicate. Look for medical ID tags as you conduct your physical exam. Pass this information on to arriving EMS personnel .

Chapter 2 REVIEW

Key Terms

- DOTS
- Physical exam
- Primary check
- Recovery position
- SAMPLE
- Secondary check
- Sign
- Symptom

Key Points

- ✓ Before you can assess a victim and provide care you must make sure the scene is safe to enter.
- ✓ The primary check is designed to quickly determine if the victim has any immediate life threats.
- ✓ Checking responsiveness in a motionless victim involves tapping and asking at the victim.
- ✓ Look at the chest for movement (rising and falling) that would indicate breathing. Listen for sounds such as gasping, gurgling, wheezing, or others that would indicate abnormal breathing.
- ✓ If an unresponsive victim begins to vomit, roll the victim onto his or her side (recovery position).
- ✓ A secondary check is done once the primary check is completed and any immediate life-threatening conditions are cared for.
- ✓ The secondary check involves gathering information and conducting a physical exam.
- ✓ A sign is a condition that you can see or feel, while a symptom is what the victim is able to describe to you.
- ✓ SAMPLE is used to gather information.
- ✓ DOTS is used to look for signs and symptoms of illness or injury.
- ✓ The physical exam involves a quick head to toe check of the victim's body.

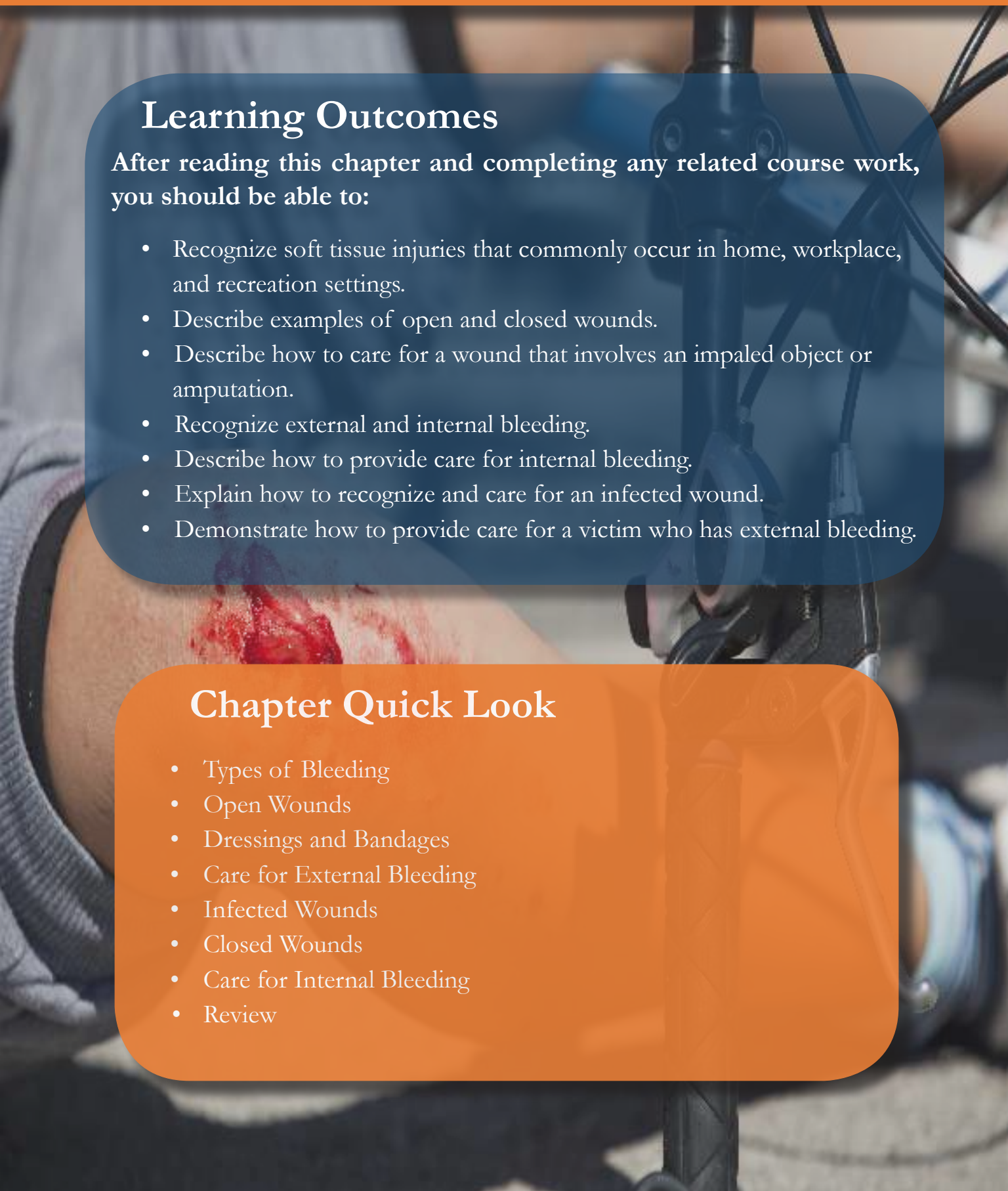
Check Your Progress

Now that you have read this chapter and completed any accompanying class activities, answer the following questions:

- ✓ Can you identify dangers at the scene of an emergency? (Pg 11)
- ✓ What is the purpose of the primary check when assessing a victim? (Pg 11)
- ✓ How do you assess a responsive victim using the primary check? (Pg 11)
- ✓ How do you assess an unresponsive victim using the primary check? (Pg 12)
- ✓ Can you name the parts of the secondary check? (Pg 13)
- ✓ Can you identify what information to gather as part of the secondary check? (Pg 13)
- ✓ Can you describe the steps of a physical exam? (Pg 14)

Chapter 3

Wounds and Bleeding Control



Learning Outcomes

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

- Recognize soft tissue injuries that commonly occur in home, workplace, and recreation settings.
- Describe examples of open and closed wounds.
- Describe how to care for a wound that involves an impaled object or amputation.
- Recognize external and internal bleeding.
- Describe how to provide care for internal bleeding.
- Explain how to recognize and care for an infected wound.
- Demonstrate how to provide care for a victim who has external bleeding.

Chapter Quick Look

- Types of Bleeding
- Open Wounds
- Dressings and Bandages
- Care for External Bleeding
- Infected Wounds
- Closed Wounds
- Care for Internal Bleeding
- Review

Types of Bleeding

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. There are two general types of wounds, those that result in external bleeding or internal 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. Because it is under greater pressure arterial bleeding is the most serious, causing rapid blood loss that is harder to control than venous or capillary bleeding.

Open Wounds

Common open wounds occurring at home, during recreation, and at work include **(Figure 3.1)**:

- **Abrasion** – Commonly called scrape, rug burn, or road rash.
- **Incision** – Smooth-edge cut, often seen with very sharp, thin objects such as a razor blade, scalpel, or paper edge.
- **Laceration** – Jaded-edge cut that tears away skin tissue, caused by items such as irregular broken glass, or 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 3.1

There are several types of open soft tissue injuries.

- **Amputation** – Injury resulting in the loss of 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.

Dressings and Bandages

Bandages and dressings are items commonly found in first aid kits, and are used to control external bleeding **(Figure 3.2)**. **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. Similar to dressings, bandages also come in various sizes.

Figure 3.2

Dressings and bandages are used to control bleeding.

Care for External Bleeding

Caring for an open wound involves protecting against disease transmission, stopping the bleeding, and reducing the chance of infection. Follow these steps to care external bleeding:

1. Before contacting the victim, follow Standard Precautions by wearing medical exam gloves.
2. Wash a shallow wound with soap and water, apply an antibiotic ointment, and bandage the wound. Change the bandage daily.
3. Your concern for a larger, deeper wound is to stop the bleeding. Place a dressing, over the wound and apply direct pressure with your gloved hand **(Figure 3.3)**.

Figure 3.3

Apply a gauze pad and pressure.

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 maintain pressure and keep the wound clean while you get the victim to medical care **(Figure 3.4)**.
5. If bleeding continues and the gauze becomes soaked, apply additional gauze and bandage over the first layer.
6. Call 9-1-1 if bleeding is severe or cannot be controlled.

Figure 3.4

Wrap roller gauze in a spiral pattern to maintain pressure and stop bleeding.

If the wound includes an impaled object, leave the object in place. Use one of these two methods to provide care:

1. Hold the object still until EMS personnel arrive and decide the best method of stabilizing the object and transportation.
2. Place several rolls of gauze around the object to limit its movement. Bandage the rolls of gauze in place, taking care not to apply pressure that moves the object **(Figure 3.5)**.

Figure 3.5

Use roller gauze to stabilize an impaled object.

Figure 3.6

Keep an amputated part dry and cool.

For an amputated 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 dry and cool if possible **(Figure 3.6)**. Provide the part to EMS personnel when they arrive.

Tourniquets

Tourniquets are meant to control life-threatening bleeding from extremity wounds that would otherwise be hard to control with normal procedures such as direct pressure and bandaging. The use of tourniquets was first noted in conflicts in the middle ages, and tourniquets have continued to be used by military personnel in conflicts from the Civil War to present day military conflicts. Around the early 1900s complications from improvised or improperly used tourniquets were documented. These complications included significant tissue damage and limb loss, increased bleeding, and increased deaths. As a result, tourniquet use had been either applauded or discouraged over the past 100 years, based on who you listen to.

Studies of battlefield injuries in Vietnam and Persian Gulf Wars concluded that tourniquet use for uncontrollable bleeding from limb wounds was the leading cause of preventable deaths among US casualties. One of the greatest threats to soldiers in Iraq or Afghanistan involves improvised explosive devices (IEDs). These devices result in devastating injuries to the extremities, including amputations. Studies found that commercial mechanical tourniquets, notably the Combat Application Tourniquet R (C-A-T), safely stopped bleeding with minimal side effects.

Over the past few years tourniquets have made the transition to civilian emergency care within emergency departments, and public safety. The use of such devices has been credited in saving lives in terrorist and mass shooting attacks. Emergency tourniquets may be necessary in situations that include:

- 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 can provide circumferential pressure to the limb. Once tightened, bleeding will cease and pressure can be maintained through the evacuation of the injured person by EMS personnel **(Figure 3.7)**.

Figure 3.7

Tourniquet.

Another advance in care for severe bleeding involves hemostatic gauze, and QuikClot [R] dressings. These gauze dressings can be applied to areas of the body other than just the limbs. Apply pressure in the same manner as regular gauze dressings. Hemostatic gauze is embedded with a shellfish-derived polysaccharide that quickly promotes clot formation. QuikClot [R] 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 3.8)**.

Figure 3.8

QuikClot[R] hemostatic dressing.

When Sutures (Stitches) are Needed

Sutures are normally placed up to 8 hours following injury, and are often needed for wounds that are:

- More than ¼ inch deep
- Have jagged edges, or gape open
- Deep, down to the fat, muscle, bone, or over a joint
- On an area of the body where scarring would be a cosmetic concern
- Still bleeding after 15 minutes of direct pressure.

Infected Wounds

A wound infection occurs when bacteria enters a break in the skin. Wounds of any size can become infected, even with proper care. This is why it is important to be able to promptly recognize and care for a wound that is becoming infected. Common signs and symptoms of wound infection include:

- Warm, red, painful, swollen wound
- Pus discharge from the wound
- Foul odor from the wound

To care for an infected wound, apply moist, warm compresses. Clean the wound with soap and water, and apply an antibiotic ointment and new bandage. Seek medical care if the condition does not improve.

Closed Wounds

Closed wounds involve internal bleeding, and result from blunt injury that does not break the skin **(Figure 3.9).** The signs and symptoms of internal bleeding include:

- Bruising
- Tenderness
- Coughing up or vomiting blood
- Black (tar - like) or bloody stool

Figure 3.9

A bruise is an example of a closed wound.

Care for Internal Bleeding

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

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

More serious internal bleeding, such as abdominal bleeding, requires more advanced care. Call 9-1-1. Care for shock by placing the victim on his or her back and keeping the victim warm.

Chapter 3 REVIEW

Key Terms

- Abrasion
- Amputation
- Avulsion
- Bandage
- Dressing
- Impaled object
- Incision
- Laceration
- RICE

Key Points

- ✓ There are three types of bleeding: capillary, venous, and arterial.
- ✓ There are numerous types of open wounds.
- ✓ Care for more serious external bleeding involves applying direct pressure with a dressing and bandage the wound.
- ✓ Impaled objects should be stabilized to avoid further movement and tissue damage.
- ✓ To care for an amputation, stop the bleeding and save the part.
- ✓ Internal bleeding can occur as a result of blunt force.
- ✓ Care for internal bleeding in limbs by following the RICE mnemonic.

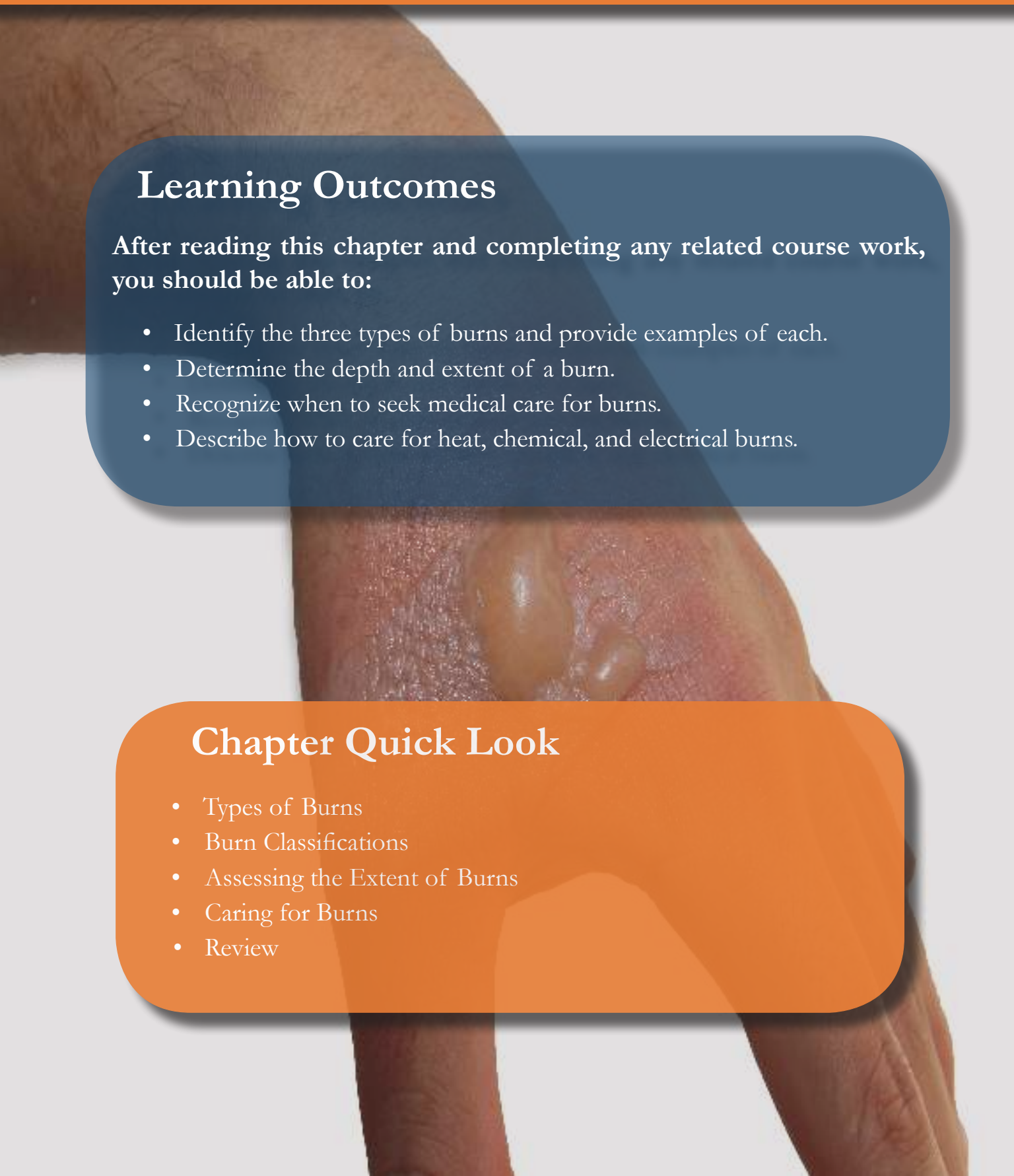
Check Your Progress

Now that you have read this chapter and completed any accompanying class activities, answer the following questions:

- ✓ Can you describe the three types of bleeding? (Pg 20)
- ✓ Can you describe seven open wounds? (Pg 20)
- ✓ Can you describe how to care for a victim with external bleeding? (Pg 21-22)
- ✓ What are several signs and symptoms of an infected wound? (Pg 24-25)
- ✓ What are the signs and symptoms of internal bleeding? (Pg 25)
- ✓ How should you care for a victim of internal bleeding? (Pg 25)

Chapter 4

Burns



Learning Outcomes

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

- Identify the three types of burns and provide examples of each.
- Determine the depth and extent of a burn.
- Recognize when to seek medical care for burns.
- Describe how to care for heat, chemical, and electrical burns.

Chapter Quick Look

- Types of Burns
- Burn Classifications
- Assessing the Extent of Burns
- Caring for Burns
- Review

Types of Burns

There are several different types of burns:

- Thermal (Heat)
- Chemical
- Electrical
- Radiation

Thermal burns are common, and 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.

Burn Classifications

Burns are classified according to the depth or severity of tissue damage that occurs **(Figure 4.1)**:

- **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 varying in size 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 victim will feel pain from the surrounding lesser damaged areas.

Figure 4.1

Burns are classified according to the extent of injury.

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 victim's hand is equal to approximately 1% of the total surface area of the victim's body. Estimate the extent of damage by counting the approximate number of hands it would take to cover the burned area.

Caring for Burns

Victims 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. The care for all burns includes stopping the burning process, minimizing further injury, and determining the need for more advanced care.

Caring for Thermal Burns

To care for 1st degree thermal burns:

- Stop the burning process and reduce the pain by applying cool water for several minutes **(Figure 4.2)**.
- 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.

Figure 4.2

Cool water can stop the burning process and reduce pain.

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

- Stop the burning process and reduce the pain by applying cool water for several minutes.

- Cover the burn with a nonstick dressing and bandage loosely, 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 pain by applying cool water.
- 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 **(Figure 4.3).** Flush continuously for up to 20 minutes, or until EMS personnel arrive if summoned.
- If the chemical is a dry powder and no water is available, brush the powder from the skin.
- If your job involves working with chemicals, follow the instructions provided on your Material Safety Data Sheets (MSDS) for the proper care if an incident occurs.

Figure 4.3

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 victim of electric 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 burns has been controlled before you provide care for the victim. Disconnect any power to be sure that you will not become a victim. If you are unable to verify that the power is off, wait until the appropriate safety personnel arrive.

Chapter 4 REVIEW

Key Terms

- First degree burn
- Rule of the hand
- Second degree burn
- Third degree burn

Key Points

- ✓ There are four types of burns: thermal, chemical, electrical, and radiation.
- ✓ There are 3 degrees of burns based on depth of damage: first degree (superficial), second degree (partial thickness), and third degree (full thickness).
- ✓ The Rule of the Hand can be used to estimate the extent of burn damage.
- ✓ Care for any burns 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.
- ✓ Care for thermal burns with cool water to stop the burning process.
- ✓ Care for chemical burns by flushing with large amounts of water.
- ✓ Care for electrical burns includes covering entrance and exit wounds.
- ✓ Seek medical care for more serious burns, including calling 9-1-1 for the most serious conditions.

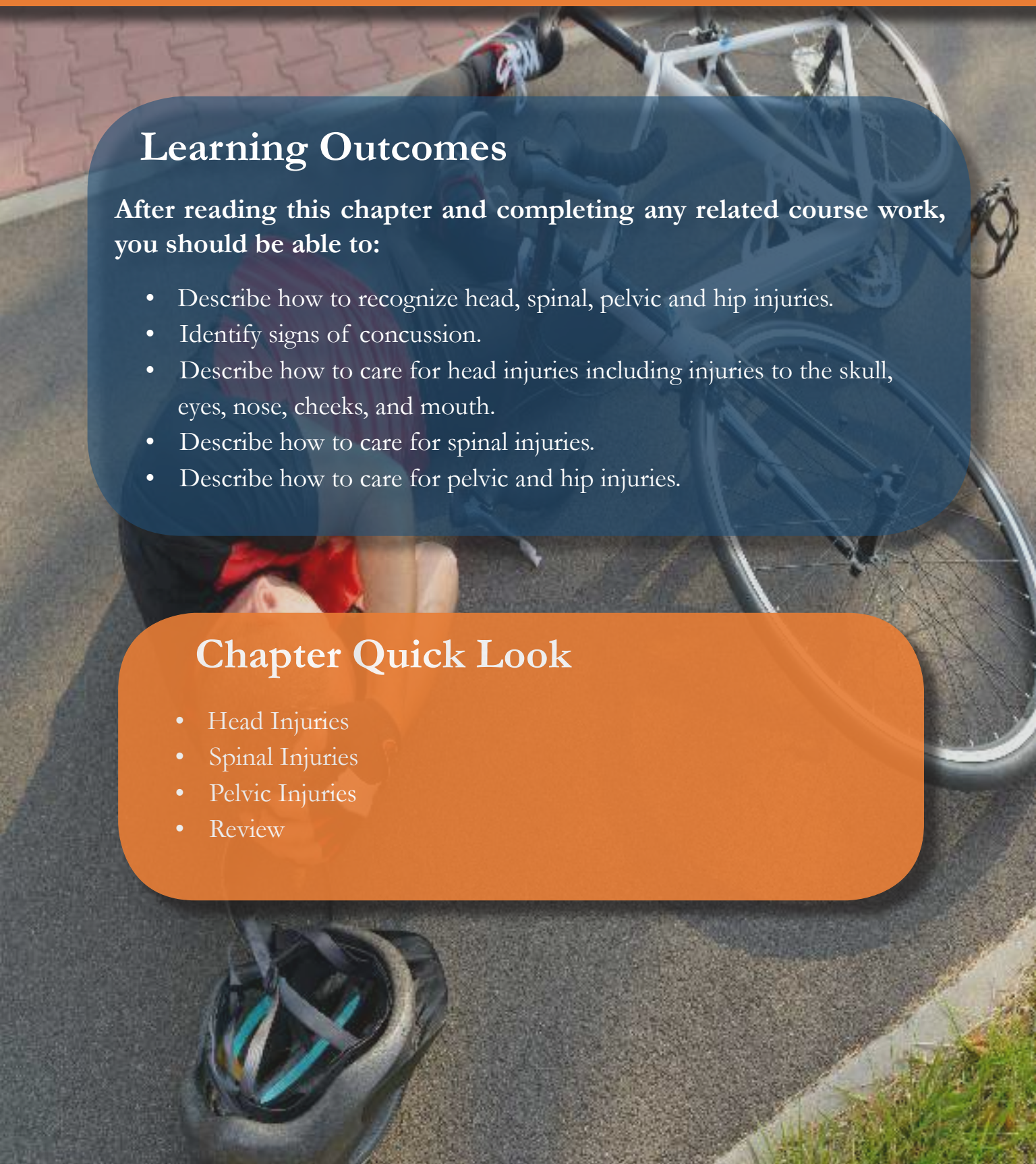
Check Your Progress

Now that you have read this chapter and completed any accompanying class activities, answer the following questions:

- ✓ Can you describe the four types of burns? (Pg 28)
- ✓ Can you differentiate the three classifications of burns? (Pg 28)
- ✓ Can you describe how to determine the extent of a burn? (Pg 29)
- ✓ What are the general steps of burn care? (Pg 29)
- ✓ How should you care for a victim suffering a thermal burn, chemical burn, or electrical burn? (Pg 29-31)

Chapter 5

Head, Spinal, Pelvic, and Hip Injuries



Learning Outcomes

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

- Describe how to recognize head, spinal, pelvic and hip injuries.
- Identify signs of concussion.
- Describe how to care for head injuries including injuries to the skull, eyes, nose, cheeks, and mouth.
- Describe how to care for spinal injuries.
- Describe how to care for pelvic and hip injuries.

Chapter Quick Look

Head Injuries

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

Skull Fracture

A skull fracture is a break of part of the skull as a result of significant force. Signs and symptoms 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 victim with a skull fracture:

1. Check responsiveness and breathing and provide care as needed.
2. Place a sterile dressing (gauze pad or other clean item) over the wound.
3. Apply pressure along the edges of the dressing, not directly over any weak area of the skull **(Figure 5.1)**.
4. Restrict movement of the victim's head.
5. Call 9-1-1.

Figure 5.1

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 victim will usually fully recover. But the time it takes a victim to recover can vary greatly depending on the extent of the injury.

Signs and symptoms 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 victim with a possible concussion, position the victim on his or her back and restrict movement of the head and neck. Call 9-1-1. Seek medical care.

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.

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

1. Place a sterile gauze pad (or other clean dressing) over the wound.
2. Apply direct pressure over the wound to stop the bleeding.
3. Bandage the wound if possible **(Figure 5.2)**.
4. Position the victim on the back with the head and shoulders slightly elevated.
5. Call 9-1-1 if bleeding cannot be controlled or the wound is large or deep.

Figure 5.2

Care for a scalp wound by applying direct pressure and bandage.

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 a grain of sand:

1. Hold the eye open
2. Rinse with water.
3. 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 chemical in the eyes:

1. Hold the eyes open and continuously flush with water. If only one eye is affected, close the unaffected eye during this process **(Figure 5.3)**.
2. Call 9-1-1 and continue to flush the eyes until EMS personnel arrive.

Figure 5.3

To remove chemicals from the eyes, flush continuously 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:

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

Eye Avulsion

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

1. 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.
2. A paper cup can be held in place over the dressing to further protect the eyeball from injury.
3. Have the victim close the uninjured eye.
4. Call 9-1-1.

Penetrating Eye Injury

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

1. If the object remains in the eyeball, apply dressings around the object to minimize movement, and hold these in place.
2. Have the victim close the uninjured eye.
3. 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:

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

Cheek Injuries

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

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

Nosebleed

Nosebleeds are common injuries that occur when people are struck in the nose, or as the result of excessive dry heat drying mucous membranes. To care for nosebleeds:

1. Have the victim sit down and lean slightly forward.
2. Have the victim pinch the nostrils together for about 5 minutes **(Figure 5.4)**.
3. Call 9-1-1 if the bleeding cannot be controlled or if the victim has an associated medical condition such as high blood pressure.

Figure 5.4

To care for a nosebleed, have the victim 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:

1. If a closed wound is present, apply ice or a cold pack to reduce swelling and pain.
2. If an open wound is present, control external bleeding by applying a dressing and direct pressure.
3. If the bleeding does not stop, seek medical care.

To care for a knocked-out (avulsed) tooth **(Figure 5.5)**:

1. Place a folded gauze pad in the socket to control bleeding.
2. Locate the missing tooth and hold it by the crown.

Figure 5.5

Care for a knocked out tooth by controlling bleeding and saving the missing tooth.

3. Use any of the following techniques to keep the tooth moist until the victim can get to the dentist:
   - Attempt to reinsert the tooth.
   - If reinsertion is not possible, place the tooth in Hanks Balanced Salt Solution, as found in Save-a-Tooth® to preserve the tooth.
   - Other fluids that can be used include coconut water, milk, or a saltwater solution (1 teaspoon salt in 1 quart of water).
   - If no other fluids are available, have the victim 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.
4. Get the victim to a dentist promptly so the tooth can be successfully replaced in its socket.
5. If more serious injuries exist, call 9-1-1.

Spinal Injuries

The spine, or spinal column, is comprised of a 33 bones, commonly called **vertebrae,** stacked upon one another. There are 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 five 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 five 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.** Falls from a height, motor vehicle collisions, and recreational and sport activities are ways in which spinal injuries can occur. Additional movement of someone with a spinal injury could damage the spinal cord and possibly cause paralysis.

Recognizing Spinal Injuries

Signs and symptoms 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:

1. Tell the victim not to attempt to move.
2. Restrict movement of the head and neck by applying **Spinal Motion Restriction (Figure 5.6)**.
3. Call 9-1-1

Figure 5.6

Hold the head still when caring for a victim with a possible spinal injury.

Pelvic and Hip Injuries

Pelvic injuries can range in severity from minor to life-threatening. A pelvic fracture can occur as a result of 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 person 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 the sciatic nerve, the most important nerve in the lower limbs.

Recognizing Pelvic and Hip Injuries

The signs and symptoms 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:

1. Support the victim in the most comfortable position. This may be with the legs bent or straight. Do not attempt to move the legs.
2. Call 9-1-1

Chapter 5 REVIEW

Key Terms

- Concussion
- Dislocation
- Spinal cord
- Spinal motion restriction
- Vertebrae

Key Points

- ✓ A skull fracture is a break of part of the skull as a result of significant force.
- ✓ Concussion is a brain injury, often caused by a blow to the head that changes the way the brain functions.
- ✓ 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.
- ✓ To care for a blow to the eye, have the victim close the affected eye and apply ice/cold pack to reduce pain and swelling.
- ✓ For penetrating cheek injuries, 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.
- ✓ To care for a nosebleed, have the victim sit down, lean slightly forward, and pinch the nostrils together.
- ✓ Minimize movement of the head and neck for victims of possible spinal injury.
- ✓ Signs and symptoms of pelvic and hip injuries include the inability to stand or walk, hip or groin pain, and numbness of the affected lower limb.

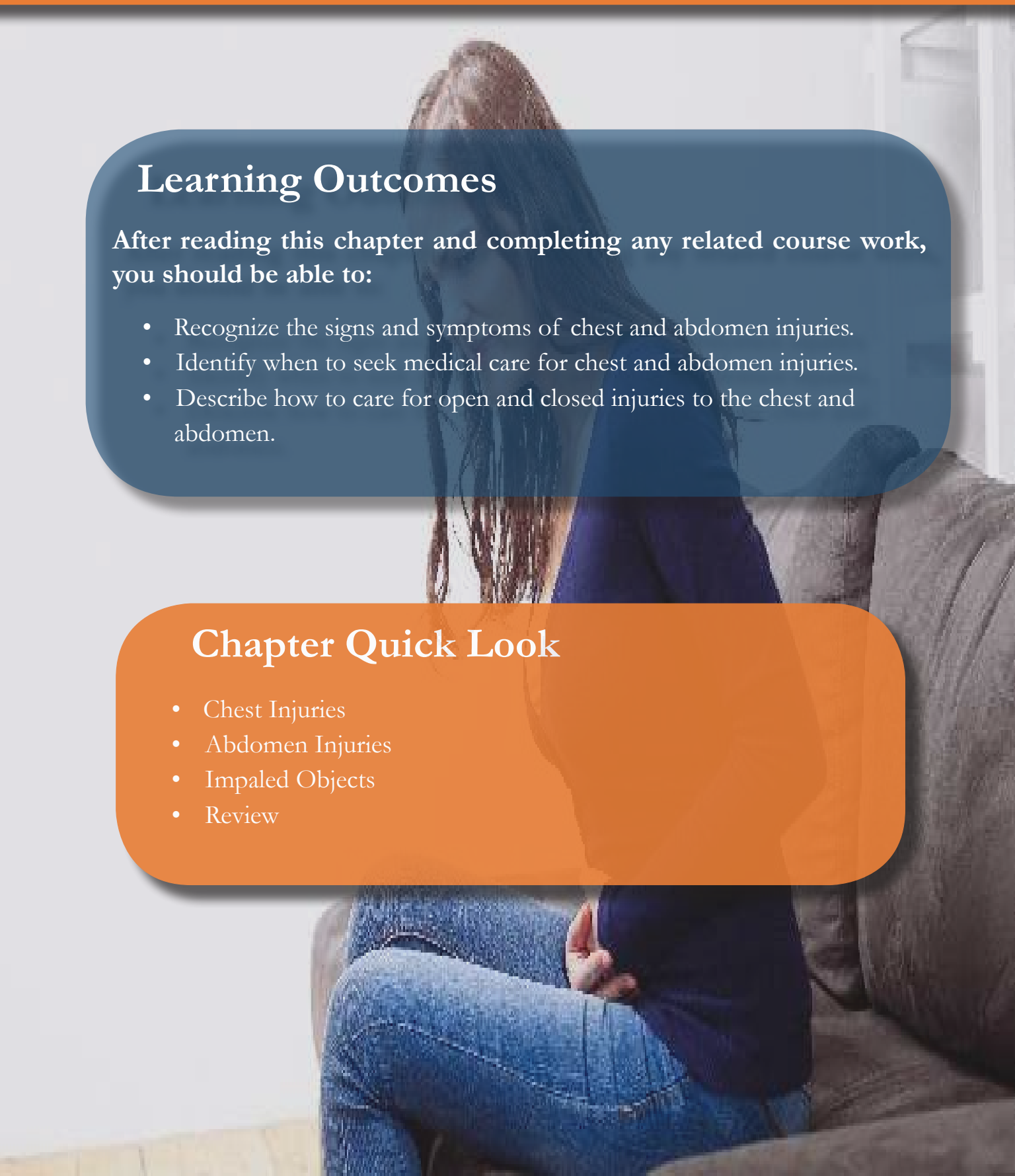
Check Your Progress

Now that you have read this chapter and completed any accompanying class activities, answer the following questions:

- ✓ How should you care for a skull fracture? (Pg 35)
- ✓ What are the signs and symptoms of a concussion? (Pg 36)
- ✓ How should you care for loses objects or chemicals in the eyes? (Pg 37)
- ✓ Can you describe how to care for eye injuries from blows and penetrating injuries? (Pg 37)
- ✓ How should you care for penetrating cheek injuries? (Pg 38)
- ✓ How should you care for a victim with a nosebleed? (Pg 39)
- ✓ Can you explain how to care for a victim who has just lost a tooth? (Pg 39-40)
- ✓ What are the signs and symptoms of possible spinal injury? (Pg 41)
- ✓ What is spinal motion restriction? (Pg 41)
- ✓ How should you care for a victim who has a possible spinal injury? (Pg 41)
- ✓ How would you recognize a possible pelvic or hip injury? (Pg 42)
- ✓ How should you care for pelvic or hip injuries? (Pg 42)

Chapter 6

Chest and Abdomen Injuries



Learning Outcomes

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

- Recognize the signs and symptoms of chest and abdomen injuries.
- Identify when to seek medical care for chest and abdomen injuries.
- Describe how to care for open and closed injuries to the chest and abdomen.

Chapter Quick Look

- Chest Injuries
- Abdomen Injuries
- Impaled Objects
- Review

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 and symptoms 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:

1. Place the victim in the most comfortable position for breathing and pain relief. This is often a seated position.
2. To help stabilize the ribs, place a folded towel, blanket, or pillow against the injured side and have the victim hold it in place with his or her arm **(Figure 6.1)**.
3. Call 9-1-1

Figure 6.1

A soft, bulky object held against the injured side of the chest can help stabilize rib fractures.

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:

1. Control any significant bleeding present.
2. If a sucking chest wound is present with little bleeding, it is acceptable to leave this open chest wound exposed.
3. Call 9-1-1.

Abdomen Injuries

Abdomen injuries, like chest injuries, can also be closed or open, and 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:

1. Place the victim in a comfortable position. This may be on his or her back or side, with the knees bent.
2. Care for shock by keeping the victim warm.
3. 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:

1. Place the victim on his or her back, with the knees bent.
2. Gently cover the protruding organs with a moist, sterile dressing. Avoid pressure and do not try to reinsert the organs
3. Care for shock by keeping the victim warm.
4. Call 9-1-1.

Impaled Objects

As you learned previously, an object that penetrates the body and becomes lodged in place creates an open wound known as an **impaled object**. Nails, shards of glass, and other sharp objects are examples of items that could become stuck in the body.

To care for an impaled object in the chest or abdomen:

5. Do not attempt to move the victim, remove the object, or apply any pressure to the object as additional injury could result.
6. Keep the object from moving. This can be done by simply holding the object still. You could also minimize movement of the object by placing bulky dressings, such as rolls of gauze, around the object and bandaging these in place, though this can be complicated by the position of the victim.
7. Call 9-1-1.

Chapter 6 REVIEW

Key Terms

- Abdominal evisceration
- Flail chest
- Impaled object
- Sucking chest wound

Key Points

- ✓ Chest and abdominal injuries can be open or closed.
- ✓ Bruising, pain or tenderness, and difficulty breathing are signs and symptoms of closed chest injuries.
- ✓ Care for possible rib fractures by stabilizing the injured area of the chest.
- ✓ Call 9-1-1 for serious conditions such as possible rib fractures, and open chest or abdominal injuries.
- ✓ Gently cover protruding abdominal organs with a moist, sterile dressing.
- ✓ Stabilize impaled objects to keep them from moving.

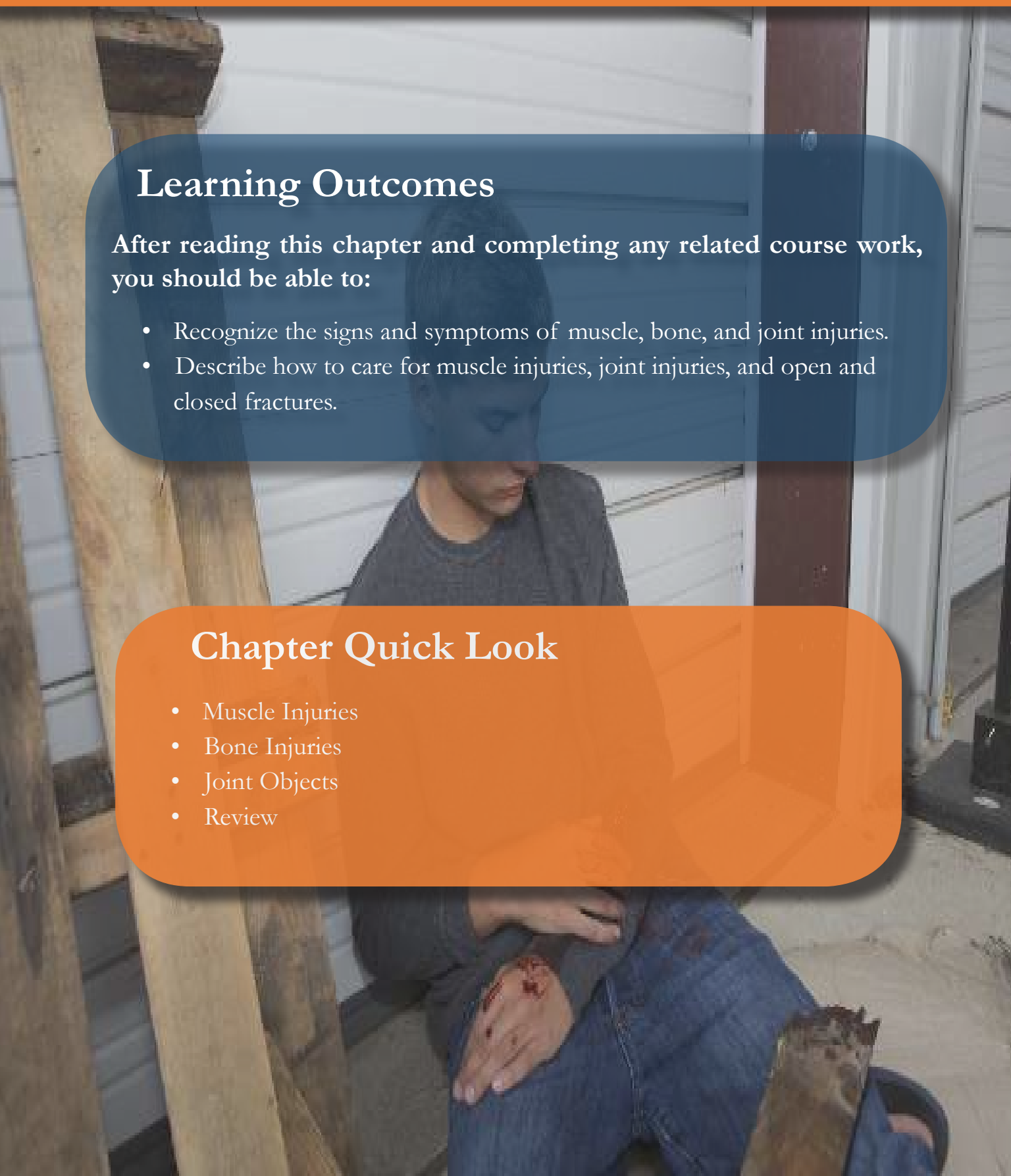
Check Your Progress

Now that you have read this chapter and completed any accompanying class activities, answer the following questions:

- ✓ Can you identify signs and symptoms of rib fractures? (Pg 46)
- ✓ Can you differentiate between a flail chest and sucking chest wound? (Pg 46)
- ✓ Can you describe how to care for closed chest injuries such as a rib fracture? (Pg 46-47)
- ✓ How should you care for a victim experiencing a sucking chest wound? (Pg 47)
- ✓ How should you care for a victim with an open abdomen wound? (Pg 47)
- ✓ What are the general steps of care for an impaled object in the chest or abdomen? (Pg 48)

Chapter 7

Muscle, Bone, and Joint Injuries



Learning Outcomes

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

- Recognize the signs and symptoms of muscle, bone, and joint injuries.
- Describe how to care for muscle injuries, joint injuries, and open and closed fractures.

Chapter Quick Look

- Muscle Injuries
- Bone Injuries
- Joint Objects
- Review

Muscle Injuries

There are three common muscle injuries:

- **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 when running.
- **Contusion** – Muscle 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 contusions by following the mnemonic RICE previously discussed **(Figure 7.1)**:

- *Rest*. Stop using the injured part.
- *Ice*. Apply ice for up to 20 minutes.
- *Compression*. Apply an elastic bandage for two hours.
- *Elevation*. Raise the affected limb.

Care for muscle cramps by having the victim apply pressure to the affected muscle until the cramp subsides.

Figure 7.1

Use the RICE approach to care for muscle strains or contusions.

Bone Injuries

Injuries to bones can involve simple bruising or a serious break in a bone, commonly called a **fracture (Figure 7.2)**. Most fractures are closed, where the bone does not break the skin. Fewer bone injuries involve open fractures, where the bone end has broken through the skin.

Figure 7.2

Fracture.

Recognizing Bone Injuries

Use the mnemonic DOTS, as previously discussed, to help identify a possible serious bone injury such as a fracture:

- **D**eformity
- **O**pen Wound
- **T**enderness
- **S**welling

Another good indication that a bone is likely broken is the inability to use the injured part normally. The victim may not be able to move the affected limb or bear weight or walk on an injured leg or foot. The victim 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.

Care for Bone Injuries

Though rarely life-threatening, all serious bone injuries require further evaluation in a hospital to ensure proper care and return to normal function. The initial care you provide should help reduce the anxiety that victims commonly experience, and keep the victim from moving the injured area. To care for possible fractures:

1. Apply a splint. **Splinting** is the process of stabilizing a possible fracture to prevent further damage to muscles, nerves, and blood vessels. There are three common types of splints that can be used for a fracture:
   - **Anatomic splint (Figure 7.3).** Also known as a self -splint, an anatomic splint is one in which 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 7.3

Anatomic splint.

- **Soft splint (Figure 7.4)**. A soft splint is made from items such as a pillow, towel, blanket, or coat wrapped around the injured part and tied in place. Bulky material such as this limits movement of the injured part.

Figure 7.4

Soft splint.

- **Rigid splint (Figure 7.5)**. 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 7.5

Rigid splint.

2. Apply an ice or cold pack if possible to help reduce the swelling and pain.
3. If an open fracture is present, do not apply pressure to any protruding bone. Cover the area with a dressing and bandage loosely.
4. Call 9-1-1 for any open fractures or large bone fractures (such as the thigh), or when transporting the victim would be difficult or would aggravate the injury.

Sling and Binder

A sling is a device that can be used to support an injured hand, wrist, arm, or shoulder. Slings are often used to further support and minimize movement of a splinted arm. The victim's bent arm rests in the sling, which can be further secured by tying a binder across the chest. Slings can be made from triangle bandages found in first aid kits or a large bandana **(Figure 7.6)**. They can also be fashioned using the victim's clothing and a safety pin **(Figure 7.7)**.

Figure 7.6

Sling made with a triangle bandage.

Figure 7.7

Sling made using the victim's clothing.

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. Dislocations can involve shoulders, elbows, knees, ankles, fingers, and toes. **(Figure 7.8)**.

Figure 7.8

Dislocation.

Recognizing Joint Injuries

Joint sprains and dislocations have signs and symptoms similar to those of fractures:

- Pain
- Deformity
- Inability to use the affected limb normally

Care for Joint Injuries

Care for joint injuries in a manner similar to muscle and bone injuries. If you suspect the joint is only sprained, use RICE. If you believe the joint is dislocated, splint the injured limb as you would a fracture. Call 9-1-1.

Chapter 7 REVIEW

Key Terms

- Anatomic splint
- Contusion
- Dislocation
- Fracture
- Rigid splint
- Soft splint
- Splinting
- Sprain
- Strain

Key Points

- ✓ A strain is an overstretched or partially torn muscle.
- ✓ A contusion is a muscle bruise that results from a direct blow to the muscle.
- ✓ A muscle cramp is an uncontrolled muscle spasm.
- ✓ Use RICE to care for muscle injuries.
- ✓ Bones can be bruised or fractured. Fractures can be closed or open.
- ✓ Care for possible fractures and dislocations by stabilizing the injured area.
- ✓ Call 9-1-1 for serious conditions.

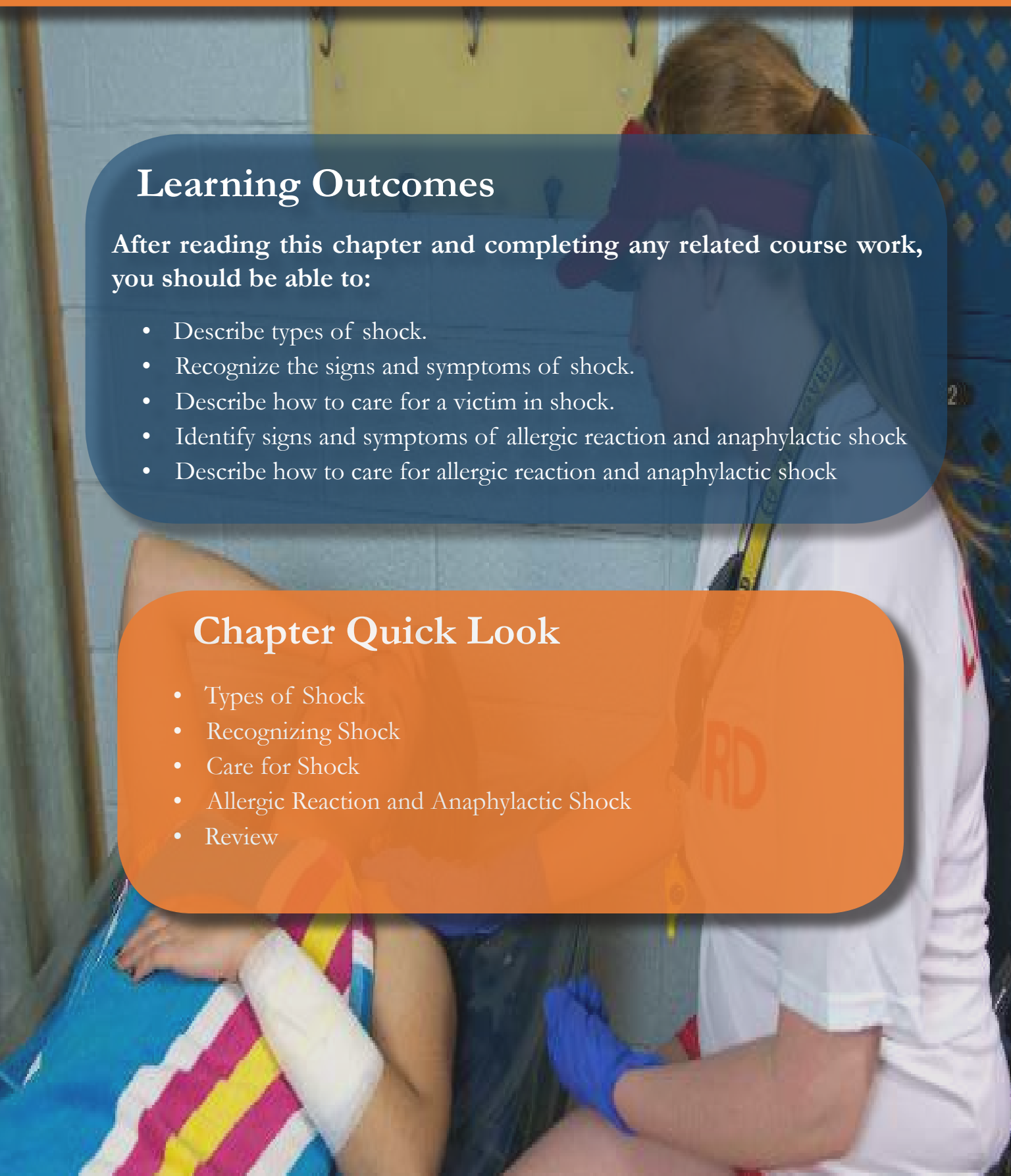
Check Your Progress

Now that you have read this chapter and completed any accompanying class activities, answer the following questions:

- ✓ Can you describe the signs and symptoms of muscle, bone, and joint injuries? (Pg 46, 47, 49)
- ✓ Can you differentiate between closed and open fractures? (Pg 46)
- ✓ How should you care for a victim with a muscle injury? (Pg 46)
- ✓ How should you care for a victim with a fracture or dislocation? (Pg 47, 48, 50)

Chapter 8

Shock



Learning Outcomes

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

- Describe types of shock.
- Recognize the signs and symptoms of shock.
- Describe how to care for a victim in shock.
- Identify signs and symptoms of allergic reaction and anaphylactic shock
- Describe how to care for allergic reaction and anaphylactic shock

Chapter Quick Look

- Types of Shock
- Recognizing Shock
- Care for Shock
- Allergic Reaction and Anaphylactic Shock
- Review

Types of 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. 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 diabetic emergency.
- *Neurogenic shock* – injury to the nervous system (spinal cord, brain)
- *Psychogenic shock* – Shock resulting from overwhelming emotional factors; fainting.
- *Septic shock* - An acute infection that overwhelms the body resulting in poisonous substances accumulating in the blood.

Recognizing Shock

The signs and symptoms of shock can vary somewhat based on the type of shock. In general the signs and symptoms can 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 8.1)**:

1. Position the victim on his or her back whenever possible. If breathing problems exist, the victim will likely need to be supported in a seated or slightly reclined position to make breathing easier.
2. Keep the victim warm.
3. Call 9-1-1.

Figure 8.1

General shock position.

Allergic Reaction and Anaphylactic Shock

Approximately 1 million people visit emergency departments each year as a result of severe allergic reactions. Most of these reactions affect teens and young adults. Food allergies are the most common cause of allergic reactions, affecting nearly 15 million people annually. Foods most commonly associated with severe allergic reactions include milk, eggs, nuts, soy, wheat, fish, and shellfish.

Antibodies are protective proteins produced by the immune system. An allergen is a type of antigen that produces an abnormally vigorous response from the immune system, causing it to fight off a perceived threat that would otherwise be harmless. While antibodies are doing their job to remove unwanted foreign substances, they also bind to specialized cells that release inflammatory chemicals that include **histamine.** This has several effects on the body associated with allergic reaction:

- Constriction (narrowing) of specialized smooth muscle, causing breathing difficulty.
- Dilation (widening) of 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.

The most serious form of allergic reaction is **anaphylactic shock,** also known as anaphylaxis. It can occur suddenly following exposure and be potentially life-threatening.

Causes of Allergic Reactions

There are many items that can cause allergic reactions. These include:

- Foods
- Insect bites and stings
- Medications such as antibiotics and pain medications
- Poisonous plants
- Latex
- Dyes used in medical procedures

Recognizing Allergic Reactions

The signs and symptoms 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 and symptoms disappear and return a few hours later. Not everyone affected by allergic reactions will experience the same thing, but common, less serious signs and symptoms include:

- Rash or hives **(Figure 8.2)**
- Itching (of any part of the body)
- Red, watery eyes
- Runny nose
- Sneezing

Figure 8.2

Hives associated with allergic reaction.

More serious signs and symptoms associated with anaphylaxis include:

- Difficulty breathing
- Difficulty swallowing
- Swelling (particularly of the face, throat, or tongue) **(Figure 8.3)**
- Rapid heart beat
- Dizziness
- Loss of consciousness

Figure 8.3

Swelling associated with anaphylaxis.

Care for Allergic Reaction

If the victim is experiencing a mild allergic reaction, consider the use of an antihistamine, such as diphenhydramine (e.g. Benadryl). To care for severe allergic reactions:

1. Have the victim rest in the most comfortable position for breathing. This is often a seated position.
2. Remove any tight clothing that would restrict breathing.
3. Call 9-1-1.
4. If the victim has a prescribed epinephrine auto injector, help with its use.

Epinephrine Auto Injectors

Figure 8.4

Twin pack of Epinephrine auto-injectors.

Epinephrine is a hormone that dilates bronchial tubes to make breathing easier. It also increases the heart rate and force of contraction of the heart to help maintain normal blood pressure. An **epinephrine auto-injector** is a prescribed medical device that that contains the proper amount of medication (epinephrine) for adults or children experiencing anaphylaxis. The medication is often available in a "twin pack" with two auto injectors **(Figure 8.4)**. This helps in the event that a second dose of the medication is needed if the serious signs and symptoms are not reduced by the first dose, or recur before EMS personnel arrive.

The auto-injector is a single dose, disposal unit that provides an intramuscular injection of epinephrine into the thigh. This injection will take a few minutes to begin to work, and will provide temporary relief for about 20 minutes, which is often enough time for EMS personnel to arrive.

Examine the medication prior to use:

- Those less than 66 lbs (29 kg), use the child dose (0.15 mg). Those more than 66 lbs use the adult dose (0.3 mg)
- Check the device to verify the expiration date is current and that the medication is clear, not discolored (brownish).

The auto-injector is spring-loaded and requires the injection to be pushed firmly into the outside of the thigh, and held in place for approximately 10 seconds. As the needle is withdrawn it is automatically covered to protect against an inadvertent needle stick from a used needle.

The most common side effects of epinephrine include increased heart rate, stronger or irregular heartbeat, sweating, nausea and vomiting, headache, and nervousness or anxiety. These side effects usually go away quickly.

Following its use, the auto-injector must be properly discarded according to applicable federal and state laws that include disposal in a properly marked "sharps" container. It can also be discarded by providing the used device to arriving EMS personnel, or taking the device to the hospital for proper disposal.

Follow these steps to administer epinephrine using an EpiPen auto injector:

1. Hold the device firmly so that your fingers are not near the needle end of the device.
2. Remove the safety cap
3. Place the victim in a seated or lying position and hold the knee firmly so that the leg does not move during injection.
4. 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.
5. Press the device firmly in place and hold for 10 seconds **(Figure 8.5).**
6. Massage the injected area for several seconds.

Figure 8.5

Inject the medication into the outer thigh.

Storing Epinephrine Auto-Injectors

Epinephrine auto-injectors should be stored at room temperature. They should not be refrigerated as this could cause the device to malfunction. They should not be exposed to extreme heat or direct sunlight, as these can shorten the life of the medication. To be effective, the solution in the auto-injector should be clear and colorless. If the solution is brown, do not use it. Replace the unit immediately.

FYI: Inhalers and Anaphylaxis

A person experiencing wheezing might benefit from the use of his or her medication inhaler. Wheezing often indicates constriction of the lower airways, commonly seen with asthma. But anaphylaxis is a systemic problem, not a local problem like asthma. Inhalers work locally and will have no effect on the systemic response. Since one of the most dangerous problems associated with anaphylaxis is constriction of the upper airway, an inhaler will not be useful to counteract this condition.

Chapter 8 REVIEW

Key Terms

- Anaphylactic shock
- Epinephrine auto-injector
- Histamine
- Shock

Key Points

- ✓ Shock is a medical emergency in which the organs and tissues of the body are not receiving an adequate flow of blood.
- ✓ There are several different types of shock.
- ✓ Signs and symptoms of shock include altered consciousness, anxiety, restlessness, pale, cool, moist skin.
- ✓ Care for shock by placing the victim on his or her back whenever possible, and keeping the victim warm.
- ✓ Anaphylactic shock is a life threatening form of allergic reaction.
- ✓ Signs and symptoms of anaphylactic shock include difficulty breathing, swallowing, swelling, especially of the airway, and dizziness.
- ✓ Epinephrine is a hormone that can be provided through an auto-injector to a victim who has the prescribed medication available and may need assistance in its delivery.

Check Your Progress

Now that you have read this chapter and completed any accompanying class activities, answer the following questions:

- ✓ Can you describe several types of shock ? (Pg 53)
- ✓ What are the signs and symptoms of shock? (Pg 53)
- ✓ How should you care for a victim experiencing shock? (Pg 54)
- ✓ What are the signs and symptoms of allergic reaction? (Pg 54)
- ✓ How should you care for allergic reactions? (Pg 56)
- ✓ How do you administer an epinephrine auto injector? (Pg 56-57)

Chapter 9

Medical Emergencies

Learning Outcomes

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

- Recognize the signs of symptoms associated with medical emergencies including breathing problems, chest discomfort, diabetic conditions, fainting, pregnancy complications, seizure, and stroke.
- Describe how to care for medical emergencies that include breathing problems, chest discomfort, diabetic conditions, fainting, pregnancy complications, seizure, and stroke.

Chapter Quick Look

- Medical Emergencies
- Breathing Problems
- Chest Discomfort
- Diabetic Conditions
- Fainting
- Pregnancy Complications
- Seizure
- Stroke
- Review

Medical Emergencies

Medical emergencies can include numerous problems including heart attack, stroke, fainting, seizures, diabetic conditions, asthma attacks, and allergic reactions. Knowing how to recognize these conditions and respond appropriately can save a life.

Breathing Problems

A person can experience breathing problems for a variety of reasons, including respiratory infections, chest or head injury, heart attack, or asthma

Recognizing Breathing Problems

The signs and symptoms of breathing problems 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

Care for Breathing Problems

To care for breathing problems:

1. Help the victim move into an upright or slightly bent-forward position.
2. Assist the victim with any prescribed inhaler for the condition **(Figure 9.1)**.
3. Call 9-1-1 if the condition does not improve in a few minutes after using the inhaler.If the condition involves a victim hyperventilating as a result of anxiety, attempt to calm the victim. Have the victim hold his or her breath for several seconds and exhale slowly.

Figure 9.1

Victims experiencing difficulty breathing may have an inhaler for use.

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 and symptoms 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.

Using an Metered Dose Inhaler

Follow these steps to help an asthmatic use his or her metered dose inhaler:

1. Shake the inhaler and remove the cap.
2. Have the victim exhale forcefully.
3. Have the victim place the inhaler to his or her mouth and start to breathe in slowly.
4. Depress the button and breathe in deeply.
5. Remove the inhaler and have the victim hold his or her breath for about 10 seconds, then exhale.
6. Wait about 30 seconds and repeat steps 2-5 if needed.

Chest Discomfort

Chest discomfort (e.g. pain or pressure) can occur for several reasons, including injury or infection. Overexertion can result in injury such as muscle strains involving muscles of the chest that aid breathing. Respiratory infections such as pneumonia, bronchitis, or pleurisy can also result in chest discomfort.

The most significant cause of chest discomfort is a **heart attack.** A heart attack occurs when blood flow to a part of the heart is disrupted due to a blocked artery in the heart. This discomfort is often persistent, not relieved by rest, and may spread to the shoulders, neck, jaw, or arms. Chest discomfort is often accompanied by other signs and symptoms, including **(Figure 9.2)**:

Figure 9.2

Chest discomfort is a frequent symptom of heart attack.

- Breathing difficulty
- Sweating
- Nausea, or vomiting
- Dizziness
- Fatigue

To care for a possible heart attack:

1. Call 9-1-1.
2. Help the victim to rest in the most comfortable position.
3. If the victim has prescribed heart medication, such as nitroglycerin, assist with its use.
4. Provide one regular aspirin or 2 low dose aspirins if available, and if the victim is not allergic to aspirin and is not taking a blood thinner.

Diabetic Conditions

Diabetes a disease in which the body's inability to produce any or enough 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 and symptoms of hypoglycemia often develop rapidly. A hypoglycemic victim 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.

Signs and symptoms of diabetic conditions include:

- Diminished level of consciousness
- Weakness
- Hunger or thirst
- Vision difficulty
- Breathing difficulty
- Frequent urination
- Distinct fruity breath odor

If you are caring for a responsive diabetic, and you are not sure if the victim is hypoglycemic or hyperglycemic, give sugar. Glucose tablets or gel are often used by diabetics for such an emergency **(Figure 9.3)**. Other items, such as a can of fruit juice, soda, packets of sugar, or sugar candy can also be used.

Figure 9.3

Glucose tablets and gel provide the quick sugar diabetics need if they are hypoglycemic.

If hypoglycemia is present, and you have given sugar, the victim's condition often improves in a few minutes. In cases of hyperglycemia, the victim's condition will remain unchanged and the extra sugar will not be harmful. Call 9-1-1 for any unresponsive victim, or for any victim whose condition does not rapidly improve.

Fainting

Fainting (syncope / passing out) is a type of shock associated with a sudden, temporary loss of consciousness the result of reduced blood flow and oxygen to the brain. Victims may have early warning signs or symptoms of an impending. Victims who faint often regain consciousness quickly after lying in a horizontal position, 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

To care for fainting:

1. Position the victim on his or her back on a flat surface and maintain normal body temperature.
2. Check responsiveness and breathing.
3. Check for any signs of injury if the victim fell when fainting.
4. If the victim vomits, roll the victim into the recovery position to keep the airway clear.
5. Loosen any restrictive clothing.
6. Call 9-1-1 if the if the victim does not quickly regain consciousness, has repeat fainting episodes, or if the victim fainted for no apparent reason.

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 immediate medical care include victims experiencing:

- Severe abdominal pain / 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 help. For vaginal bleeding or severe abdominal pain or cramps, place the victim on her left side. If vaginal bleeding is present, have the victim 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 victim to the hospital for further evaluation.

Seizure

A **Seizure** is uncontrolled electrical activity in the brain, which may produce a convulsion (shaking), muscle rigidity, altered levels of consciousness, or thought disturbances. The type of seizure and the signs and symptoms that are exhibited depend on where the abnormal electrical activity takes place in the brain, its cause, and factors such as a victim's general state of health.

A seizure can be caused by head injury, brain tumor, hypoglycemia, drug overdose, poisoning, infectious illnesses, and fever.

To care for seizures:

1. Protect the victim from injury. Move any items away that might cause injury, such as sharp objects.
2. Roll the victim onto one side (recovery position) to help keep the airway clear **(Figure 9.4).**
3. Protect the head from injury if convulsions are present by placing a soft object, such as a folded towel, under the victim's head.
4. Call 9-1-1.

Figure 9.4

Place a seizure victim on her side.

Stroke

A **stroke** occurs when blood flow to a part of the brain is disrupted due to blocked or ruptured arteries in the brain. Symptoms 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 mnemonic to recognize and care for stroke:

- F = Facial droop
- A = Arm weakness
- S = Speech difficulty
- T = Time of onset

To care for a victim with a possible stroke:

1. Call 9-1-1.
2. Have the victim rest in the most comfortable position. This is often lying on the back with head and shoulders elevated.
3. If vomiting occurs, roll the victim onto his or her side (recovery position) to keep the airway clear.

Chapter 9 REVIEW

Key Terms

- Asthma
- Fainting
- Heart attack
- Hyperglycemia
- Hypoglycemia
- Seizure
- Stroke

Key Points

- ✓ Chest discomfort can be caused by several conditions, the most significant of which is heart attack.
- ✓ The signs and symptoms of breathing problems include breathing that is excessively fast, slow, or noisy.
- ✓ Care for an asthma attack by having the victim use his or her inhaler whenever available.
- ✓ There are two types of diabetic emergencies: hypoglycemia (low blood sugar), and hyperglycemia (high blood sugar).
- ✓ Care for diabetic conditions by providing sugar and calling 9-1-1 if the victim's condition does not improve in a few minutes.
- ✓ Fainting is a form of shock associated with a sudden, temporary loss of consciousness the result of reduced blood flow and oxygen to the brain.
- ✓ There are several causes of fainting, but the care is the same. Position the victim on his or her back, and call 9-1-1 if the condition does now quickly resolve itself.
- ✓ Some signs and symptoms during pregnancy are expected, but others require medical care such as abdominal pain and heavy vaginal bleeding.
- ✓ There are different types and causes of seizures, but the care is same. Keep the victim 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 victim rest in the most comfortable position.

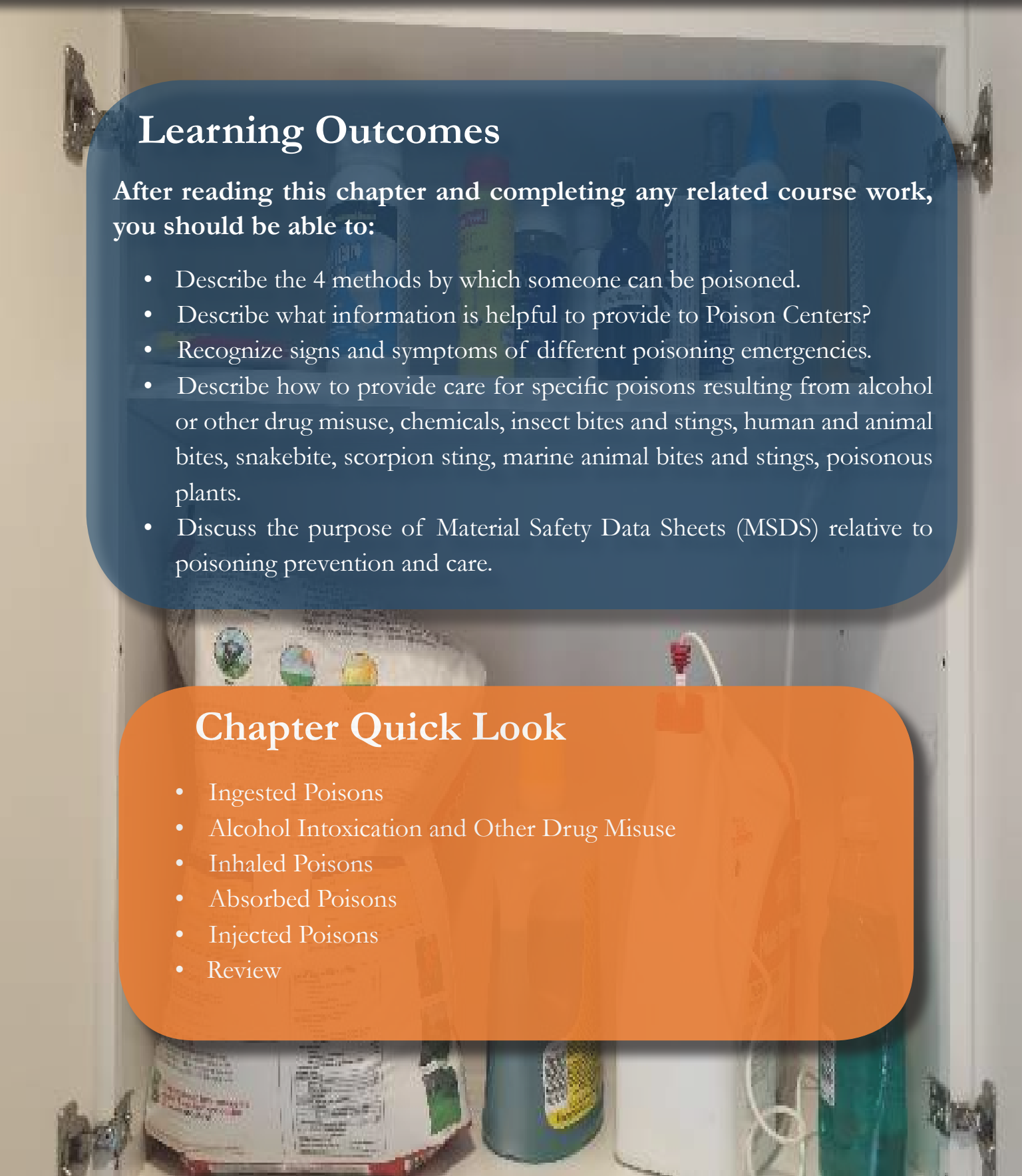
Check Your Progress

Now that you have read this chapter and completed any accompanying class activities, answer the following questions:

- ✓ Can you describe causes of chest discomfort? (Pg 64)
- ✓ How would you care for a victim having a heart attack? (Pg 64)
- ✓ What are the signs and symptoms of breathing problems? (Pg 62)
- ✓ How should you care for a victim having difficulty breathing? (Pg 62)
- ✓ What are the two diabetic conditions and how do you provide care for these? (Pg 65)
- ✓ What signs and symptoms suggest pregnancy complications that require immediate medical care? (Pg 66-67)
- ✓ How would you care for a victim experiencing a seizure? (Pg 67)
- ✓ What are the signs and symptoms of a stroke? (Pg 68)
- ✓ How should you care for a stroke victim? (Pg 68)

Chapter 10

Poisoning



Learning Outcomes

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

- Describe the 4 methods by which someone can be poisoned.
- Describe what information is helpful to provide to Poison Centers?
- Recognize signs and symptoms of different poisoning emergencies.
- Describe how to provide care for specific poisons resulting from alcohol or other drug misuse, chemicals, insect bites and stings, human and animal bites, snakebite, scorpion sting, marine animal bites and stings, poisonous plants.
- Discuss the purpose of Material Safety Data Sheets (MSDS) relative to poisoning prevention and care.

Chapter Quick Look

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. The vast majority of poisoning incidents involve children under 5 years of age. Childhood poisonings are often linked to an inability to read warning labels, curiosity, inadequate supervision, and a desire to imitate adults. The effects of poisons vary. Poisons 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 centers** in United States in their efforts to prevent and care for poisoning incidents, and helps 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 victim 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 victim exposed to?
- How much poison was the victim exposed to?
- In what manner was the victim poisoned?
- What is the age and approximate weight of the victim?
- What care has been provided?

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 dishwashing liquids and drain openers
- Personal care products such as hand sanitizer, shampoo, and nail polish
- Laundry detergents
- Pesticides

- Plants
- Alcohol and other drugs

Recognizing Ingested Poisons

The signs and symptoms of ingested poisons can include:

- Nausea and vomiting
- Abdominal cramps and pain
- Burns of the moth, lips, tongue, and throat
- Diminished consciousness
- Seizures

Care for Ingested Poisons

For responsive victims without breathing problems, call the Poison Help line and follow their advice. This might include diluting the ingested poison with milk or water, or inducing vomiting. This may also involve providing **activated charcoal**, a substance available at local pharmacies without prescription.**(Figure 10.1)**. Activated Charcoal is effective if used early to absorb ingested poisons in the stomach before they can begin being absorbed in the digestive system. But it does not absorb all substances. Acids, alkalis, alcohol, and gasoline are examples of some products for which different care is needed.

Call 9-1-1 if the victim is unresponsive or having difficulty breathing.

Figure 10.1

use activated charcoal if advised by a poison center.

Alcohol Intoxication and Other Drug Misuse

Alcohol is the most commonly abused drug in the United States. Binge drinking is a common cause of alcohol poisoning. There are about 50,000 cases of alcohol poisoning each year in the United States, with one death each week. 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. Alcohol depresses the nervous system

The signs and symptoms of alcohol intoxication include:

- the odor of alcohol
- Slurred / slow / incomprehensible speech
- Confusion
- Dizziness / loss of consciousness
- Slowed actions
- Staggering gait / collapsing
- Nausea or vomiting

To care for alcohol intoxication in a responsive, breathing victim, call the Poison Help line for advice. If the victim is preparing to sleep, have the victim sleep on his or her side, and stay with the victim. If the victim becomes hostile and cannot be easily controlled, leave the victim and call 9-1-1. If the victim is unresponsive, place the victim in the recovery position and call 9-1-1. If unresponsive and not breathing, start CPR.

Opioid Painkillers

Opioid substances include powerful 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.

It is estimated that more than 2 million people in the United States suffer from substance use disorders related to prescription opioid pain relievers. To counteract this epidemic involving legal and illegal use of opioids, the American Medical Association and the American Heart Association, have endorsed public efforts to provide education to prevent overdoses, and to train anyone in the use of the medication **naloxone** to reverse opioid overdose. The medication can be given through an auto-injector similar to the one used to deliver epinephrine for anaphylaxis, or through a nasal spray device. Statewide laws are being enacted to make this medication available without prescription.

Inhaled Poisons

People can be poisoned by fumes they inhale. 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

Recognizing Inhaled Poisons

The signs and symptoms associated with inhaled poisons include:

- Headache
- Dizziness
- Altered consciousness
- Breathing difficulty

Care for Inhaled Poisons

To care for a victim who has inhaled a poison, get the victim out of any toxic environment if it is safe for you to enter. Check responsiveness and breathing. Provide CPR if the victim is unresponsive and not breathing normally. Call 9-1-1.

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 10.2)**. The allergic reaction is caused from the oily resin called urushiol, This oil is in the leaves, stems and roots of poison ivy, poison oak and poison sumac. The reaction usually develops 12 to 48 hours after exposure and lasts two to three weeks. The severity of the rash depends on the amount of urushiol that gets on the skin.

Figure 10.2

Poison Ivy.

Recognizing Plant Poisoning

The signs and symptoms of plant poisoning include:

- **Dermatitis** (swollen red skin with an itchy rash) **(Figure 10.3)**
- Blisters
- Difficulty breathing, if the smoke from burning poison ivy has been inhaled

Figure 10.3

Dermatitis associated with plant poisoning.

Care for Plant Poisons

Follow these steps to care for plant poisoning:

1. Upon initial contact with the plant:
   - Wash the affected area thoroughly with soap and water.
   - Apply a commercial product such as Technu®, Cortaid®, or Zanfel®.
2. If the dermatitis is already present:
   - Apply a corticosteroid cream, calamine lotion, or commercial product such as Zanfel.
   - Use oral antihistamines, such as diphenhydramine (Benadryl)
   - Soak in a cool-water bath containing an oatmeal-based bath product (Aveeno).
   - Place cool, wet compresses on the affected area for 15 to 30 minutes several times a day.
3. Seek medical care if:
   - The dermatitis is widespread, affects areas such as face, neck, or genitals, or appears to be infected.
   - Corticosteroids such as prednisone, and/or antibiotics may be prescribed to reduce the swelling and irritation.

Chemical Poisons and Material Safety Data Sheets (MSDS)

Employers are required by law to maintain a copy of Material Safety Data Sheets (MSDS) 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 disseminated to employees along with training on handling the chemicals, and proper chemical safety labeling. MSDSs contain helpful information about product identification, accidental release response measures, exposure control and personal protection, and poisoning treatment.

Injected Poisons

Injected poisons can result from a toxic substance in a hypodermic needle, but more commonly occur as a result of bites or stings from:

- Insects
- Spiders
- Ticks
- Marine life
- Snakes
- Animals
- Humans

Insect Bites and Stings

Insects that bite or sting include bees, wasps, hornets, yellow jackets, mosquitos, and fire ants **(Figure 10.4)**. Bees are the only stinging insects that leave behind part of their bodies, the venom sack, when they sting. Spiders and ticks also bite. Most of these bites or stings occur outdoors during warm months.

Figure 10.4

Swelling from a honey bee sting.

To care for insect bites and stings:

1. For a bee sting, remove the stinger as quickly as possible. This can be done with a fingernail or the edge of a card, such as a credit card or driver's license, to scrape the stinger out. Tweezers can also be used, but they are often not immediately available, and the longer the stinger remains in contact with the victim, the greater the potential for more venom.
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. Topical hydrocortisone cream applied to the skin, or an oral antihistamine, such as Benadryl, can be used to help relieve itching and swelling.
6. Monitor the victim for signs of any severe allergic reaction.
7. Call 9-1-1 at the first sign of anaphylaxis, and assist the victim with his or her prescribed epinephrine auto injector if available.

Spider Bites

There are many different types of spiders, and they all bite. Many spider fangs are too small to penetrate human skin, or their venom is not potent enough to cause harm. Two spiders of concern in the United States are the black widow and the brown spiders, such as the brown recluse **(Figure 10.5)**.

Figure 10.5

Dangerous spiders include the black widow and brown recluse.

A victim of a black widow spider bite may feel a pinprick at the time of the bite. Shortly after the victim 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 within an hour, as well as fever, chills, headache, dizziness, and nausea.

A victim of a brown recluse spider bite is unlikely to feel the initial bite. But 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 properly heal.

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 or go to your local hospital emergency department promptly.

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. To care for an embedded tick:

1. Using tweezers, grasp the tick as close to the skin as possible. 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. Hydrocortisone cream can be applied to aid with any itching.
5. Advise the victim to be alert to any rashes, flulike symptoms, or joint discomfort over the next 30 days **(Figure 10.6)**. If these or other signs and symptoms are present, seek medical care. Antibiotics are prescribed for tick diseases.

Figure 10.6

Rash associated with tick disease.

Scorpion Stings

Scorpions are closely related to spiders and ticks. Though they have pincers, the tail contains the stinger that injects a toxin to the victim. Though most scorpions are harmless, the bark scorpion found in the southwestern United States is dangerous. Like insects, spiders, and ticks, contact with scorpions is usually accidental. Scorpion stings are painful, and can occasionally be fatal, particularly to children. To care for a scorpion sting, wash the site with soap and water, apply a cold pack, and seek medical care.

Human Bites

Human bite wounds may not seem dangerous, but they may be more dangerous than most animal bites due to the high levels of bacteria and different types of viruses contained in human mouths. A minor wound from a human bite can become a severe infection that is hard to treat, and can result in serious complications. Bites are very common among young children who bite to express anger or other negative feelings.

To care for human bites:

1. If the area is NOT bleeding severely, wash the wound with soap and water and cover the bite 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. Antibiotics may be prescribed to prevent infection.

Animal Bites

Animal bites can be serious wounds requiring EMS and hospital care. Most animal bites are from domestic dogs and cats. Dog bites typically cause a crushing-type wound because of their rounded teeth and strong jaws **(Figure 10.7).** This may damage deeper structures such as muscles, tendons, ligaments and bones. Cats have sharp pointed teeth that often cause puncture wounds that may inject bacteria into deeper tissue. Because of this, infections caused by cat bites generally develop faster than those of dogs.

Figure 10.7

Dogs and cats account for most animal bites.

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 rare, with 3 or fewer cases reported annually. In unvaccinated humans, rabies is almost always fatal after serious signs and symptoms have developed. Vaccination after exposure is

highly successful in preventing the disease if administered within a few days of infection. Care for animal bites in the same manner as human bites. Seek medical care for any serious animal bites. Report bites to local law enforcement personnel.

Marine Animal Bites, Stings, and Punctures

Marine animals can result in sting, bite, and puncture injuries. Jellyfish and Portuguese man-of-wars account for the greatest number of injuries each year. Sea slugs, known as blue dragons, were once thought to only be found in the temperate climates in the Southern Pacific Ocean. These small creatures feed on Portuguese man-of-wars, and have are now known to inhabit Florida coastal waters. The signs and symptoms of these stinging marine animals include redness, swelling, 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 victims accidently 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 victims. To care for injuries cause by stingrays, immediately immerse the injured part in hot water to neutralize the venom. Flush the injured area to help remove any debris and toxin. The wound of a stingray can become infected and should be cleaned thoroughly. Pieces of barb that are embedded in the skin must be removed completely. The wound may also need sutures. Seek medical care.

Injuries from marine animals such as sharks, barracudas, and eels are rare, but when they occur the bite can cause a tear or puncture. Control bleeding, care for shock, and call 9-1-1.

Snakebites

There are 4 venomous snakes in the United States **(Figure 10.8)**:

- 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

Figure 10.8

Rattlesnakes account for the most snakebites in the USA.

seeking system. They inject their venom through two fangs. The coral snake is not a pit viper and does not have large fangs. Each year, approximately 8,000 venomous snakebites occur in the United States. The bite of these snakes can cause severe burning pain and swelling, with later discoloration and blood-filled blisters. Fangs from the pit vipers can create deep puncture wounds. Deaths are very rare from these snakebites.

To care for these venomous snakebites:

1. Get the victim away from the snake. Do not try to capture or kill the snake.
2. Limit movement of the victim
3. Wash the wound
4. Splint any bitten limb
5. Applying an elastic bandage over the affected limb may help slow the spread of the venom.
6. Call 9-1-1

Chapter 10 REVIEW

Key Terms

- Activated charcoal
- Dermatitis
- Material Safety Data Sheets (MSDS)
- Naloxone
- Poison Centers
- Poisoning
- Rabies

Key Points

- ✓ Poisoning occurs when any substance interferes with normal body functions after it enters the body.
- ✓ A poison can be ingested, inhaled, injected, or absorbed.
- ✓ Poison centers provide advice for poisoning emergencies through a Poison Help line at 800-222-1222.
- ✓ Care for ingested poisons can include diluting the poison, inducing vomiting, or absorbing the poison through the use of activated charcoal.
- ✓ Care for bee stings by quickly removing any stinger, cleaning the area, and watching for later signs of tick disease that require medical care.
- ✓ Care for ticks by carefully removing the entire tick, cleaning the affected area, reducing swelling, pain, and itching, and watching for signs of anaphylaxis.
- ✓ Care for black widow or brown recluse spiders by cleaning the affected area, reducing swelling, and seeking medical care.
- ✓ Human bites have a potential to become infected
- ✓ Report animal bites and seek immediate medical care for serious bites or animals that could be rabid.
- ✓ Clean any snakebite, limit movement, and call 9-1-1.

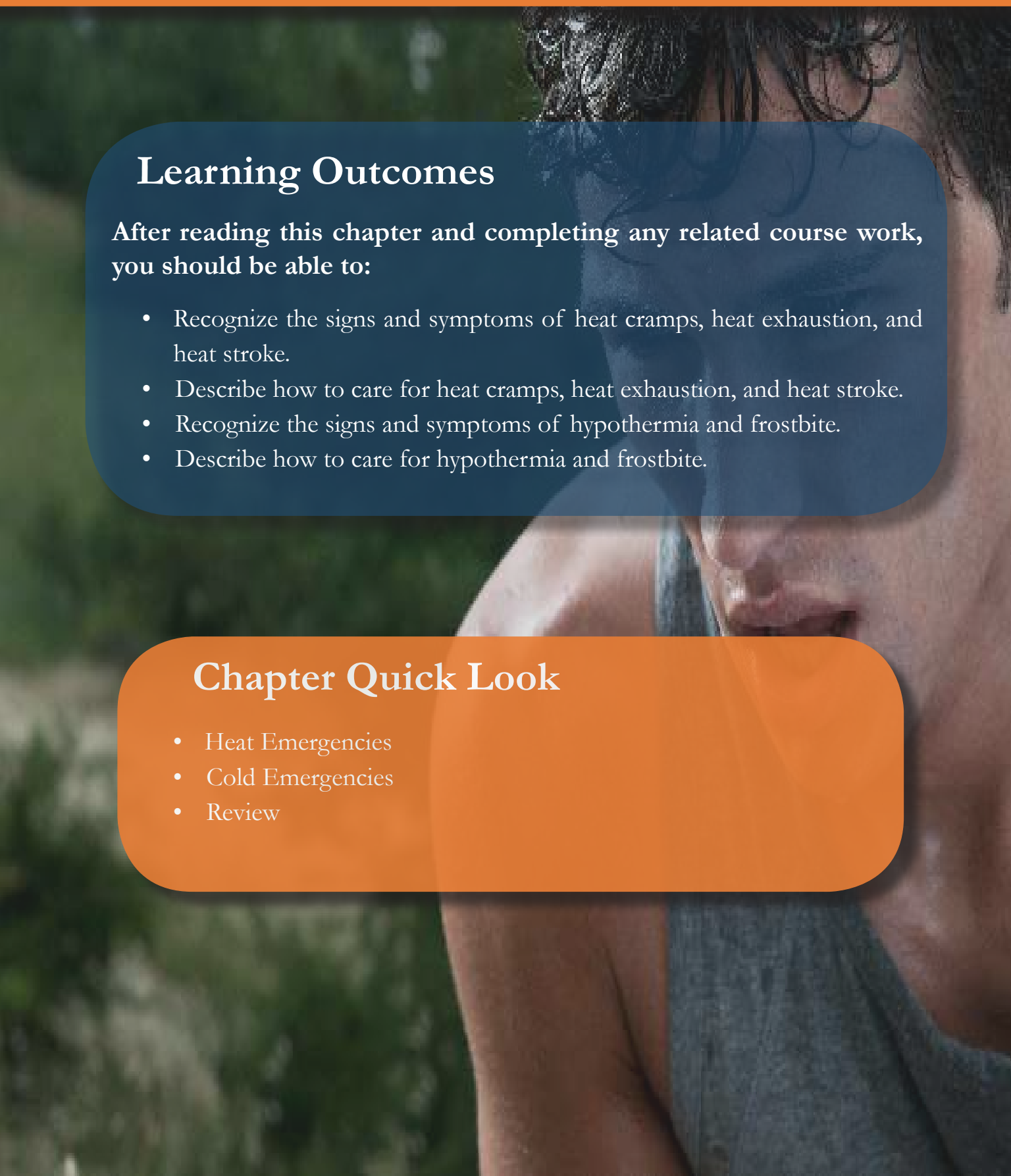
Check Your Progress

Now that you have read this chapter and completed any accompanying class activities, answer the following questions:

- ✓ Can you describe the 4 ways a person can become poisoned? (Pg 72)
- ✓ What information is helpful to provide to Poison Centers? (Pg 72)
- ✓ What are the signs and symptoms of ingested poisons? (Pg 73)
- ✓ What are the signs and symptoms of inhaled poisons? (Pg 75)
- ✓ Can you discuss the purpose of Material Safety Data Sheets (MSDS)? (Pg 77)
- ✓ How would you provide care for exposure to poisonous plants? (Pg 76)
- ✓ Can you describe the care for injected poisons including insect bites and stings, human and animal bites, scorpion sting, marine animal bites and stings, and snakebite? (Pg 78-82)

Chapter 11

Temperature Extremes



Learning Outcomes

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

- Recognize the signs and symptoms of heat cramps, heat exhaustion, and heat stroke.
- Describe how to care for heat cramps, heat exhaustion, and heat stroke.
- Recognize the signs and symptoms of hypothermia and frostbite.
- Describe how to care for hypothermia and frostbite.

Chapter Quick Look

- Heat Emergencies
- Cold Emergencies
- Review

Heat Emergencies

Physical activity in a hot environment can lead to three heat emergencies:

- Heat cramps
- Heat exhaustion
- Heat stroke

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 **(Figure 11.1)**.

To care for heat cramps, have the victim stop any strenuous activity and stretch the affected muscle. Provide water or an electrolyte drink.

Figure 11.1

Heat cramps can be relieved by stretching the affected muscle.

Heat Exhaustion

Heavy sweating results in a loss of salt and water that can lead to heat exhaustion. **Heat exhaustion** is a warning that the body is getting too warm and its' ability to cool itself is starting to fail.

The signs and symptoms of heat exhaustion include:

- Heavy sweating
- Fatigue
- Thirst
- Weakness
- Dizziness
- Nausea and vomiting
- Headache

Care for heat exhaustion is aimed at cooling the body and replacing lost water and electrolytes **(Figure 11.2)**. Follow these steps:

1. Have the victim rest in a cool environment
2. Provide water or commercial sports drink if the victim is not nauseated
3. Cool the victim by spraying with water or applying water soaked towels.
4. Call 9-1-1 if the victim's condition does not improve

Figure 11.2

Cool a victim suffering from heat exhaustion.

Heatstroke

Heatstroke occurs when the sweat mechanism of the body fails and the body becomes dangerously overheated. Heatstroke can occur quickly to someone working in a hot environment in heavy clothing, such as a firefighter. But it can also build up over days, 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 victim by any means possible. This can include immersing the victim up to the neck in cold water, such as in a bathtub or pool; or applying cold packs to large blood vessels located at the sides of neck, armpits, and groin.
2. Call 9-1-1

3. If the victim is unresponsive and not breathing (or only occasionally gasping),begin CPR.

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.

Hypothermia

Hypothermia is a condition of abnormally low body temperature. It occurs when the body loses heat faster than it can be produced, thereby using up the body's stored energy. Body temperature that is too low affects the brain, causing confusion and slowing movement.

The signs and symptoms of hypothermia include:

- Shivering
- Confusion
- Drowsiness
- Exhaustion
- Cold skin, even under clothing

To care for hypothermia:

- Warm the victim gradually, replacing any wet, cold clothing with dry clothing and insulation, such as a blanket **(Figure 11.3)**.
- If the victim is alert, provide a sugary, non-caffeinated, non-alcoholic beverage to help increase the body temperature. Hot chocolate is fine, but mostly because of the sugar content, not the warmth of the beverage.
- Call 9-1-1 if the victim's condition does not improve.

Figure 11.3

Gradually rewarm a hypothermic victim.

Frostbite

Frostbite occurs when skin 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 **(Figure 11.4)**.

Figure 11.4

Frostbite.

The signs and symptoms of frostbite include:

- Skin appears white, gray, and waxy
- Affected part is cold, painful, or becomes numb

To care for frostbite:

1. Get the victim out of the cold
2. Remove any cold or wet clothing, as well as any jewelry from the affected part, such as the hand.
3. Call 9-1-1. Frostbitten parts are best cared for when rewarmed under a controlled environment in a hospital
4. If the victim is more than 1 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 to help with the pain and swelling, such as ibuprofen.

Chapter 11 REVIEW

Key Terms

- Frostbite
- Heat cramps
- Heat exhaustion
- Heatstroke
- Hypothermia

Key Points

- ✓ Heat cramps are muscle cramps, often in legs, that can be cared for by stretching the affected area.
- ✓ Heat exhaustion and heat stroke are emergencies in which the body is becoming overwhelmed by the heat. Cool the victim and provide cool water and an electrolyte drink. Call 9-1-1 if the condition does not resolve shortly.
- ✓ Hypothermia is general cooling of the body that can be cared for by getting the victim out of the cold and into warm, dry clothing, and providing sugary beverages.
- ✓ Frostbite is the freezing of the skin and the water in the cells. Care for frostbite in a hospital whenever possible.

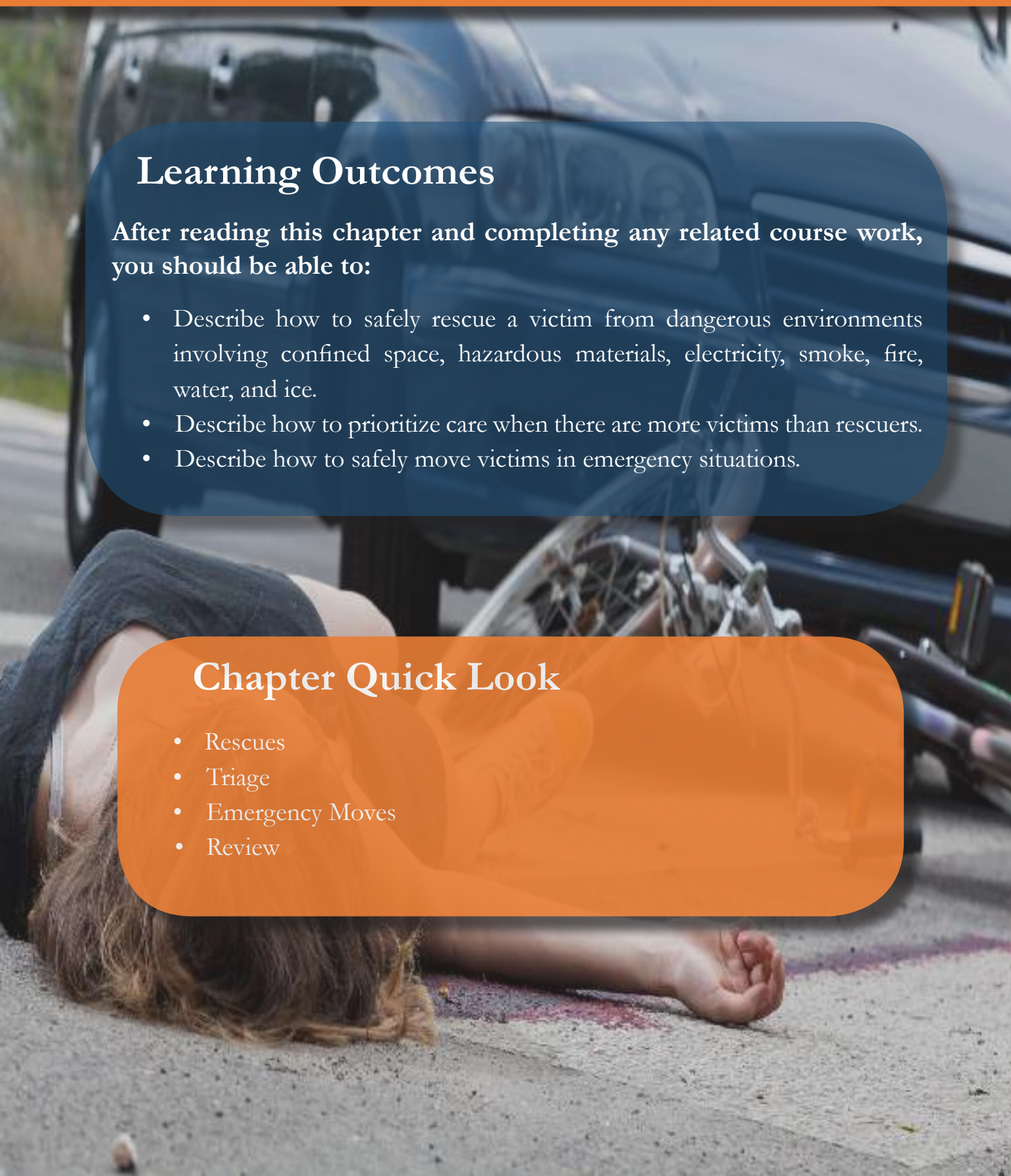
Check Your Progress

Now that you have read this chapter and completed any accompanying class activities, answer the following questions:

- ✓ Can you describe the 3 types of heat emergencies ? (Pg 86-87)
- ✓ Can you describe the 2 types of cold emergencies? (Pg 88-89)
- ✓ What are the signs and symptoms of heat exhaustion and heat stroke? (Pg 86-87)
- ✓ How should you care for a victim experiencing any of the three types of heat emergencies? (Pg 86-88)
- ✓ How would you differentiate hypothermia from frostbite? (Pg 88-89)
- ✓ How do you care for hypothermia? (Pg 88)
- ✓ How do you care for frostbite? (Pg 89)

Chapter 12

Rescue, Triage, and Emergency Moves



Learning Outcomes

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

- Describe how to safely rescue a victim from dangerous environments involving confined space, hazardous materials, electricity, smoke, fire, water, and ice.
- Describe how to prioritize care when there are more victims than rescuers.
- Describe how to safely move victims in emergency situations.

Chapter Quick Look

- Rescues
- Triage
- Emergency Moves
- Review

Rescues

There may be a time when a victim needs your help, but the location of the victim poses a potential for danger. Examples of these types of situations include confined space, hazardous materials motor vehicle collision, water, ice, and electrical dangers. Regardless of the situation, follow these general safety guidelines:

- Do not put yourself at risk trying to rescue a victim. This could further complicate the rescue if you also become part of the problem.
- Do not attempt any rescue technique for which you have not been trained. Professional rescue personnel take specialized courses to prepare for dangerous situations.
- Try to make the surrounding area safe for others. This could include establishing a safe zone far enough away from the area where the victim is located. Hazardous materials, structure collapse, and sinkholes are examples of dangerous areas that require distance away from the victim.

Confined Space

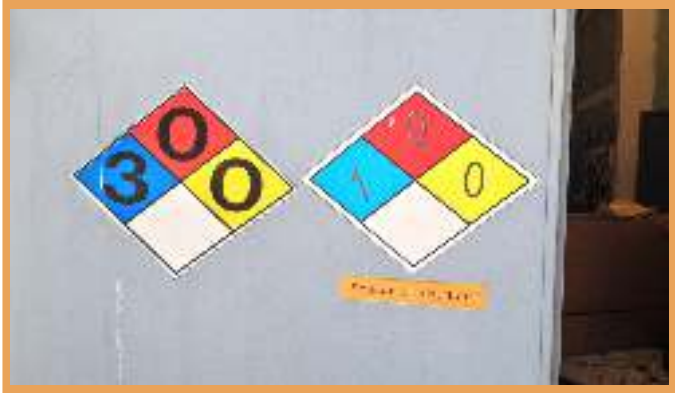
A **confined space** is an area that has restricted openings and an atmosphere that may be dangerous to those who enter. Examples of confined spaces include wells, mines, caves, manholes, storage tanks and farm silos. If someone is in trouble within a confined space:

1. Call 9-1-1
2. Enter the area only if you have the proper respiratory protective equipment and the training to do so safely.
3. Remove the victim from the area and provide care whenever it is safe to do so.

Hazardous Materials

Hazardous materials include those that are flammable, explosive, corrosive, radioactive, and biological **(Figure 12.1)**. Chemicals can be hazardous to humans or the environment if used or released improperly. When released, they can have toxic vapors and unusual odors. Remain at a distance approximately half a mile away, and upwind from any hazardous materials

Figure 12.1



Hazardous materials warning signs.

incident. Attempt to keep others away from the danger as well. Call 9-1-1. Only specially trained rescuers, with the proper protective equipment, should enter an area where hazardous materials have been released.

Electricity

Electricity enters a victim's body at the point of contact, travels along blood vessels and nerves, and generating heat that can damage any organs along the path. The electrical entry wound is often smaller than the exit wound.

Before making contact with an electrocuted victim, make sure that the area is not still energized. Unplug, disconnect, or shut off any power to the area. If you are unable or uncertain of how to make the area safe, stay a t a safe distance, call 9-1-1, and wait for trained professionals with the proper equipment to arrive.

Smoke and Fire

Remember the old saying "Where there is smoke, there is fire." It means that if something looks wrong then it probably is wrong – just like if you see smoke then there probably is fire nearby. If you encounter smoke or fire in a structure, shout to notify others and exit quickly through the closest door or window that will provide safety. Call 9-1-1. If the fire is small and you have a fire extinguisher available, aim at the base of the flames and expel the contents of the extinguisher in a sweeping motion **(Figure 12.2).**

Figure 12.2

Point the nozzle of the fire extinguisher at the base of the fire.

Water and Ice

Water and ice both pose dangerous threats to rescuer safety. Make sure 9-1-1 has been called, and follow these simple 4 steps to safe around water and ice, "Reach, throw, row, go," in that order of preference:

- *Reach* - If the victim is within reach, and you can be sure that you will not be pulled into the water, extend an object, such as your arm, towel, branch, or pole.
- *Throw* - If the victim is beyond easy reach, throw a floatable object, or attach an object to a rope and toss this to the victim **(Figure 12.3)**.
- *Row* – If the victim is beyond throwing distance, consider reaching the victim with a device such as a surfboard, boogie board, canoe, paddleboat, kayak.
- *Go* –Enter the water and swim to the victim only as a last resort, and only if you are a strong swimmer and trained in lifeguarding.

Figure 12.3

Extend or throw an object to a victim in the water.

Motor Vehicle Crash

If you are preparing to help a victim of a crash, make sure 9-1-1 has been called and then follow these steps:

- If you are in a vehicle, park your vehicle well off the roadway, with your hazard flashers on to help alert oncoming traffic of a problem.
- Do not attempt to enter an unstable car or truck to check on victims. A vehicle on its side or on an embankment needs to be stabilized before safe entry can occur.
- Turn off the ignition of the damaged vehicle if not already done.
- Place roadside reflectors or flares at least 250 feet from the crash site. Do not ignite flares around leaking fuel.
- Assess the victim(s) and provide care until EMS personnel arrive. Only attempt to remove a victim from a vehicle if there is an immediate life threat, such as a vehicle fire, or if the victim is unresponsive and not breathing (or only gasping occasionally) and needs CPR.

Triage

Triage means to separate, sift or select. In emergency situations, it is the process of determining the care priority of a victim based on the severity of the condition. Triage is needed when resources, such as rescuers, are insufficient for all victims to be cared for immediately. In a situation where the victims are many and the rescuers are few, triage must be used to determine the order and priority of care. This is different from the normal process of assessing the victim and providing immediate care. For example, if a victim was in cardiac arrest, CPR would normally be started immediately. But in a triage situation with numerous victims, the victim found in cardiac arrest would be assessed as dead. No care would be started, as the limited number of rescuers must move on quickly to check others and care for those who are still alive.

If you are the first on the scene of a multiple victim incident, such as structure collapse, begin triage by asking all who can walk to come to your voice and exit the unsafe area. Designate a safe zone away from the dangerous area. These "walking wounded" victims can help care for each other in this area. If it is safe for you to enter, move to the victim closest to you and quickly assess his or her condition. Do not stop to render lengthy care for any victims. Your priority at this point is only to determine how many victims there are, and the seriousness of their conditions. If possible, instruct the victim on self-care, such as applying pressure to bleeding wound. Quickly move on to assess each victim, and then return to provide care for the most serious victims first.

Victims in need of immediate care following triage include those with breathing difficulty, severe bleeding, severe burns, shock, or who are unresponsive.

Victims for which care can be delayed up to an hour following triage include those with bone injuries such as a broken lower leg that has not broken through the skin, lesser burns, or back injury without suspected spinal cord damage.

Victims for which care can be delayed for up to 3 hours include those with minor wounds or minor fractures.

The lowest category of triage involves any victim with injuries that are incompatible with life. This includes those who are unresponsive and not breathing.

Emergency Moves

Injured or ill victims 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 victim to be moved immediately. Before moving a victim, consider the:

- Possible condition of the victim, such as back or neck injury
- Size and weight of the victim
- Your size and strength
- The surface upon which you must move the victim (e.g. flat and smooth, rugged, steps)
- Whether other bystanders can assist

There are three categories of emergency moves:

- Drags **(Figure 12.4)** – Used to move a victim over flat, smooth surfaces. For a victim with possible spinal injury, grasp under the armpits and rest the victim's head on your forearms. Walk carefully backward while pulling the victim. For a large victim without possible spinal injury, an ankle drag can be used.

Figure 12.4a

Armpit drag.

Figure 12.4b

Ankle drag.

- Assists **(Figure 12.5)** – Used by one or two rescuers to support the victim to walk or hop

Figure 12.5a

One- person assist.

Figure 12.5b

Two-person assist.

- Carries **(Figure 12.6)** – Used by one or two rescuers to lift and move the victim.

Figure 12.6a

Piggyback carry.

Figure 12.6b

Cradle carry.

Chapter 12 REVIEW

Key Terms

- Confined space
- Hazardous materials
- Triage

Key Points

- ✓ Do not risk your own safety attempting to rescue a victim from a dangerous situation.
- ✓ Prioritize victim care based on triage, the sorting of multiple victims according to their conditions.
- ✓ Only move a victim if the scene is unsafe.
- ✓ Use one of several techniques to move a victim based on the victim's condition.

Check Your Progress

Now that you have read this chapter and completed any accompanying class activities, answer the following questions:

- ✓ Can you describe how to safely rescue a victim from dangerous environments? (Pg 92-94)
- ✓ Can you describe the process of triage? (Pg 95)
- ✓ Can you give examples of victims who would be placed in various triage categories (Pg 95)
- ✓ Can you describe the three types of emergency moves and provide examples of each? (Pg 95-96)

APPENDICES

APPENDIX A – FIRST AID KIT SUPPLIES

The contents of a first-aid kit often vary slightly. This is based upon the size of the group for which the kit will be used. Small work sites or group outings, consisting of approximately two to three personnel often need fewer supplies compared to larger operations consisting of many people. First-aid kits should be easily accessible and the contents periodically checked to maintain the necessary items. A sample first aid kit for use in worksites can include:

- 4 x 4" gauze pads
- 8 x 10" gauze pads
- Box of adhesive bandages
- Roller gauze bandages at least 2 inches wide
- Triangular bandages
- Antiseptic wipes
- Burn gel
- Scissors
- Disposable emergency blanket
- Tweezers
- Adhesive tape
- Medical exam gloves (non-latex)
- Breathing device, such as face shield or pocket mask.
- Elastic bandage
- Splint material
- Cold pack
- Directions for use

Figure Appendix A

Basic First Aid Kit

APPENDIX B – PARTICIPANT SKILL SHEETS

SKILL PERFORMANCE SHEET: CONTROLLING EXTERNAL BLEEDING FROM A LIMB

Name: Date: Instructor:

Task	*Practice Prompts*	Satisfactory	Unsatisfactory
Follow "Standard Precautions" to prevent an exposure	*Medical exam gloves are on.*		
Uncover the wound so it can be completely viewed	*The wound is visible*		
Apply direct pressure with a gauze pad or other clean item	*Pressure has been applied*		
Apply a pressure bandage using a roll of gauze	*The bandage has been applied*		
If bleeding in uncontrollable, apply a commercial or homemade tourniquet			

Notes: _____

SKILL PERFORMANCE SHEET: SPLINTING AN INJURED LOWER ARM

Name: Date: Instructor:

Task	*Practice Prompts*	Satisfactory	Unsatisfactory
Support the injured arm			
Soft Splint – Place a folded soft object (e.g. thick towel) under and alongside the arm. Rigid Splint – Place a rigid object under the arm	*Select one method to splint the arm*		
Apply roller gauze to hold the object to the arm, securing the splint	*The splint is secure*		
Use a triangle bandage to create a sling, supporting the arm with 90^0 bend.	*The sling is applied*		
Fold a second triangle bandage to create a binder and bind the arm in the sling to the chest.	*The binder is applied and the arm is secure*		

Notes: _____

SKILL PERFORMANCE SHEET: USING AN EPINEPHRINE AUTO INJECTOR

Name: Date: Instructor:

Task	***Practice Prompts***	**Satisfactory**	**Unsatisfactory**
Verify the device expiration date.	*Medication expiration date is current.*		
Hold the device firmly in the middle, keeping fingers away from ends.	*Device is positioned properly*		
Remove safety cap	*Safety cap has been removed*		
Hold knee still and place needle end of device near outer thigh.	*Device is properly positioned*		
Press firmly until "click" is heard and hold for 10 seconds.	*Injection has been given*		
Remove the injector to verify the device has discharged			

Notes: _____

GLOSSARY

Abandonment Abandoning a person after you started to give care without ensuring the person continues to receive care at an equal or higher level.

Abdominal evisceration Penetrating injury to the abdomen resulting in organs protruding from the abdomen.

Abrasion Commonly called scrape, rug burn, or road rash.

Advanced cardiac life support (ACLS) Specialized care procedures initiated by paramedics and EMTs in the prehospital setting, and physicians and nurses in the hospital setting.

Airway Obstruction Choking

Amputation Injury resulting in the loss of body part, such as a finger or toe.

Anaphylactic shock The most serious form of allergic reaction.

Anatomic splint Also known as a self -splint, an anatomic splint is one in which the injured part of the body is secured to an uninjured part.

Asthma a chronic lung disorder that occurs when inflammation causes the bronchi to swell and narrow the airways.

Avulsion Tissue torn away and hanging from the body.

Automated External Defibrillator (AED) Battery powered device used to correct certain types of electrical disturbances within the heart.

Bandage Item such as a roll of gauze used to cover and hold a dressing in place, while maintaining pressure over the wound.

Capillaries Tiny blood vessels involved in the exchange of oxygen and carbon dioxide.

Cardiac arrest Absence of responsiveness, breathing, and pulse.

Cardiopulmonary resuscitation (CPR) Providing chest compressions and breaths to a person in cardiac arrest (unresponsive and not breathing).

Choking Blockage of the airway.

Concussion A brain injury, often caused by a blow to the head that changes the way the brain functions.

Confined space An area that has restricted openings and an atmosphere that may be dangerous to those who enter.

Consent Approval given by an ill or injured person, either verbally or as a gesture. If a person is unable to grant consent due to mental impairment, confusion, or loss of consciousness, then consent is implied.

Contusion Muscle bruise that results from a direct blow to the muscle.

Cramp Uncontrolled, painful muscle spasm.

Defibrillation A process in which an electronic device sends an electric shock to the heart to stop an extremely rapid/ irregular heartbeat and restore normal heart rhythm.

Dislocation Bone displaced out of the joint.

D.O.T.S Mnemonic used to help identify a possible serious injury, such as a fracture.

Dressing Sterile gauze pad placed over an open wound to help prevent infection and absorb blood.

Duty to Act Legal duty to respond to emergency situations and provide care.

Emergency Medical Services Community resources including EMTs and paramedics.

Epinephrine auto-injector A prescribed medical device that that contains the proper amount of medication (epinephrine) for adults or children experiencing anaphylaxis.

Fainting A type of shock associated with a sudden, temporary loss of consciousness the result of reduced blood flow and oxygen to the brain.

First Aid The immediate care provided to an ill or injured victim.

First degree burns Superficial burns affecting the outer layers of skin.

Flail chest Multiple ribs in the same area, each broken in multiple places.

Fracture A broken bone.

Frostbite Localized cooling of a body part.

Good Samaritan Laws State laws enacted to protect responders from legal actions that might arise from emergency care provided while not in the line of duty. These laws vary from state to state.

Hazardous materials Items that can be flammable, explosive, corrosive, radioactive, and biological.

Heat cramps A heat emergency with sudden, painful muscle cramps.

Heat exhaustion Warning that the body is getting too warm and its' ability to cool itself is starting to fail.

Heat stroke When the sweat mechanism of the body fails and the body becomes dangerously overheated.

Heart Attack Resulting damage that occurs when blood flow to a part of the heart is blocked.

Heimlich Maneuver Care procedure for a conscious choking adult or child.

Hepatitis A bloodborne virus causing serious disease of the liver.

Human Immunodeficiency Syndrome A bloodborne virus that attacks white blood cells, destroying the body's ability to fight infection, and leading to AIDS in most cases.

Hypoglygemia When the blood sugar level is too low and the insulin level is too high.

Hypothermia General cooling of the body.

Hyperglygemia When the blood sugar level is too high and the insulin level is too low.

Impaled object Injury where an object, such as a nail, knife, or glass has punctured the skin and is impaled (embedded) in the body.

Incision Smooth-edge cut, often seen with very sharp, thin objects such as a razor blade, scalpel, or paper edge.

Laceration Jaded-edge cut that tears away skin tissue, caused by items such as irregular broken glass, or saw.

Negligence Failure to follow a reasonable standard of care, which causes or contributes to injury or damage.

Personal Protective Equipment (PPE) Standard precautions used to ensure that health care providers have an effective barrier between themselves and an ill or injured person.

Primary Check The initial process of checking for immediate threats to life.

Puncture Injury from a pointed object that penetrates the skin, such as a nail, icepick, or bullet.

Respiratory distress Difficulty breathing.

R.I.C.E. Acronym used to guide the care for internal bleeding of a limb; stands for Rest, Ice, Compression, and Elevation.

Rigid splint **A** splint can be made from rolled newspaper, magazines, heavy cardboard, or wood or metal strips.

Rule of the Hand The size of the victim's hand is equal to approximately 1% of the total surface area of the victim's body. Used to estimate the extent of damage by counting the approximate number of hands it would take to cover the burned area.

Second degree burns Partial thickness burns affecting deeper layers of skin.

Seizure Uncontrolled electrical activity in the brain, which may produce a convulsion (shaking), muscle rigidity, altered levels of consciousness, or thought disturbances.

Shock A medical emergency in which the organs and tissues of the body are not receiving an adequate flow of blood.

Soft splint A splint is made from items such as a pillow, towel, blanket, or coat wrapped around the injured part.

Spinal cord Bundle of nerves within the spinal column.

Spinal Motion Restriction Restricting movement of the head and neck by holding the head still.

Splinting The process of stabilizing a possible fracture to prevent further damage to muscles, nerves, and blood vessels.

Standard Precautions Measures used to reduce the risk of disease transmission.

Strain An overstretched or partially torn muscle.

Stroke A blockage of blood flow or rupture of an artery to the brain resulting in death of brain cells.

Sucking chest wound A chest injury that allows air to pass into and out of the chest cavity.

Third degree burns Full-thickness burns affecting all layers of the skin and underlying fat. Nerves, blood vessels, and muscle can also be affected.

Triage The process of determining the care priority of a victim based on the severity of the condition.

Tuberculosis (TB) A communicable airborne disease.

Vertebrae One of the 33 bones that comprise the spinal column.

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