



Submittal Review Response

Project Name: *Hilo WWTP Rehabilitation and Replacement Project Phase 1*
Submittal No.: *10401-001.0*
Date: *5/13/2025*

Client: County of Hawai'i Carollo Project No.: 203975
Contractor: Nan, Inc.
Submittal Name: Medical Equipment
Reviewed By: Gavin Goo

SUBMITTAL REVIEW

Review is for general compliance with contract documents. No responsibility is assumed by Carollo for correctness of quantities, dimensions, and details. No deviation or variation is approved unless specifically addressed in these review comments. Refer to Section 01330 for additional requirements. The Contractor shall assume full responsibility for coordination with all other trades and deviations from contract requirements.

Approved	<input type="checkbox"/> No Exceptions
	<input checked="" type="checkbox"/> Make Corrections Noted - See Comments
	<input type="checkbox"/> Make Corrections Noted - Confirm
Not Approved	<input type="checkbox"/> Correct and Resubmit
	<input type="checkbox"/> Rejected - See Remarks
Receipt Acknowledged	<input type="checkbox"/> Filed for Record
	<input type="checkbox"/> With Comments - Resubmit

Review Comments:

1. No exceptions with the contents of either first aid kit. However, if ordering product 76049-036 the enclosure will need to be metal to meet specification requirements.

CONTRACTOR SUBMITTAL TRANSMITTAL FORM

Owner:	County of Hawaii	Date:	5/1/2025
Contractor:	Nan, Inc.	Project No.:	WW-4705R
Project Name:	WWTP	Submittal Number:	10401-001.0
Submittal Title:	First Aid Kits		
To:	Engineer		
From:	Nan Inc.		

Specification No. and Subject of Submittal / Equipment Supplier			
Spec #:	10401	Subject:	First Aid Kits
Authored By:	Matthew Chun	Date Submitted:	5/5/2025

Submittal Certification		
Check Either (A) or (B):		
<input checked="" type="checkbox"/> (A)	We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings with no exceptions.	
<input type="checkbox"/> (B)	We have verified that the equipment or material contained in this submittal meets all the requirements specified in the project manual or shown on the contract drawings except for the deviations listed.	
Certification Statement: By this submittal, I hereby represent that I have determined and verified all field measurements, field construction criteria, materials, dimensions, catalog numbers and similar data, and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.		
General Contractor's Reviewer's Signature: <i>Matthew Chun</i>		
Printed Name and Title: Matthew Chun, QC		
In the event, Contractor believes the Submittal response does or will cause a change to the requirements of the Contract, Contractor shall immediately give written notice stating that Contractor considers the response to be a Change Order.		
Firm:	Signature:	Date Returned:

PM/CM Office Use		
Date Received GC to PM/CM:		
Date Received PM/CM to Reviewer:		
Date Received Reviewer to PM/CM:		
Date Sent PM/CM to GC:		

Nan, Inc

PROJECT: HILO WWTP REHABILITATION
AND REPLACEMENT PROJECT - PHASE 1

JOB NO. WW-4705R

THIS SUBMITTAL HAS BEEN CHECKED BY
THIS CONTRACTOR. IT IS CERTIFIED
CORRECT, COMPLETE, AND IN
COMPLIANCE WITH CONTRACT
DRAWINGS AND SPECIFICATIONS. ALL
AFFECTED CONTRACTORS AND
SUPPLIERS ARE AWARE OF, AND WILL
INTEGRATE THIS SUBMITTAL (UPON
APPROVAL) INTO THEIR OWN WORK.

DATE RECEIVED 5/5/2025
SPECIFICATION SECTION # 10401
SPECIFICATION First Aid
PARAGRAPH 1.03
DRAWING n/a
SUBCONTRACTOR n/a
SUPPLIER N/A
MANUFACTURER N/A

CERTIFIED BY: Matthew Chun

SECTION 10401
SAFETY EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes: Safety equipment.

1.02 REFERENCES

- A. National Fire Protection Association.
- B. Occupational Safety and Health Administration (OSHA).
- C. Underwriters Laboratories, Inc. (UL).

1.03 SUBMITTALS

- ✓ A. Shop drawings.
- ✓ B. Product data:
 - ✓ 1. Submit manufacturer's product literature information for products specified.
 - ✓ 2. Manufacturer's installation instructions.
- ✓ C. Samples.
- ✓ D. Operation and maintenance data.
- ✓ E. Warranty.

1.04 QUALITY ASSURANCE

- A. Manufacturer qualifications: Show evidence that the firm has been engaged in producing such materials and products for at least 5 years and that the product submitted has a satisfactory performance record of at least 5 years.
- B. Installer qualifications: Installer shall have 3 years of experience in installing these materials for similar projects and shall be approved by the manufacturer prior to bidding of the project.
- C. Regulatory requirements: As applicable, equipment of this Section shall comply with requirements of public agencies of the state where the project is located, including OSHA, UL, NFPA.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Packing and shipping: Deliver to the job site in manufacturer's original containers.
- B. Storage and protection: Store materials in original, unopened containers in compliance with manufacturer's printed instructions.
- C. Keep materials dry until ready for use.
- D. Keep packages of material off the ground, under cover, and away from sweating walls and other damp surfaces.
- E. Protect finished surfaces from soiling and damage during handling and installation. Keep covered with a protective covering.

PART 2 PRODUCTS

2.01 FIRST AID KIT

- A. Provide two first aid kits. Locations to be determined by Owner.
- B. Manufacturers: One of the following or equal:
 - 1. VWR Scientific, 56613-216.
 - 2. Fire Safety Source, 223UFAO.
- C. Features/characteristics:
 - 1. Prefinished, wall-mounted metal cabinet.
 - 2. Standard medical supplies capable of serving up to 25 people.
 - 3. Meets OSHA requirements.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products and fixed equipment in accordance with manufacturers' recommendations.

END OF SECTION

VWR® first aid

avantor™

01. DURABLE FIRST
AID KITS

02. CABINETS IN
VARIOUS SIZES

03. SINGLE AND DOUBLE
EYEWASH STATION
CONFIGURATIONS



VWR® Bulk First Aid Kits

- Meet ANSI/ISEA Z308.1-2015 Standards
- Available in ANSI A and A+ Classes
- Metal or plastic case options
- Wall mountable



Description	10 Person Bulk Plastic First Aid Kit	25 Person Bulk Metal First Aid Kit	25 Person Bulk Plastic First Aid Kit	50 Person Bulk Metal First Aid Kit	50 Person Bulk Plastic First Aid Kit
Cat. No.	76049-204	76049-034	76049-036	76049-038	76049-054
Class/Type	ANSI A, Type III	ANSI A, Type III	ANSI A+, Type III	ANSI A+, Type III	ANSI A+, Type III
Dimensions	8" x 5" x 3"	9.5" x 6-1/2" x 3"	9" x 6-5/16" x 2-3/8"	9-1/4" x 10" x 2-5/8"	9-1/8" x 9-1/8" x 2-3/4"
Pieces	71	89	141	183	
Contents (Quantity)	<ul style="list-style-type: none"> Plastic Bandages, 1" x 3" (16) First Aid Tape, 1/2" x 5 yd. (1) Triple Antibiotic Ointment Packets (10) BZK Antiseptic Towelettes (10) Burn Cream Packets, 0.9g (10) Burn Dressing, 4" x 4" (1) Cold Compress, 4" x 5" (1) Sterile Eye Pads (2) Eyewash, 1oz (1) Hand Sanitizer Packets, 0.9g (6) Nitrile Gloves (4) Conforming Gauze Roll, 2" (1) Gauze Dressing Pads, 3" x 3" (2) Trauma Pads, 5" x 9" (2) Scissors (1) Triangular Sling/Bandage, 40" x 40" x 56" (1) CPR Mask with One-Way Valve (1) First Aid Guide (1) 	<ul style="list-style-type: none"> Plastic Bandages, 1" x 3" (32) First Aid Tape, 1/2" x 5 yd. (1) Triple Antibiotic Ointment Packets (10) BZK Antiseptic Towelettes (10) Burn Cream Packets, 0.9g (10) Burn Dressing 4" x 4" (1) Cold Compress 4" x 5" (1) Sterile Eye Pads (2) Eyewash, 1oz (1) Hand Sanitizer Packets, 0.9g (6) Nitrile Gloves (2) Conforming Gauze Roll, 2" (1) Gauze Dressing Pads, 3" x 3" (4) Trauma Pads 5" x 9" (2) Scissors (1) Triangular Sling/Bandage, 40" x 40" x 56" (1) CPR Mask with One-Way Valve (1) Fingertip Fabric Bandages (5) Knuckle Fabric Bandages (5) Insect Sting Relief Wipes (3) Tweezers (1) First Aid Guide (1) Aspirin Tablets (12) 	<ul style="list-style-type: none"> Plastic Bandages, 1" x 3" (50) First Aid Tape, 1/2" x 5 yd. (1) Triple Antibiotic Ointment Packets (10) BZK Antiseptic Towelettes (12) Burn Cream Packets, 0.9g (10) Burn Dressing, 4" x 4" (1) Cold Compress, 4" x 5" (1) Sterile Eye Pads (2) Eyewash, 1oz (1) Hand Sanitizer Packets, 0.9g (10) Nitrile Gloves (4) Conforming Gauze Roll, 2" (1) Gauze Dressing Pads, 3" x 3" (6) Trauma Pads, 5" x 9" (2) Scissors (1) Triangular Sling/Bandage, 40" x 40" x 56" (1) CPR Mask with One-Way Valve (1) Fingertip Fabric Bandages (10) Knuckle Fabric Bandages (10) Insect Sting Relief Wipes (3) Tweezers (1) Alcohol Wipes (20) Povidone-Iodine Infection Control Wipes (4) 	<ul style="list-style-type: none"> Plastic Bandages, 1" x 3" (60) First Aid Tape 1/2" x 5 yd. (1) Triple Antibiotic Ointment Packets (12) BZK Antiseptic Towelettes (15) Burn Cream Packets, 0.9g (12) Burn Dressing, 4" x 4" (1) Cold Compress, 4" x 5" (1) Sterile Eye Pads (2) Eyewash, 1oz (1) Hand Sanitizer Packets, 0.9g (10) Nitrile Gloves (4) Conforming Gauze Roll, 2" (2) Conforming Gauze Roll, 4" (1) Gauze Dressing Pads, 3" x 3" (6) Trauma Pads, 5" x 9" (2) Scissors (1) Triangular Sling/Bandage, 40" x 40" x 56" (1) Elastic Bandage, 2" x 5yd. (1) CPR Mask with One-Way Valve (1) Fingertip Fabric Bandages (10) Knuckle Fabric Bandages (10) Insect Sting Relief Wipes (3) Tweezers (1) Alcohol Wipes (20) Povidone-Iodine Infection Control Wipes (4) 	<ul style="list-style-type: none"> Plastic Bandages, 1" x 3" (60) First Aid Tape 1/2" x 5 yd. (1) Triple Antibiotic Ointment Packets (12) BZK Antiseptic Towelettes (15) Burn Cream Packets, 0.9g (12) Burn Dressing, 4" x 4" (1) Cold Compress, 4" x 5" (1) Sterile Eye Pads (2) Eyewash, 1oz (1) Hand Sanitizer Packets, 0.9g (10) Nitrile Gloves (4) Conforming Gauze Roll, 2" (2) Conforming Gauze Roll, 4" (1) Gauze Dressing Pads, 3" x 3" (6) Trauma Pads, 5" x 9" (2) Scissors (1) Triangular Sling/Bandage, 40" x 40" x 56" (1) Elastic Bandage, 2" x 5yd. (1) CPR Mask with One-Way Valve (1) Fingertip Fabric Bandages (10) Knuckle Fabric Bandages (10) Insect Sting Relief Wipes (3) Tweezers (1) Alcohol Wipes (20) Povidone-Iodine Infection Control Wipes (4)

VWR® First Aid Metal Cabinets with Medications

- Meet ANSI/ISEA Z308.1-2015 Standards
- Solid steel case
- Supplied with carrying handle and is wall mountable



Description	75 Person 2-Shelf Metal First Aid Cabinet	100 Person 3-Shelf Metal First Aid Cabinet
Cat. No.	76049-056	76049-060
Class/Type	ANSI A+, Type I & II with Medications	ANSI A+, Type I & II with Medications
Dimensions	14.75" x 10.25" x 4.63"	15" x 16.15" x 5.56"
Pieces	347	669
Contents (Quantity)	<ul style="list-style-type: none"> • Plastic Bandages, $\frac{3}{4}$" x 3", 100ct. (1) • Fabric Bandages, 1" x 3", 50ct. (1) • Fingertip Fabric Bandages, 10ct. (1) • Knuckle Fabric Bandages, 8ct. (1) • First Aid Tape, $\frac{1}{2}$" x 5yds. (1) • Antibiotic Ointment Packets, 10ct. (1) • Antiseptic Spray, 4oz. (1) • Alcohol Wipes, 10ct. (2) • Burn Spray, 4oz. (1) • Burn Dressing, 4" x 4" (1) • Cold Compress, 4" x 5" (1) • 4 Sterile Eye Pads & 4 Strips (1) • Eyewash, 1oz. (1) • Hand Sanitizer Packets, 0.9g, 10ct. (1) • Nitrile Gloves (2) • Nitrile Exam Gloves (2) • Conforming Gauze Rolls, 2" (2) • Gauze Dressing Pads, 3" x 3", 2ct. (2) • Trauma Pad, 5" x 9" (1) • Hema-Flex 5" x 9" Trauma Pad in 4" x 4" Gauze (1) • Scissors (1) • Tweezers (1) • Triangular Sling/Bandage, 40" x 40" x 56" (1) • CPR Mask with One-Way Valve (1) • Aspirin Tablets, 50ct. (1) • Non-Aspirin Tablets, 50ct. (1) • First Aid Guide (1) 	<ul style="list-style-type: none"> • Fabric Bandages, 2" x 3", 10ct. (1) • Fabric Bandages, 1" x 3", 100ct. (1) • Fabric Knuckle and Fingertip Bandages, 50ct. (1) • Elastic Bandage, 4" x 5yds. (1) • First Aid Tape, $\frac{1}{2}$" x 5yds. (1) • Triple Antibiotic Ointment Packets, 25ct. (1) • Antiseptic Spray, 4oz. (1) • Alcohol Wipes, 100ct. (1) • Burn Spray, 4oz. (1) • Burn Dressing, 4" x 4" (1) • Cold Compress, 6" x 9" (1) • 4 Sterile Eye Pads & 4 Strips (1) • Eyewash, 4oz. (1) • Hand Sanitizer Packets, 0.9g, 10ct. (1) • Nitrile Gloves (2) • Nitrile Exam Gloves, 10ct. (1) • Conforming Gauze Roll, 2" (1) • Gauze Dressing Pads, 2" x 2", 2ct. (5) • Gauze Dressing Pads, 3" x 3", 10ct. (1) • Gauze Dressing Pads, 4" x 4", 2ct. (5) • Trauma Pad, 5" x 9" (1) • Hema-Flex 5" x 9" Trauma Pad in 4" x 4" Gauze (1) • Scissors (1) • Tweezers (1) • Triangular Sling/Bandages, 40" x 40" x 56" (2) • CPR Mask with One-Way Valve (1) • Cotton Tipped Applicators, 3", 100ct. (1) • Non-Aspirin Tablets, 100ct. (1) • Antacid Tablets, 100ct. (1) • First Aid Guide (1)

VWR® Eyewash Stations

VWR Eyewash Stations include a PhysiciansCare sterile isotonic buffered eye wash solution to help to clear eyes of foreign material such as dust, pollen, and chemicals, and to relieve itching and burning of the eyes and skin. The plastic squeeze bottle with tear-off top helps create a fluid stream to direct the solution into the affected areas.

- Wall mountable for quick access for emergencies
- Single or double configuration with two bottle size options
- Includes PhysiciansCare Eyewash Solution



Description	Dimensions, in.	Cat. No.
Single, 16 oz Bottle	15 x 4 x 11	76049-022
Double, 16 oz Bottles	17.5 x 4 x 11	76049-028
Single, 32 oz Bottle	11.5 x 4 x 15	76049-030
Double, 32 oz Bottles	19 x 4 x 14.5	76049-032

Ensuing Sheet Contains Warranty Information

WARRANTY AND RETURN POLICY

VWR International Limited, legal document number 3-102-659845 ("VWR"), in accordance with the provisions of Law No. 7472, and its respective Regulations, issues this Warranty and Return Policy. The Policy established here is only valid for the products, goods and/or equipment delivered to the customer; any other condition or requirement not included must be analyzed and approved in writing by the General Management of VWR.

Coverage and warranty period:

The warranty is valid only within Costa Rica and only covers goods and/or services purchased from VWR.

Goods and/or equipment distributed by VWR:

Every product sold by VWR comes with a warranty. VWR provides a one-year warranty on equipment and furniture and a 30-day warranty on goods from the date of invoice.

Return Policy:

At VWR's request, the Customer shall immediately make available to VWR for examination any Goods alleged to be defective or not in conformity with the specifications of the purchase order. If any Goods prove to be defective or non-conforming, VWR may choose at its sole discretion to remedy such situation by applying any of the following options: (i) replace any defective or non-conforming Goods at no cost to the Customer; (ii) in the event a return is authorized, credit will be given to the Customer's account for all amounts paid in respect of the defective Goods; or (iii) repair the Goods. In the event of replacement, the replacement Goods will be warranted for the remainder of the original warranty period. For the purposes of this warranty, defective or non-conforming Goods are defined as Goods that do not meet the original manufacturer's specifications.

Services:

Laundry: Laundry processed garments have a 30-day warranty after delivery. Garments will be freshly processed, mended and finished in accordance with generally accepted standards of the textile industry. VWR will replace Goods worn out through normal wear and tear that can no longer be rendered adequately serviceable.

Manufacturing: Manufactured garments products have a 30-day warranty after delivery for manufacturing defects.

Laundry Remedies: If the Laundry Services prove to be defective or nonconforming, VWR may elect at its sole discretion to remedy such situation by applying either of the following options (i) re-performing the Services, at no cost to the Client; or (ii) crediting the Client's account for all amounts paid in respect of the defective or nonconforming Services.

Manufacturing Remedies: With respect to garments manufactured by VWR, and when such parts are found to be defective or non-conforming during the first thirty (30) days after delivery, VWR may choose at its sole discretion to remedy such situation by applying any of the following options: (i) refund the purchase price; or

(ii) modify, repair or (iii) supply a replacement part, including labor and transportation, at no charge to the Customer.

Exclusions.

The warranty for the distribution of manufactured and laundry Goods and services covers only operating damages, excluding those caused by the following reasons:

- Improper use of Goods, processed garments or products manufactured by VWR.
- Different use than the one stipulated in the user's manual either accidentally or with malice.
- Use under environmental conditions other than those recommended by the manufacturer or VWR.
- Accidents due to causes external to VWR.
- Improper storage or transport by the customer.

Only service providers or personnel authorized by VWR may perform checks, repairs, or modifications to Goods, processed garments, or products manufactured by VWR during the warranty period. Actions by personnel who have not been previously authorized will immediately void the warranty coverage established in the present document.

Product Return.

The customer may only return products, goods and/or equipment in accordance with the following:

All returns of products, goods and/or equipment must be authorized in writing by VWR, and VWR reserves the right to refuse any return requested more than thirty (30) days after the date of delivery. Upon acceptance of the return, VWR will generate a credit note to be applied to the customer's account or future purchases. VWR reserves the right to make cash returns. VWR must receive all authorized returns within fifteen (15) days of the date of VWR's return authorization. Customer is responsible for all transportation fees related to returned Product unless otherwise authorized in advance by VWR. VWR reserves the right to refuse any return shipment of the Product that has not been authorized by VWR or to return such shipment to the Customer at the Customer's expense. If any Goods or any other associated product and/or equipment is shipped or returned in error to VWR's facility, the Customer shall be responsible for removing it from VWR's facility immediately in accordance with applicable laws and regulations.

To ensure that proper credit can be provided, the following information must be included with every return:

- Customer's name and address
- Purchase order number
- VWR Shipping Order Number
- Invoice date and invoice number
- Article number and quantity of returned products
- VWR Return Authorization Number
- Reason for return

Products, goods and/or equipment not authorized for return include:

- Customized and/or custom manufactured products
- Products that have been provided under terms that indicate they are non-returnable
- Products that cannot be completely resold (including, but not limited to, opened products, sample products, or products with damaged, missing or damaged labeling or packaging)
- Products in quantities less than the full box that were sold in full box quantities
- Chemical products, reactive, diagnostics, culture media, flammable material, sterile products or controlled products
- Laboratory apparatus or instruments that have been used or do not have the original packaging, labeling and manuals
- Refrigerated products, temperature-controlled products, live specimens or other perishable products
- Products that are not inventoried by VWR ("Out of Stock Products") that cannot be returned to the manufacturer
- Garments that are not in original packaging or that have been used or laundered
- Products purchased by special order (including, but not limited to, non-standard furniture products)
- Products not purchased by the customer from VWR
- Products with an expired shelf life or an expiration date of less than 6 months for resale
- Discontinued products

When VWR authorizes the return of hazardous materials, the Customer must:

1. use the original packaging and no alternatives on the VWR label,
2. make the return shipment of hazardous materials in accordance with all applicable transportation laws and regulations; and
3. provide the necessary documents.

When necessary, Customer must include with each return shipment of the equipment a certification from an authorized representative of Customer that the equipment was properly decontaminated in accordance with applicable laws and regulations and recommended guidelines. To ensure prompt handling, Customer must affix the return authorization number on the outside of the package and include any return authorization provided by VWR as a packing slip with the returned Products. Customer must ship the Product to the location indicated by VWR with the transportation charges prepaid.

All returned products are subject to VWR inspection and acceptance. Title and risk of loss in the returned Products will be transferred to VWR only when accepted by VWR.

Ensuing Sheet Contains Operating Instructions

Soft Tissue Injuries



Soft tissue injuries happen to children and adults of all ages. They can be minor, serious or life threatening. Examples of minor soft tissue injuries include scrapes, bruises and mild sunburns. Examples of serious soft tissue injuries include large cuts that require stitches and partial-thickness burns. Life-threatening soft tissue injuries include stab wounds to the abdomen, lacerations that cause serious bleeding and full-thickness burns.

This chapter discusses the signals of soft tissue injuries, including closed wounds, open wounds and burns. You will read about the differences between major wounds and minor wounds and between different types of burns. In addition, you will learn when to call 9-1-1 or the local emergency number and how to give care.

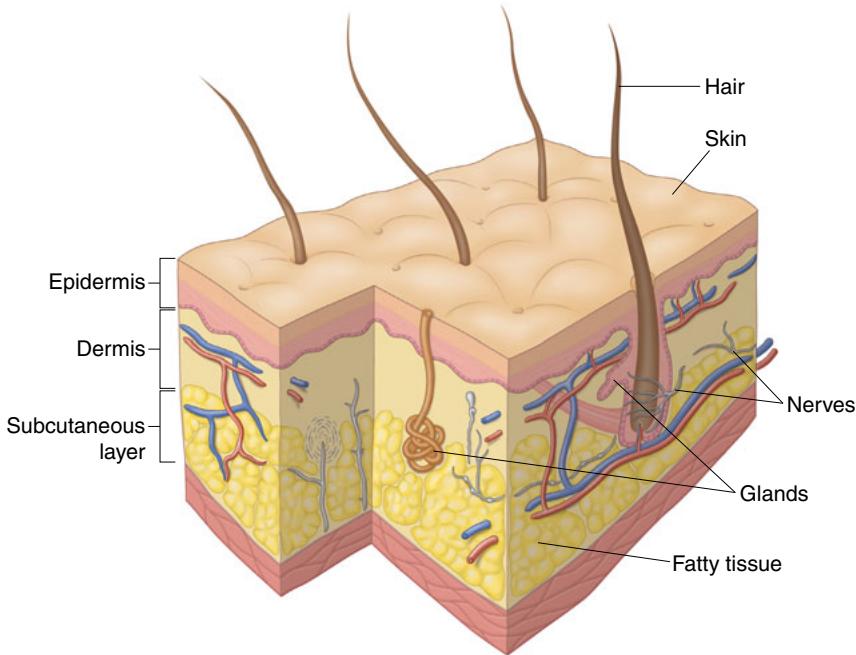


FIGURE 7-1 The soft tissues include the layers of skin, fat and muscle.

WOUNDS

Soft tissues are the layers of skin and the fat and muscle beneath the skin's outer layer (Fig. 7-1). An injury to the soft tissue commonly is called a *wound*. Any time the soft tissue is damaged or torn, the body is threatened. Injuries may damage the soft tissue at or near the skin's surface or deep in the body. Severe bleeding can occur at the skin's surface or beneath, where it is harder to detect. Germs can enter the body through the wound and cause infection.

Wounds usually are classified as either closed or open. In a *closed wound*, the skin's surface is not broken; therefore, tissue damage and any bleeding occur below the surface. In an *open wound*, the skin's surface is broken, and blood may come through the tear in the skin.

Fortunately, most of the bleeding you will encounter will not be serious. In most cases it usually stops by itself within a few minutes with minimal intervention. The trauma may cause a blood vessel to tear causing bleeding, but the blood at the wound site usually clots quickly and stops flowing. Sometimes, however, the damaged blood vessel is too large or the pressure in the blood vessel is too great for the blood to clot, then bleeding can be life threatening. This can happen with both closed and open wounds.

Closed Wounds

The simplest closed wound is a bruise. A bruise develops when the body is bumped or hit, such as when you bump your leg on a table or chair (Fig. 7-2). The force of the blow to the body damages the soft tissue layers beneath the skin. This causes internal bleeding. Blood and other fluids seep

into the surrounding tissues, causing the area to swell and change color.

A more serious closed wound can be caused by a violent force hitting the body. This type of force can injure larger blood vessels and deeper layers of muscle tissue, which may result in heavy bleeding beneath the skin and damage to internal organs.

What to Look For

Signals of internal bleeding include:

- Tender, swollen, bruised or hard areas of the body, such as the abdomen.
- Rapid, weak pulse.
- Skin that feels cool or moist or looks pale or bluish.
- Vomiting blood or coughing up blood.
- Excessive thirst.
- An injured extremity that is blue or extremely pale.
- Altered mental state, such as the person becoming confused, faint, drowsy or unconscious.

When to Call 9-1-1

Call 9-1-1 or the local emergency number if:

- A person complains of severe pain or cannot move a body part without pain.
- You think the force that caused the injury was great enough to cause serious damage.
- An injured extremity is blue or extremely pale.
- The person's abdomen is tender and distended.
- The person is vomiting blood or coughing up blood.
- The person shows signals of shock or becomes confused, drowsy or unconscious.



FIGURE 7-2 The simplest closed wound is a bruise, which develops when the body is bumped or hit. Courtesy of Ted Crites.

What to Do Until Help Arrives

Many closed wounds, like bruises, do not require special medical care. To care for a closed wound, you can apply an ice pack to the area to decrease bleeding beneath the skin.

Applying cold also can be effective in helping to control both pain and swelling (Fig. 7-3). Fill a plastic bag with ice and water or wrap ice in a wet cloth and apply it to the injured area for periods of about 20 minutes. Place a thin



FIGURE 7-3 Apply ice to a closed wound to help control pain and swelling.

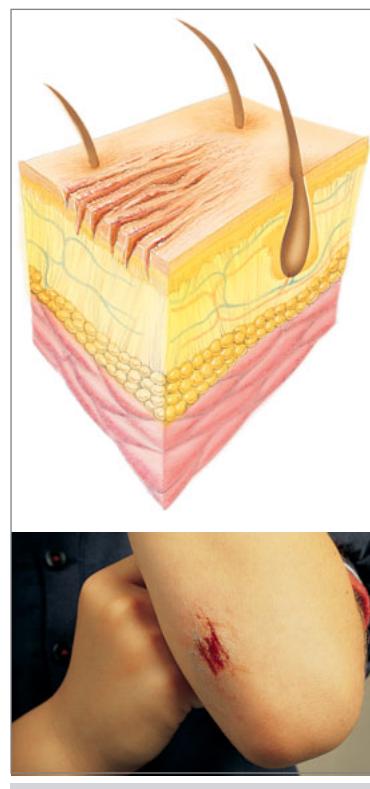


FIGURE 7-4 Abrasion

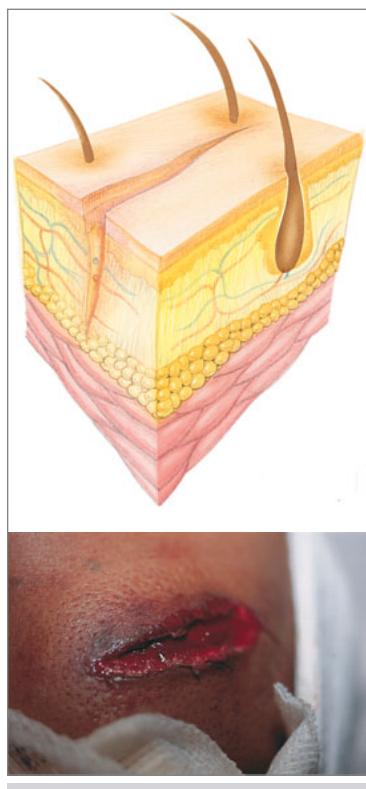


FIGURE 7-5 Laceration

barrier between the ice and bare skin. Remove the ice and wait for 20 minutes before reapplying. If the person is not able to tolerate a 20-minute application, apply the ice pack for periods of 10 minutes on and off. Elevating the injured part may help to reduce swelling; however, *do not* elevate the injured part if it causes more pain.

Do not assume that all closed wounds are minor injuries. Take the time to find out whether more serious injuries could be present.

With all closed wounds, help the person to rest in the most comfortable position possible. In addition, keep the person from getting chilled or overheated. It also is helpful to comfort and reassure the person. Be sure that a person with an injured lower extremity does not bear weight on it until advised to do so by a medical professional.

Open Wounds

In an open wound, the break in the skin can be as minor as a scrape of the surface layers or as severe as a deep penetration. The amount of bleeding depends on the location and severity of the injury.

The four main types of open soft tissue wounds are abrasions, lacerations, avulsions and punctures.

Abrasions

Abrasions are the most common type of open wound (Fig. 7-4). They usually are caused by something rubbing roughly against the skin. Abrasions do not bleed much. Any bleeding that occurs comes from *capillaries* (tiny blood vessels). Dirt and germs frequently have been rubbed into this type of wound, which is why it is important to clean and irrigate an abrasion thoroughly with soap and water to prevent infection.

Other terms for an abrasion include a scrape, a rug burn, a road rash or a strawberry. Abrasions usually are painful because scraping of the outer skin layers exposes sensitive nerve endings.

Lacerations

A *laceration* is a cut in the skin, which commonly is caused by a sharp object, such as a knife, scissors or broken glass (Fig. 7-5). A laceration also can occur when a blunt force splits the skin. Deep lacerations may cut layers of fat and muscle, damaging both nerves and blood vessels. Bleeding may be heavy or there may be none at all. Lacerations are not always painful because damaged nerves cannot send pain signals to the brain. Infection can easily occur with lacerations if proper care is not given.

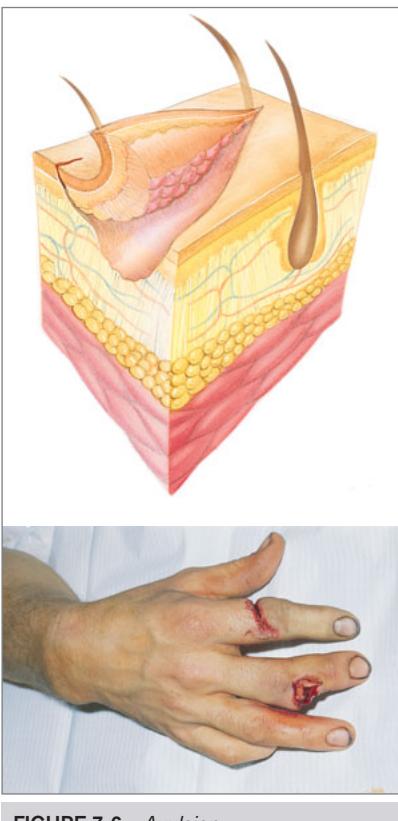


FIGURE 7-6 *Avulsion*

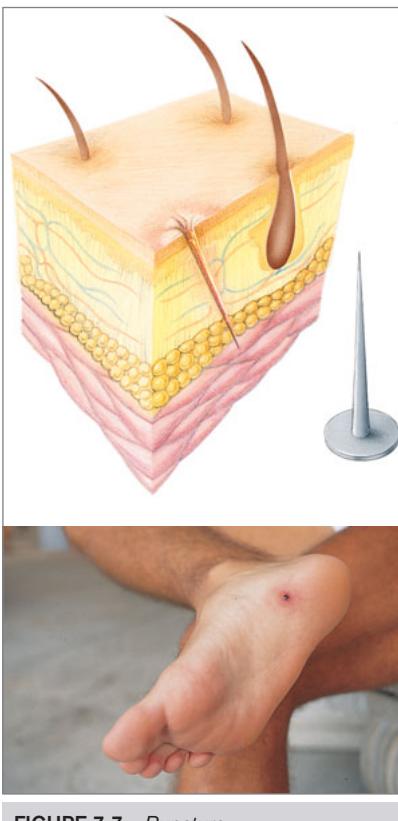


FIGURE 7-7 *Puncture*

Avulsions

An *avulsion* is a serious soft tissue injury. It happens when a portion of the skin, and sometimes other soft tissue, is partially or completely torn away (Fig. 7-6). This type of injury often damages deeper tissues, causing significant bleeding. Sometimes a violent force may completely tear away a body part, including bone, such as a finger. This is known as an *amputation*. With amputations, sometimes bleeding is easier to control because the tissues close around the vessels at the injury site. If there is a violent tearing, twisting or crushing of the extremity, the bleeding may be hard to control.

Punctures

Punctures usually occur when a pointed object, such as a nail, pierces the skin (Fig. 7-7). A gunshot wound is a puncture wound. Puncture wounds do not bleed much unless a blood vessel has been injured. However, an object that goes into the soft tissues beneath the skin can carry germs deep into the body. These germs can cause infections—sometimes serious ones. If the object remains in the wound, it is called an *embedded object*.

When to Call 9-1-1

Call 9-1-1 or the local emergency number immediately for any major open or closed wound.

What to Do Until Help Arrives

Give general care for all open wounds. Specific care depends on whether the person has a minor or a major open wound.

General Care for Open Wounds

General care for open wounds includes controlling bleeding, preventing infection and using dressings and bandages.

Preventing Infection

When the skin is broken, the best initial defense against infection is to clean the area. For minor wounds, after controlling any bleeding, wash the area with soap and water and, if possible, irrigate with large amounts of fresh running water to remove debris and germs. You should not wash more serious wounds that require medical attention because they involve more extensive tissue damage or bleeding and it is more important to control the bleeding.

Sometimes even the best care for a soft tissue injury is not enough to prevent infection. You usually will be able to recognize the early signals of infection.

The area around the wound becomes swollen and red (Fig. 7-8). The area may feel warm or throb with pain. Some wounds discharge pus. Serious infections may cause a person to develop a fever and feel ill. Red streaks may develop that progress from the wound toward the heart. If this happens, the infected person should seek immediate professional medical attention.

If you see any signals of infection, keep the area clean, soak it in clean, warm water and apply an antibiotic ointment if the person has no known allergies or sensitivities to the medication. Change coverings over the wound daily.



FIGURE 7-8 *The area around an infected wound becomes swollen and red.* Image © Fedor Kondratenko, 2010 Used under license from Shutterstock.com.



FIGURE 7-9 Wounds to the face could cause scarring and therefore often require stitches. © iStockphoto.com/Angie Kohler.



FIGURE 7-10 Dressings are placed directly on the wound to absorb blood and prevent infection.

Determining if the Person Needs Stitches

It can be difficult to judge when a wound requires stitches. One rule of thumb is that a health care provider will need to stitch a wound if the edges of skin do not fall together, the laceration involves the face or when any wound is over $\frac{1}{2}$ inch long (Fig. 7-9).

Stitches speed the healing process, lessen the chances of infection and minimize scarring. They should be placed within the first few hours after the injury. The following major injuries often require stitches:

- Bleeding from an artery or uncontrolled bleeding.
- Wounds that show muscle or bone, involve joints, gape widely, or involve hands or feet.
- Wounds from large or deeply embedded objects.
- Wounds from human or animal bites.
- Wounds that, if left unstitched, could leave conspicuous scars, such as those on the face.

FOCUS ON PREVENTION

TETANUS

Tetanus is a severe infection that can result from a puncture or a deep cut. Tetanus is a disease caused by bacteria. These bacteria produce a powerful poison in the body. The poison enters the nervous system and can cause muscle paralysis. Once tetanus reaches the nervous system, its effects are highly dangerous and can be fatal. Fortunately, tetanus often can be successfully treated with medicines called antitoxins.

One way to prevent tetanus is through immunizations. All of us need to have a shot to protect against tetanus. We also need a booster shot at least every 10 years. Check with your health care provider to learn whether you need a booster shot if either of the following happens:

- Your skin is punctured or cut by an object that could carry infection, such as a rusty nail.
- You are bitten by an animal.



FIGURE 7-11 Occlusive dressings are designed to close a wound or damaged area of the body and prevent it from being exposed to the air or water.



FIGURE 7-13 Adhesive compress

prevents it from being exposed to the air or water (Fig. 7-11). By preventing exposure to the air, occlusive dressings help to prevent infection. Occlusive dressings help to keep in place medications that have been applied to the affected area. They also help to keep in heat, body fluids and moisture. Occlusive dressings are manufactured but can be improvised. An example of an improvised occlusive dressing is plastic wrap secured with medical tape. This type of dressing can be used for certain chest and abdominal injuries.

A *bandage* is any material that is used to wrap or cover any part of the body. Bandages are used to hold dressings in place, to apply pressure to control bleeding, to protect a wound from dirt and infection, and to provide support to an injured limb or body part (Fig. 7-12). Any bandage applied snugly to create pressure on a wound or an injury is called a *pressure bandage*.

You can purchase many different types of bandages, including:

- **Adhesive compresses**, which are available in assorted sizes and consist of a small pad of nonstick gauze on a strip of adhesive tape that is applied directly to minor wounds (Fig. 7-13).
- **Bandage compresses**, which are thick gauze dressings attached to a bandage that is tied in place. Bandage compresses are specially designed to help control severe bleeding and usually come in sterile packages.
- **Roller bandages**, which are usually made of gauze or gauze-like material (Fig. 7-14). Roller bandages are available in assorted widths from $\frac{1}{2}$ to 12 inches (1.3–30.5 cm) and in lengths from 5 to 10 yards. A narrow bandage would be used to wrap a hand or wrist. A medium-width bandage would be used



FIGURE 7-12 Bandages are used to hold dressings in place, control bleeding, protect wounds and provide support to an injured limb or body part.



FIGURE 7-14 Roller bandage



FIGURE 7-15, A–D To apply a roller bandage: **A**, Start by securing the bandage in place. **B**, Use overlapping turns to cover the dressing completely. **C**, Tie or tape the bandage in place. **D**, Check the fingers or toes for feeling, warmth and color.

for an arm or ankle. A wide bandage would be used to wrap a leg. A roller bandage generally is wrapped around the body part. It can be tied or taped in place. A roller bandage also may be used to hold a dressing in place, secure a splint or control external bleeding.

Follow these general guidelines when applying a roller bandage:

- Check for feeling, warmth and color of the area below the injury site, especially fingers and toes, before and after applying the bandage.
- Elevate the injured body part only if you do not suspect that a bone has been broken and if doing so does not cause more pain.
- Secure the end of the bandage in place with a turn of the bandage. Wrap the bandage around the body part until the dressing is completely covered and the bandage extends several inches beyond the dressing. Tie or tape the bandage in place (Fig. 7-15, A–C).
- Do not cover fingers or toes. By keeping these parts uncovered, you will be able to see if the bandage is too tight (Fig. 7-15, D). If fingers or toes become cold or begin to turn pale, blue or ashen, the bandage is too tight and should be loosened slightly.

- Apply additional dressings and another bandage if blood soaks through the first bandage. Do not remove the blood-soaked bandages and dressings. Disturbing them may disrupt the formation of a clot and restart the bleeding.

Elastic roller bandages, sometimes called elastic wraps, are designed to keep continuous pressure on a body part (Fig. 7-16). Elastic bandages are available in 2-, 3-, 4- and 6-inch widths. As with roller bandages, the



FIGURE 7-16 Elastic roller bandage

first step in using an elastic bandage is to select the correct size of the bandage: a narrow bandage is used to wrap a hand or wrist; a medium-width bandage is used for an arm or ankle and a wide bandage is used to wrap a leg.

When properly applied, an elastic bandage may control swelling or support an injured limb, as in the care for a venomous snakebite. However, an improperly applied elastic bandage can restrict blood flow, which is not only painful but also can cause tissue damage if not corrected.

To apply an elastic roller bandage:

- Check the circulation of the limb beyond where you will be placing the bandage by checking for feeling, warmth and color.
- Place the end of the bandage against the skin and use overlapping turns (Fig. 7-17, A).
- Gently stretch the bandage as you continue wrapping (Fig. 7-17, B). The wrap should cover a long body section, like an arm or a calf, beginning at the point farthest from the heart. For a joint like



A



B

FIGURE 7-17, A-B A, To apply an elastic bandage: Place the bandage against the skin and use overlapping turns. B, Gently stretch the bandage as you continue wrapping. The wrap should cover a long body section, like an arm or a calf, beginning at the point farthest from the heart.

a knee or an ankle, use figure-eight turns to support the joint.

- Check the snugness of the bandaging—a finger should easily, but not loosely, pass under the bandage.
- Always check the area above and below the injury site for feeling, warmth and color, especially fingers and toes, after you have applied an elastic roller bandage. By checking both before and after bandaging, you will be able to tell if any tingling or numbness is from the bandaging or the injury.

Specific Care Guidelines for Minor Open Wounds

In minor open wounds, such as abrasions, there is only a small amount of damage and minimal bleeding.

To care for a minor open wound, follow these general guidelines:

- Use a barrier between your hand and the wound. If readily available, put on disposable gloves and place a sterile dressing on the wound.
- Apply direct pressure for a few minutes to control any bleeding.
- Wash the wound thoroughly with soap and water. If possible, irrigate an abrasion for about 5 minutes with clean, warm, running tap water.
- Apply an antibiotic ointment to a minor wound if the person has no known allergies or sensitivities to the medication.
- Cover the wound with a sterile dressing and a bandage or with an adhesive bandage to keep the wound moist and prevent drying.

Specific Care Guidelines for Major Open Wounds

A major open wound has serious tissue damage and severe bleeding. To care for a major open wound, you must act at once. Follow these steps:

- Put on disposable gloves. If you suspect that blood might splatter, you may need to wear eye and face protection.
- Control bleeding by:
 - Covering the wound with a dressing and firmly pressing against the wound with a gloved hand until the bleeding stops.
 - Applying a pressure bandage over the dressing to maintain pressure on the wound and to hold the dressing in place. If blood soaks through the bandage, do not remove the blood-soaked bandages. Instead, add more

dressings and bandages and apply additional direct pressure.

- Continue to monitor the person's condition. Observe the person closely for signals that may indicate that the person's condition is worsening, such as faster or slower breathing, changes in skin color and restlessness.
- Care for shock. Keep the person from getting chilled or overheated.
- Have the person rest comfortably and provide reassurance.
- Wash your hands immediately after giving care, even if you wore gloves.

Using Tourniquets When Help Is Delayed

A *tourniquet* is a tight band placed around an arm or leg to constrict blood vessels in order to stop blood flow to a wound. Because of the potential for adverse effects, a tourniquet should be used *only as a last resort* in cases of delayed care or situations where response from emergency medical services (EMS) is delayed, when direct pressure does not stop the bleeding or you are not able to apply direct pressure.

For example, a tourniquet may be appropriate if you cannot reach the wound because of entrapment, there are multiple injuries or the size of the wound prohibits application of direct pressure. In most areas, application of a tourniquet is considered to be a skill at the emergency medical technician (EMT) level or higher and requires proper training. There are several types of manufactured tourniquets available and are preferred over makeshift (improvised) devices. For a manufactured tourniquet, always follow the manufacturer's instructions.

In general, the tourniquet is applied around the wounded extremity, just above the wound. The tag end of the strap is routed through the buckle, and the strap is pulled tightly, which secures the tourniquet in place. The rod (windlass) then is twisted to tighten the tourniquet until the bright-red bleeding stops. The rod then is secured in place (Fig. 7-18, A–B). The tourniquet should *not* be removed in the prehospital setting once it is applied. The time that the tourniquet was applied should be noted and recorded and then given to EMS personnel.

Blood pressure cuffs sometimes are used as a tourniquet to slow the flow of blood in an upper extremity. Another technique is to use a bandage that is 4 inches wide and six to eight layers deep. Always follow local protocols when the use of a tourniquet is considered.



FIGURE 7-18, A–B When applying a tourniquet: **A**, Twist the rod to tighten until bright-red bleeding stops. **B**, Secure it in place.

Hemostatic Agents

Hemostatic agents generally are substances that speed clot formation by absorbing the excess moisture caused by the bleeding. Hemostatic agents are found in a variety of forms, including treated sponge or gauze pads and powder or granular forms. The powder or granular forms are poured directly on the bleeding vessel, then other hemostatic agents, such as gauze pads, are used in conjunction with direct pressure.

Over-the-counter versions of hemostatic bandages are available in addition to hemostatic agents intended for use by professional rescuers. Some are more effective than others. However, because some types present a risk of further injury or tissue damage, the routine use of hemostatic agents in first aid settings is not recommended.

BURNS

Burns are a special kind of soft tissue injury. Like other types of soft tissue injury, burns can damage the top layer of skin or the skin and the layers of fat, muscle and bone beneath.



FIGURE 7-19, A–C The three classifications of burns are **A**, superficial burns, **B**, partial-thickness burns and **C**, full-thickness burns. Courtesy of Alan Dimick, M.D., Professor of Surgery, Former Director of UAB Burn Center.

Burns are classified by their depth. The deeper the burn, the more severe it is. The three classifications of burns are as follows: superficial (sometimes referred to as first degree) (Fig. 7-19, A), partial thickness (sometimes referred to as second degree) (Fig. 7-19, B) and full thickness (sometimes referred to as third degree) (Fig. 7-19, C). Burns also are classified by their source: heat (thermal), chemical, electrical and radiation (such as from the sun).

A *critical burn* requires immediate medical attention. These burns are potentially life threatening, disfiguring and disabling. Unfortunately, it often is difficult to tell if a burn is critical. Even superficial burns can be critical if they affect a large area or certain body parts. You cannot judge a burn's severity by the person's level of pain because nerve endings may be destroyed.

Be aware that burns to a child or an infant could be caused by child abuse. Burns that are done intentionally to a child often leave an injury that cannot be hidden. One example is a sharp line dividing the burned and unburned skin such as from scalding water in a tub. If you think you have reasonable cause to believe that abuse has occurred, report your suspicions to the appropriate community or state agency. For more information on child abuse, see Chapter 9.

What to Look For

Signals of burns depend on whether the burn is superficial, partial thickness or full thickness.

■ Superficial burns:

- Involve only the top layer of skin.
- Cause skin to become red and dry, usually painful and the area may swell.
- Usually heal within a week without permanent scarring.

■ Partial-thickness burns:

- Involve the top layers of skin.
- Cause skin to become red; usually painful; have blisters that may open and weep clear fluid,

making the skin appear wet; may appear mottled; and often swells.

- Usually heal in 3 to 4 weeks and may scar.

■ Full-thickness burns:

- May destroy all layers of skin and some or all of the underlying structures—fat, muscles, bones and nerves.
- The skin may be brown or black (charred), with the tissue underneath sometimes appearing white, and can either be extremely painful or relatively painless (if the burn destroys nerve endings).
- Healing may require medical assistance; scarring is likely.

When to Call 9-1-1

You should always call 9-1-1 or the local emergency number if the burned person has:

- Trouble breathing.
- Burns covering more than one body part or a large surface area.
- Suspected burns to the airway. Burns to the mouth and nose may be a sign of this.
- Burns to the head, neck, hands, feet or genitals.
- A full-thickness burn and is younger than 5 years or older than 60 years.
- A burn caused by chemicals, explosions or electricity.

What to Do Until Help Arrives

Care given for burns depends on the type of burn.

Heat (Thermal) Burns

Follow these basic steps when caring for a *heat* burn:

- Check the scene for safety.
- Stop the burning by removing the person from the source of the burn.
- Check for life-threatening conditions.

- As soon as possible, cool the burn with large amounts of cold running water, at least until pain is relieved (Fig. 7-20, A).
- Cover the burn loosely with a sterile dressing (Fig. 7-20, B).
- Take steps to minimize shock. Keep the person from getting chilled or overheated.
- Comfort and reassure the person.
- *Do not* apply ice or ice water to any burn. Ice and ice water can cause the body to lose heat rapidly and further damage body tissues.
- *Do not* touch a burn with anything except a clean covering.
- *Do not* remove pieces of clothing that stick to the burned area.
- *Do not* try to clean a severe burn.
- *Do not* break blisters.
- *Do not* use any kind of ointment on a severe burn.

When a person suffers a burn, he or she is less able to regulate body temperature. As a result, a person who has been burned tends to become chilled. To help maintain body temperature and prevent hypothermia, keep the person warm and away from drafts. Remember that cooling a burn over a large area of the body can bring on hypothermia. Be aware of this risk and look for signals of hypothermia. If possible, monitor the person's core



A



FIGURE 7-20 A-B A, Cool a thermal burn with large amounts of cold running water until the pain is relieved. B, Cover a thermal burn loosely with a sterile dressing.

body temperature when cooling a burn that covers a large area.

Chemical Burns

When caring for *chemical burns* it is important to remember that the chemical will continue to burn as long as it is on the skin. You must remove the chemical from the skin as quickly as possible. To do so, follow these steps:

- If the burn was caused by dry chemicals, brush off the chemicals using gloved hands or a towel and remove any contaminated clothing before flushing with tap water (under pressure). Be careful not to get the chemical on yourself or on a different area of the person's skin.
- Flush the burn with large amounts of cool running water. Continue flushing the burn for at least 20 minutes or until EMS personnel take over.
- If an eye is burned by a chemical, flush the affected eye with water until EMS personnel take over. Tilt the head so that the affected eye is lower than the unaffected eye as you flush (Fig. 7-21).
- If possible, have the person remove contaminated clothes to prevent further contamination while you continue to flush the area.

Be aware that chemicals can be inhaled, potentially damaging the airway or lungs.

Electrical Burns

If you encounter a person with an *electrical burn*, you should:

- Never go near the person until you are sure he or she is not still in contact with the power source.
- Turn off the power at its source and care for any life-threatening conditions.
- Call 9-1-1 or the local emergency number. Any person who has suffered an electrical shock needs to be evaluated by a medical professional to determine the extent of injury.



FIGURE 7-21 If an eye is burned by a chemical, flush the affected eye with water until EMS personnel take over.



FIGURE 7-22 For an electrical burn, look for entry and exit wounds and give the appropriate care.

- Be aware that electrocution can cause cardiac and respiratory emergencies. Therefore, be prepared to perform CPR or use an automated external defibrillator (AED).
- Care for shock and thermal burns.
- Look for entry and exit wounds and give the appropriate care (Fig. 7-22).
- Remember that anyone suffering from electric shock requires advanced medical care.

Radiation Burns

Care for a *radiation (sun) burn* as you would for any thermal burn (Fig. 7-23). Always cool the burn and protect the area from further damage by keeping the person away from the source of the burn.

Preventing Burns

- Heat burns can be prevented by following safety practices that prevent fire and by being careful around sources of heat.

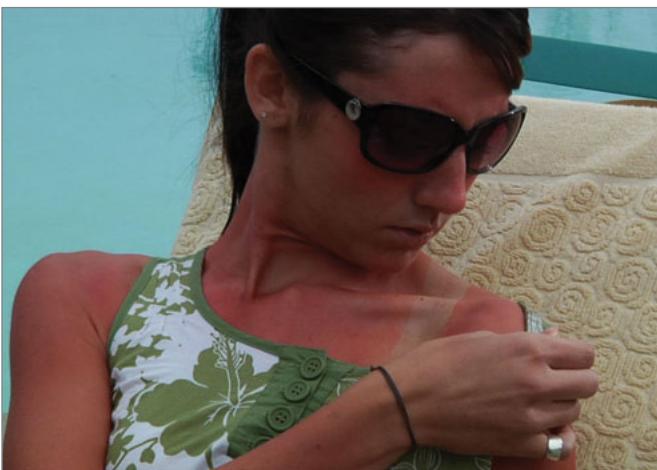


FIGURE 7-23 Care for sunburn as you would for any thermal burn.

- Chemical burns can be prevented by following safety practices around all chemicals and by following manufacturers' guidelines when handling chemicals.
- Electrical burns can be prevented by following safety practices around electrical lines and equipment and by leaving outdoor areas when lightning could strike.
- Sunburn can be prevented by wearing appropriate clothing and using sunscreen. Sunscreen should have a sun protection factor (SPF) of at least 15.

SPECIAL SITUATIONS

Certain types of wounds need special attention or care. These types of situations include crush injury; severed body parts (amputations); impaled objects; and injury to the mouth, nose, lip, tooth, chest and abdomen.

Crush Injuries

A crush injury is caused by strong pressure against a body part, often a limb. It may result in serious damage to underlying tissue, causing bruising, bleeding, lacerations, fractures, shock and internal injuries. Call 9-1-1 or the local emergency number for any serious or life-threatening condition. Care for specific injuries found and assume that internal injuries are present. Also care for shock.

Severed Body Parts

If part of the body has been torn or cut off, call 9-1-1 or the local emergency number, then try to find the part and wrap it in sterile gauze or any clean material, such as a washcloth. Put the wrapped part in a plastic bag and seal the bag. Keep the part cold and bag cool by placing it in a larger bag or container of an ice and water slurry, *not* on ice alone and *not* on dry ice, if possible, but do not freeze (Fig. 7-24). Be sure the part is taken to the hospital with the person. Doctors may be able to reattach it.



FIGURE 7-24 Wrap a severed body part in sterile gauze, put it in a plastic bag and put the bag on ice.



FIGURE 7-25 Place several dressings around an embedded object to keep it from moving. Bandage the dressings in place around the object.

Embedded Objects

If an object, such as a knife or a piece of glass or metal, is embedded in a wound, do not remove it. Place several dressings around it to keep it from moving (Fig. 7-25). Bandage the dressings in place around the object.

If it is only a splinter in the surface of the skin, it can be removed with tweezers. After removing the splinter from the skin, wash the area with soap and water, rinsing the area with tap water for about 5 minutes. After drying the area, apply an antibiotic ointment to the area if the person has no known allergies or sensitivities to the medication and then cover it to keep it clean. If the splinter is in the eye, do not attempt to remove it. Call 9-1-1 or the local emergency number.

Nose Injuries

Nose injuries usually are caused by a blow from a blunt object, often resulting in a nosebleed. High blood pressure or changes in altitude also can cause nosebleeds. In most cases, you can control bleeding by having the person sit with the head slightly forward while pinching the nostrils together for about 10 minutes (Fig. 7-26). If pinching the nostrils does not control the



FIGURE 7-26 To control a nosebleed, have the person lean forward and pinch the nostrils together until bleeding stops (about 10 minutes).

bleeding, other methods include applying an ice pack to the bridge of the nose or putting pressure on the upper lip just beneath the nose. Remember, ice should not be applied directly to the skin since it can damage the skin tissue. Place a cloth between the ice and the skin. Seek medical attention if the bleeding persists or recurs or if the person says that it is caused by high blood pressure.

Mouth Injuries

With mouth injuries, you must make sure the person is able to breathe. Injuries to the mouth may cause breathing problems if blood or loose teeth block the airway.

If the person is bleeding from the mouth and you do not suspect a serious head, neck or spinal injury, place the person in a seated position leaning slightly forward. This will allow any blood to drain from the mouth. If this position is not possible, place the person on his or her side.

Lip Injuries

For injuries that penetrate the lip, place a rolled dressing between the lip and the gum. You can place another dressing on the outer surface of the lip. If the tongue is bleeding, apply a dressing and direct pressure. Applying cold to the lips or tongue can help to reduce swelling and ease pain.

Tooth Injuries

If a person's tooth is knocked out, control the bleeding and save the tooth so it may possibly be reinserted. When the fibers and tissues are torn from the socket, it is important for the person to seek dental or emergency care as soon as possible after the injury. Generally, the sooner the tooth is replaced, the better the chance is that it will survive.

If the person is conscious and able to cooperate, rinse out the mouth with cold tap water if available. You can control the bleeding by placing a rolled sterile dressing into the space left by the missing tooth (Fig. 7-27). Have



FIGURE 7-27 You can control the bleeding by placing a rolled sterile dressing and inserting it into the space left by the missing tooth.

the person gently bite down to maintain pressure. To save the tooth, place it in milk, if possible, or cool water if milk is not available. Be careful to pick up the tooth only by the crown (white part) rather than by the root.

Chest Injuries

The chest is the upper part of the trunk. It is shaped by 12 pairs of ribs. Ten of the pairs attach to the *sternum* (breastbone) in front and to the spine in back. Two pairs, the *floating ribs*, attach only to the spine. The *rib cage*, formed by the ribs, the sternum and the spine, protects vital organs, such as the heart, major blood vessels and the lungs. Also in the chest are the esophagus, trachea and muscles used for respiration.

Chest injuries are a leading cause of trauma deaths each year. Injuries to the chest may result from a wide variety of causes, such as motor vehicle crashes, falls, sports mishaps and crushing or penetrating forces. Chest injuries may involve the bones that form the chest cavity or the organs or other structures in the cavity itself.

Chest wounds may be either closed or open. A *closed chest wound* does not break the skin. Closed chest wounds generally are caused by blunt objects, such as steering wheels. *Open chest wounds* occur when an object, such as a knife or bullet, penetrates the chest wall. Fractured ribs may break through the skin to cause an open chest injury.

Rib fractures usually are caused by direct force to the chest.

Puncture wounds to the chest range from minor to life threatening. Stab and gunshot wounds are examples of puncture injuries. The penetrating object can injure any structure or organ within the chest, including the lungs. A puncture injury can allow air to enter the chest through the wound. Air in the chest cavity does not allow the lungs to function normally.

Puncture wounds cause varying degrees of internal and external bleeding. A puncture wound to the chest is a life-threatening injury. If the injury penetrates the rib cage, air can pass freely in and out of the chest cavity and the person cannot breathe normally. With each breath the person takes, you will hear a sucking sound coming from the wound. This sound is the primary signal of a penetrating chest injury called a *sucking chest wound* (Fig. 7-28). Without proper care, the person's condition will worsen. The affected lung or lungs will fail to function, and breathing will become more difficult.

What to Look For

Signals of a serious chest injury include:

- Trouble breathing.
- Severe pain at the site of the injury.

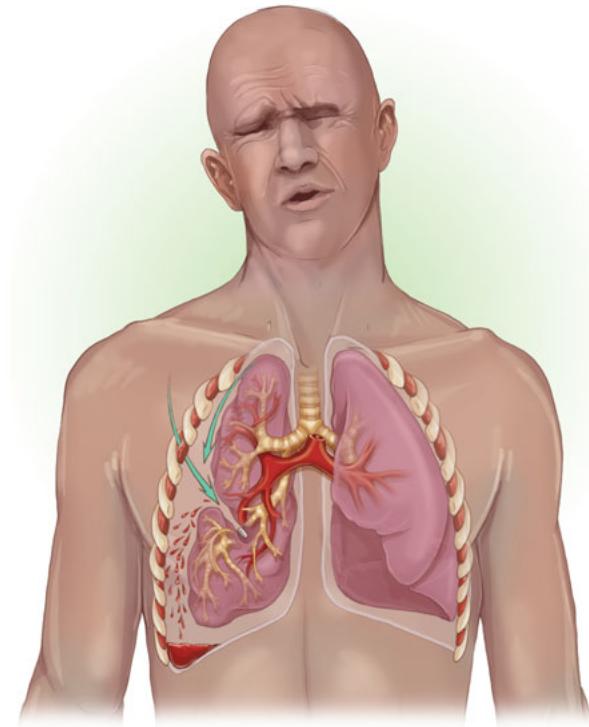


FIGURE 7-28 If the injury penetrates the rib cage, air can pass freely in and out of the chest cavity and the person cannot breathe normally.

- Flushed, pale, ashen or bluish skin.
- Obvious deformity, such as that caused by a fracture.
- Coughing up blood (may be bright red or dark, like coffee grounds).
- Bruising at the site of a blunt injury, such as that caused by a seat belt.
- A “sucking” noise or distinct sound when the person breathes.

When to Call 9-1-1

Call 9-1-1 or the local emergency number for any open or closed chest wound, especially if the person has a puncture wound to the chest. Also call if the person has trouble breathing or a sucking chest wound, or if you suspect rib fractures.

What to Do Until Help Arrives

Care for a chest injury depends on the type of injury.

Caring for Rib Fractures

Although painful, a simple rib fracture is rarely life threatening. Give the person a blanket or pillow to hold against the fractured ribs. Use a sling and binder to hold the person's arm against the injured side of the chest. Monitor breathing.



A



B

FIGURE 7-29, A–B **A**, An occlusive dressing helps keep air from entering a chest wound when the person inhales. **B**, Having an open corner allows air to escape when the person exhales.

Caring for a Sucking Chest Wound

To care for a sucking chest wound, cover the wound with a large occlusive dressing (Fig. 7-29, A–B). A piece of plastic wrap, or a plastic bag folded several times and placed over the wound, makes an effective occlusive dressing. Tape the dressing in place except for one side or corner, which should remain loose. A taped-down dressing keeps air from entering the wound when the person inhales, and having an open corner allows air to escape when the person exhales. If these materials are not available to use as dressings, use a folded cloth. Take steps to minimize shock. Monitor the person’s breathing.

Abdominal Injury

Like a chest injury, an injury to the abdomen may be either open or closed. Injuries to the abdomen can be very painful. Even with a closed wound, the rupture of an organ can cause serious internal bleeding, resulting in shock. It is especially difficult to determine if a person has an internal abdominal injury if he or she is unconscious.

Always suspect an abdominal injury in a person who has multiple injuries.

What to Look For

Signals of serious abdominal injury include:

- Severe pain.
- Bruising.
- External bleeding.
- Nausea.
- Vomiting (sometimes blood).
- Weakness.
- Thirst.
- Pain, tenderness or a tight feeling in the abdomen.

- Organs protruding from the abdomen.

- Rigid abdominal muscles.

- Other signals of shock.

When to Call 9-1-1

Call 9-1-1 or the local emergency number for any serious abdominal injury.

What to Do Until Help Arrives

With a severe open injury, abdominal organs sometimes protrude through the wound (Fig. 7-30, A).

To care for an *open wound to the abdomen*, follow these steps:

1. Put on disposable gloves or use another barrier.
2. Carefully position the person on his or her back with the knees bent, if that position does not cause pain.
3. Do not apply direct pressure.
4. Do not push any protruding organs back into the open wound.
5. Remove clothing from around the wound (Fig. 7-30, B).
6. Apply moist, sterile dressings loosely over the wound (clean, warm tap water can be used) (Fig. 7-30, C).
7. Cover dressings loosely with plastic wrap, if available (Fig. 7-30, D).

To care for a *closed wound to the abdomen*:

- While keeping the injured area still, apply cold to the affected area to control pain and swelling.
- Carefully position the person on his or her back with the knees bent, if that position does not cause pain.
- Keep the person from getting chilled or overheated.

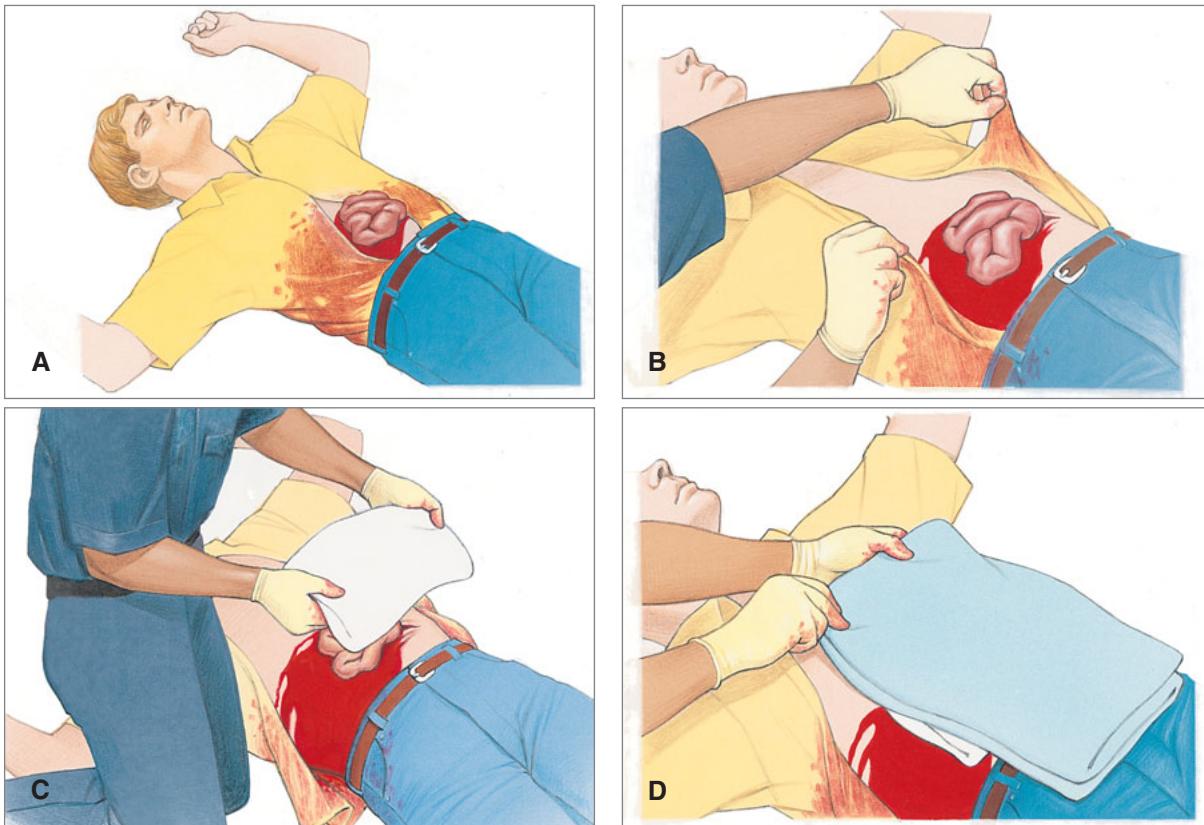


FIGURE 7-30, A–D **A,** Wounds to the abdomen can cause the organs to protrude. **B,** Carefully remove clothing from around the wound. **C,** Cover the organs loosely with a moist, sterile dressing. **D,** Cover the dressings loosely with plastic wrap, if available.

PUTTING IT ALL TOGETHER

For minor soft tissue injuries like scrapes, bruises and sunburns, it is important to give quick care and take steps to prevent infection. If you do this, these types of wounds and burns usually heal quickly and completely.

Serious and life-threatening soft tissue injuries are emergencies.

Call 9-1-1 or the local emergency number and give immediate care. These are crucial steps for any serious wound or burn.

CONTROLLING EXTERNAL BLEEDING

AFTER CHECKING THE SCENE AND THE INJURED OR ILL PERSON:

1 COVER THE WOUND

Cover the wound with a sterile dressing.

2 APPLY DIRECT PRESSURE

Apply pressure until bleeding stops.



3 COVER DRESSING WITH BANDAGE

Check for circulation beyond the injury
(check for feeling, warmth and color).



4 APPLY MORE PRESSURE AND CALL 9-1-1

If bleeding does not stop:

- Apply more dressings and bandages and continue to apply additional pressure.
- Take steps to minimize shock.
- CALL 9-1-1 if not already done.

TIP: Wash hands with soap and water after giving care.

USING A MANUFACTURED TOURNIQUET

NOTE: Always follow standard precautions and follow manufacturer's instructions when applying a tourniquet. Call 9-1-1 or the local emergency number.

1 POSITION THE TOURNIQUET

Place the tourniquet around the limb, approximately **2** inches (about two finger widths) above the wound but not over a joint.

2 PULL STRAP THROUGH BUCKLE

- Route the tag end of the strap through the buckle, if necessary.
- Pull the strap tightly and secure it in place.



3 TWIST THE ROD

Tighten the tourniquet by twisting the rod until the flow of bleeding stops and secure the rod in place. *Do not cover the tourniquet with clothing.*



4 RECORD TIME

Note and record the time that you applied the tourniquet and give this information to EMS personnel.

CHAPTER 8

Injuries to Muscles, Bones and Joints



Injuries to muscles, bones and joints happen to people of all ages at home, work and play. A person may fall while walking in the park and bruise the muscles of a leg. Equipment may fall on a worker and break bones. A skier may fall and twist a leg, tearing muscles in the process.

These injuries are painful and make life difficult, but they seldom are life threatening. However, if they are not recognized and care is not given, they can cause serious problems. In the rare case of a head, neck or spinal injury, lifelong disability, or even death, can result if immediate care is not given.

This chapter discusses the signals of muscle, bone and joint injuries and how to give care for these injuries. In addition, you will read about how to recognize head, neck and spinal injuries, and how to give immediate, potentially life-saving care in these situations.

BACKGROUND

The body's skeleton is made up of bones, muscles, and the tendons and ligaments that connect them. They give the body shape and stability. Bones and muscles give the body shape and mobility. Tendons and ligaments connect to muscle and bones, giving support. They all work together to allow the body to move.

Muscles

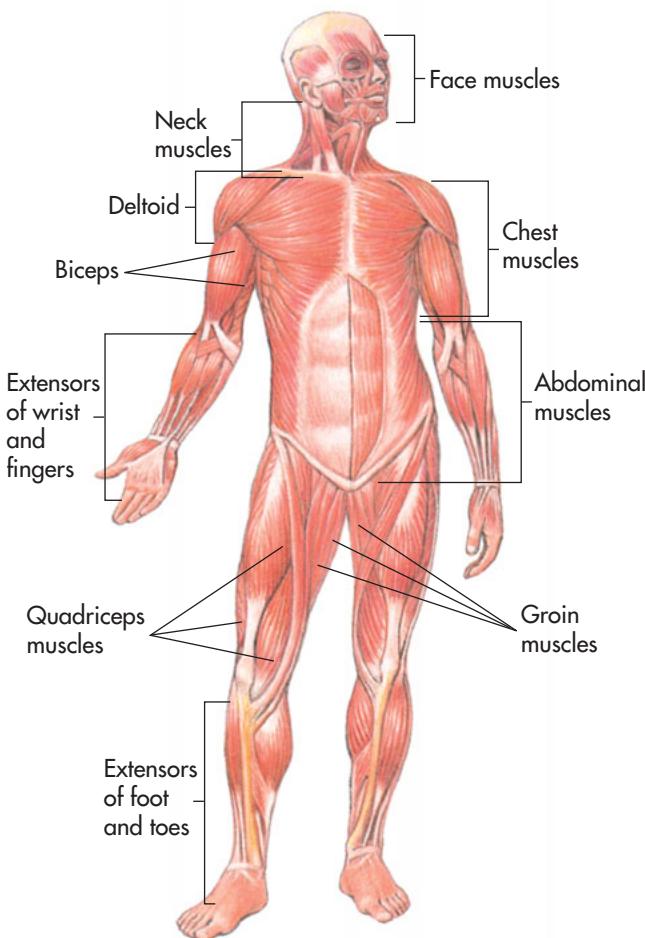
Muscles are soft tissues. The body has over 600 muscles, most of which are attached to bones by strong tissues called *tendons* (Fig. 8-1). Unlike other soft tissues, muscles are able to shorten and lengthen—contract and relax. This contracting and relaxing enables the body to move. The brain directs the muscles to move through the spinal cord, a pathway of nerves in the spine. Tiny jolts of electricity called *electrical impulses* travel through the nerves to the muscles. They cause the muscles to contract. When the muscles contract, they pull at the bones, causing motion at a joint.

Injuries to the brain, spinal cord or nerves can affect muscle control. When nerves lose control of muscles, it is called *paralysis*. When a muscle is injured, a nearby muscle often takes over for the injured one.

Bones

Approximately 200 bones in various sizes and shapes form the *skeleton* (Fig. 8-2). The skeleton protects many of the organs inside the body. Bones are hard and dense. Because they are strong and rigid, they are not injured easily. Bones have a rich supply of blood and nerves. Bone injuries can bleed and usually are painful. If care is not given for the injury, the bleeding can become life threatening. Children have more flexible bones than adults; their bones break less easily. But if a child sustains a fracture to a *growth plate* (areas of developing cartilage near the ends of long bones), it can affect future bone growth. Bones weaken with age. Older adults have more brittle bones. Sometimes they break surprisingly easily. This gradual weakening of bones is called *osteoporosis*.

FRONT VIEW



BACK VIEW

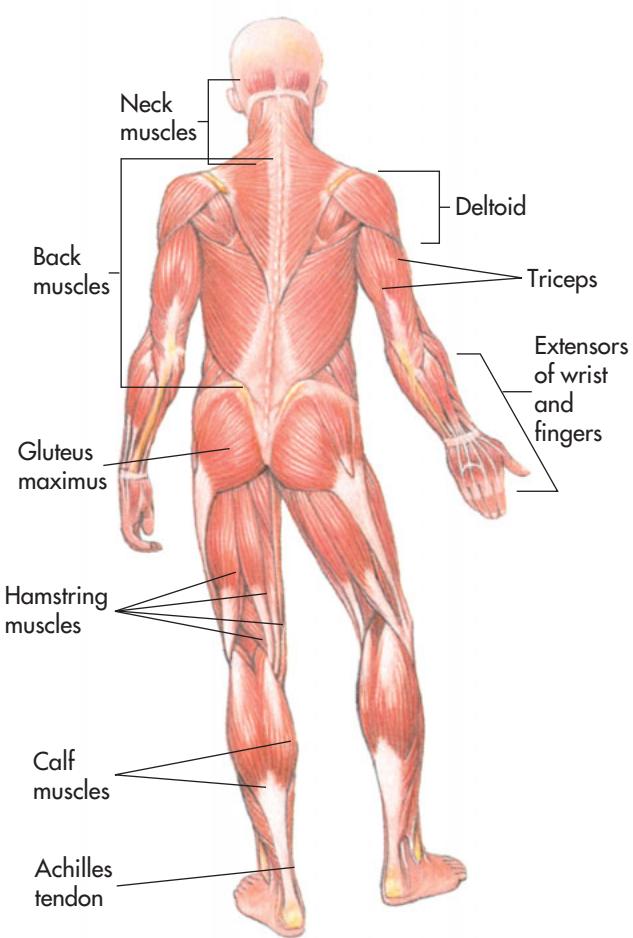


FIGURE 8-1 The body has over 600 muscles, most of which are attached to bones by strong tissues called tendons.

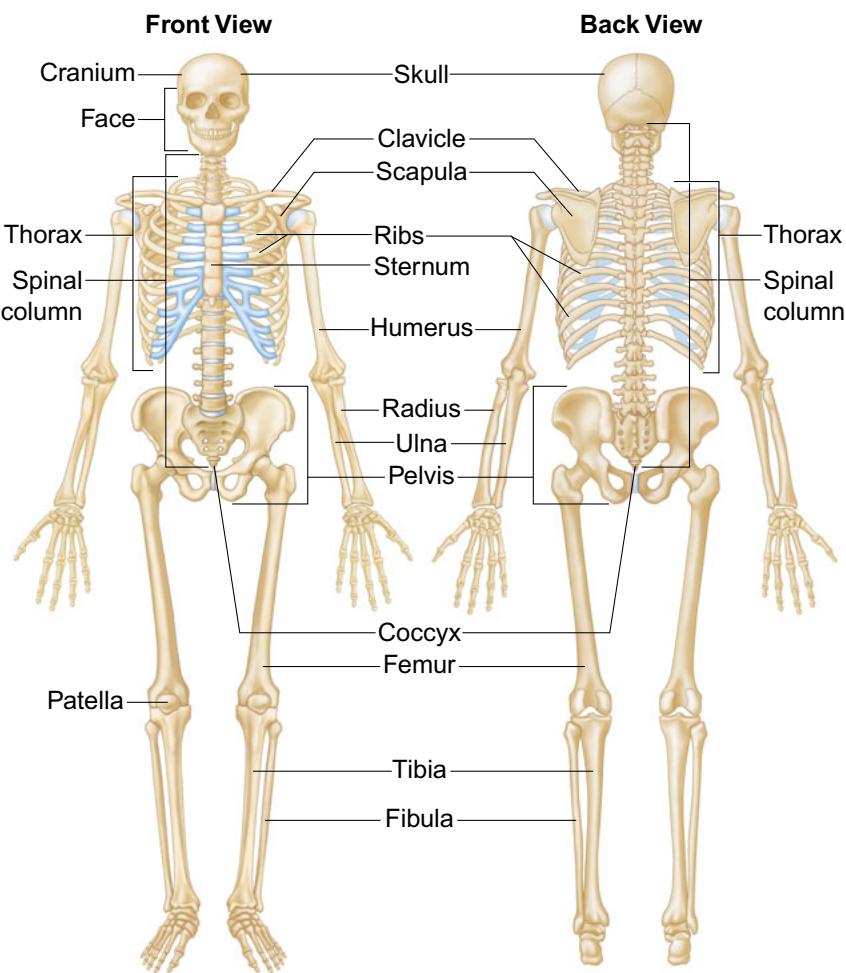


FIGURE 8-2 Approximately 200 bones in various sizes and shapes form the skeleton. The skeleton protects many of the organs inside of the body.

Joints

The ends of two or more bones coming together at one place form a *joint* (Fig. 8-3). Strong, tough bands called *ligaments* hold the bones at a joint together. All joints have a normal range of movement in which they can move freely, without too much stress or strain. When joints are forced beyond this range, ligaments stretch and tear.

TYPES OF INJURIES

The four basic types of injuries to muscles, bones and joints are fractures, dislocations, sprains and strains. They occur in a variety of ways.

Fractures

A *fracture* is a complete break, a chip or a crack in a bone (Fig. 8-4). A fall, a blow or sometimes even a twisting movement can cause a fracture.

Fractures are open or closed. An *open fracture* involves an open wound.

It occurs when the end of a bone tears through the skin. An object that goes into the skin and breaks the bone, such as a bullet, also can cause an open fracture. In a *closed fracture* the skin is not broken.

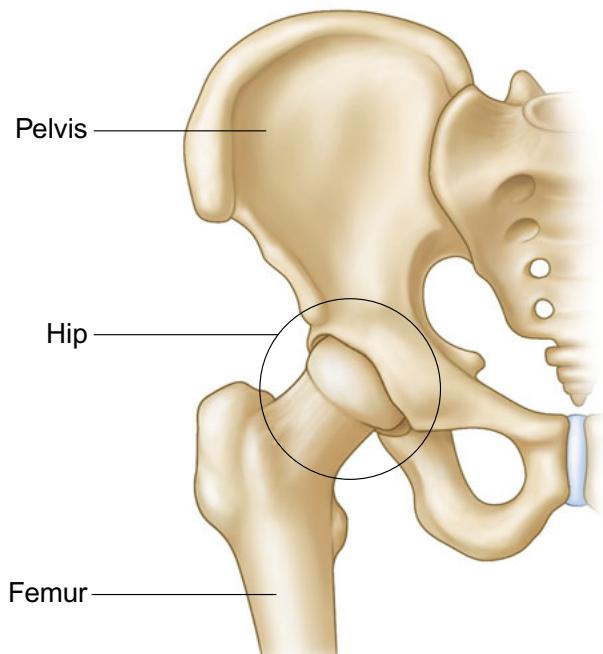


FIGURE 8-3 The ends of two or more bones coming together at one place form a joint.

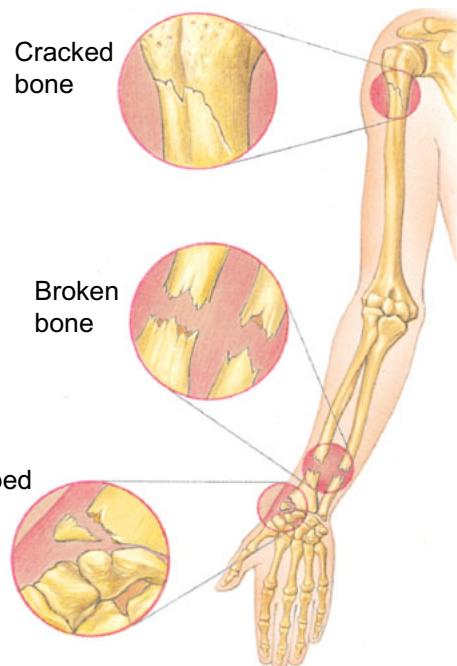


FIGURE 8-4 A fracture is a crack, complete break or chip in a bone.

THE BREAKING POINT

Osteoporosis is a disease that causes the bones to fracture easily. Approximately 10 million Americans have osteoporosis, and 80 percent of these are women. In 2005, some 2 million spine, hip, wrist and other fractures occurred in the United States because of osteoporosis. People usually have osteoporosis for decades before they experience signals. People do not usually become aware they have this "silent" disease until after the age of 60 years.

The disease is caused by a decrease in calcium content of the bones. Normal bones are hard, dense tissues that endure great stresses. Calcium is a key to bone growth, development and repair. When the calcium content of bones decreases, bones become frail and less dense. They are less able to repair the normal damage they incur. This leaves bones, especially hip, back and wrist, more prone to fractures. These fractures may occur with only a little force. Some even occur without force. The person may be taking a walk or washing dishes when the fracture occurs.

Risk Factors

The risk of an American woman suffering a hip fracture alone is equal to her combined risk of breast, uterine and ovarian cancer. Some risk factors for osteoporosis cannot be changed, including:

- Being female.
- Having ancestors from northern Europe, the British Isles, Japan or China.
- Being of an advanced age.
- Having a family history of the disease.
- Having a small, thin body frame.
- Reaching menopause.

However, other risk factors can be changed; there are steps that a person can take to lower the risk of developing osteoporosis. These involve lifestyle choices, including improving diet and exercise, reducing alcohol consumption and stopping smoking.

Preventing Osteoporosis

Osteoporosis can begin as early as 30 years of age. Building strong bones before age 35 years is the key to preventing osteoporosis. To help prevent osteoporosis, take the following steps:

- **Eat a Well-Balanced Diet.** A diet rich in calcium, vitamins and minerals and low in salt is essential for bone health. Limiting caffeine intake and avoiding a high protein diet also are important for bone health.

As a person ages, the amount of calcium absorbed from the diet declines, making it more important to have an adequate calcium intake. Calcium is necessary to bone building and maintenance. Three to four daily servings of low-fat dairy products should provide enough calcium for good bone health.

Vitamin D also is necessary because it helps the body to absorb the calcium to strengthen bones. Exposure to sunshine enables the body to make vitamin D. People who do not receive adequate exposure to the sun need to eat foods that contain vitamin D. The best sources are vitamin-fortified milk and fatty fish, such as tuna, salmon and eel. When exposing yourself to the sun, however, you should not risk a burn or deep tan because both increase the risk of skin cancer.

- **Take Vitamins and Supplements if Necessary.** People who do not take in adequate calcium may be able to make up for the loss by taking calcium supplements. Some are combined with vitamin D. Before taking a calcium supplement, consult your health care provider. Many highly advertised calcium supplements are ineffective because they do not dissolve in the gastrointestinal tract and cannot be absorbed. An insufficient intake of phosphorous, magnesium, and vitamins K, B₆ and B₁₂ also can increase your risk for osteoporosis. To ensure that you are getting enough of these vitamins and minerals, talk to your health care provider about taking a daily multivitamin.

- **Exercise.** Exercise also is necessary to building strong bones. Weight-bearing exercise increases bone density and the activity of bone-building cells. Regular exercise may reduce the rate of bone loss by promoting new bone formation. It also may stimulate the

(Continued)

FOCUS ON PREVENTION *(Continued)*

skeletal system to repair itself. An effective exercise program, such as aerobics, jogging or walking, involves the weight-bearing bones and muscles of the legs.

- **Stop Smoking.** Smoking is bad for your bone health since it can block your body's ability to absorb calcium. The chemicals in cigarettes are bad for bone cells. Also, in women, smoking can block the bone-protective effects of the

hormone estrogen, which can affect bone density.

- **Avoid Too Much Alcohol.** Alcohol intake should be limited to two drinks a day. Drinking more than this on a regular basis can reduce bone formation. Too much alcohol also can reduce calcium levels in the body.

If you have questions about your health and osteoporosis, consult your health care provider.

Closed fractures are more common, but open fractures are more dangerous because they carry a risk of infection and severe bleeding. In general, fractures are life threatening only if they involve breaks in large bones such as the thigh, sever an artery or affect breathing. Since you cannot always tell if a person has a fracture, you should consider the cause of the injury. A fall from a significant height or a motor vehicle crash could signal a possible fracture.

Dislocations

Dislocations usually are more obvious than fractures. A *dislocation* is the movement of a bone at a joint away from its normal position (Fig. 8-5). This movement



FIGURE 8-5 A dislocation is the movement of a bone at a joint away from its normal position.

usually is caused by a violent force tearing the ligaments that hold the bones in place. When a bone is moved out of place, the joint no longer functions. The displaced end of the bone often forms a bump, a ridge or a hollow that does not normally exist.

Sprains

A *sprain* is the tearing of ligaments at a joint (Fig. 8-6). Mild sprains may swell but usually heal quickly. The person might not feel much pain and is active again soon. If a person ignores the signals of swelling and pain and becomes active too soon, the joint will not heal properly and will remain weak. There is a good chance that it will become reinjured, only this time more severely. A severe sprain also can involve a fracture or dislocation of the bones at the joint. The joints most easily injured are at the ankle, knee, wrist and fingers.



FIGURE 8-6 A sprain is the tearing of ligaments at a joint.

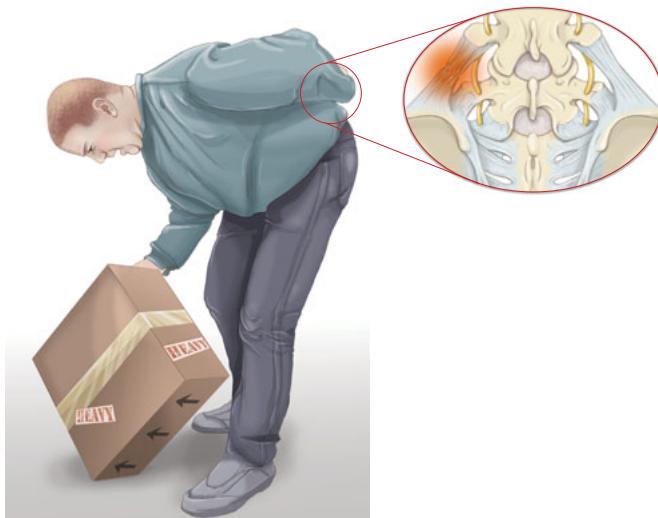


FIGURE 8-7 A strain is a stretching and tearing of muscles or tendons.



FIGURE 8-8 A severely injured bone or joint may appear to be deformed.

Strains

A *strain* is a stretching and tearing of muscles or tendons (Fig. 8-7). Strains often are caused by lifting something heavy or working a muscle too hard. They usually involve the muscles in the neck, back, thigh or the back of the lower leg. Some strains can reoccur, especially in the neck and back.

What to Look For

Always suspect a *severe injury* when any of the following signals are present:

- There is pain. One of the most common signals in any muscle, bone or joint injury is pain. The injured area may be very painful to touch and move.
- There is significant bruising and swelling. The area may be swollen and red or bruised.
- There is significant deformity. The area may be twisted or strangely bent (Fig. 8-8). It may have abnormal lumps, ridges and hollows.
- The person is unable to use the affected part normally.
- There are bone fragments sticking out of a wound.
- The person feels bones grating or the person felt or heard a snap or pop at the time of injury.
- The injured area is cold, numb and tingly.
- The cause of the injury suggests that it may be severe.

It can be difficult to tell if an injury is to a muscle, bone or joint. Sometimes an x-ray, computer assisted tomography (CAT) scan or magnetic resonance imaging (MRI) is needed to determine the extent of the injury.

When to Call 9-1-1

Call 9-1-1 or the local emergency number for the following situations:

- There is obvious deformity.

- There is moderate or severe swelling and discoloration.
- Bones sound or feel like they are rubbing together.
- A snap or pop was heard or felt at the time of the injury.
- There is a fracture with an open wound at, or bone piercing through, the injury site.
- The injured person cannot move or use the affected part normally.
- The injured area is cold and numb.
- The injury involves the head, neck or spine.
- The injured person has trouble breathing.
- The cause of the injury suggests that the injury may be severe.
- It is not possible to safely or comfortably move the person to a vehicle for transport to a hospital.

What to Do Until Help Arrives

General care for injuries to muscles, bone and joints includes following the mnemonic RICE:

- **R**est—Do not move or straighten the injured area.
- **I**mmobilize—Stabilize the injured area in the position it was found. Splint the injured part only if the person must be moved or transported to receive medical care and it does not cause more pain (see Splinting an Injury). Minimizing movement can prevent further injury.
- **C**old—Fill a plastic bag with ice and water or wrap ice with a damp cloth and apply ice to the injured area for periods of about 20 minutes (Fig. 8-9). Place a thin barrier between the ice and bare skin. If 20-minute icing cannot be tolerated, apply ice for periods of 10 minutes. If continued icing is needed, remove the pack for 20 minutes, and then replace it. Cold reduces internal bleeding, pain and swelling. Do *not* apply heat as there is no evidence that applying heat helps muscle, bone or joint injuries.



FIGURE 8-9 Applying ice can help to control swelling and reduce pain.

- Elevate—Elevate the injured part only if it *does not* cause more pain. Elevating the injured part may help reduce swelling.

Some injuries, such as a broken finger, may not require you to call 9-1-1 or the local emergency number, yet they still need medical attention. When transporting the person to a medical facility, have someone else drive. This way you can keep an eye on the person and give care if needed. Injuries to the pelvis, hip or thigh can be life threatening. A person with such an injury should not be moved unnecessarily. Minimizing movement until EMS personnel take over can help to prevent the injury from becoming worse.

Splinting an Injury

Splinting is a method of immobilizing an injured part to minimize movement and prevent further injury and should be used *only* if you have to move or transport the person to seek medical attention *and* if it does not cause more pain. Splint an injury in the position in which you find it. For fractures, splint the *joints* above and below the site of the injury. For sprains or joint injuries, splint the *bones* above and below the site of the injury. If you are not sure if the injury is a fracture or a sprain, splint both the bones and joints above and below the point of injury. Splinting materials should be soft or padded for comfort. Check for circulation (feeling, warmth and color) before and after splinting to make sure that the splint is not too tight.

There are many methods of splinting, including:

- Anatomic splints. The person's body is the splint. For example, you can splint an arm to the chest or an injured leg to the uninjured leg (Fig. 8-10).
- Soft splints. Soft materials, such as a folded blanket, towel, pillow or folded triangular bandage, can be

used for the splint (Fig. 8-11). A sling is a specific kind of soft splint that uses a triangular bandage tied to support an injured arm, wrist or hand.

- Rigid splints. Padded boards, folded magazines or newspapers, or padded metal strips that do not have any sharp edges can serve as splints (Fig. 8-12).
- The ground. An injured leg stretched out on the ground is supported by the ground.



FIGURE 8-10 An anatomic splint uses a part of the body as the splint.



FIGURE 8-11 Folded blankets, towels, pillows or a triangular bandage tied as a sling can be used as soft splints.



FIGURE 8-12 Commercially made rigid splints are available (shown), but many items, such as padded boards or folded newspapers, can be used.

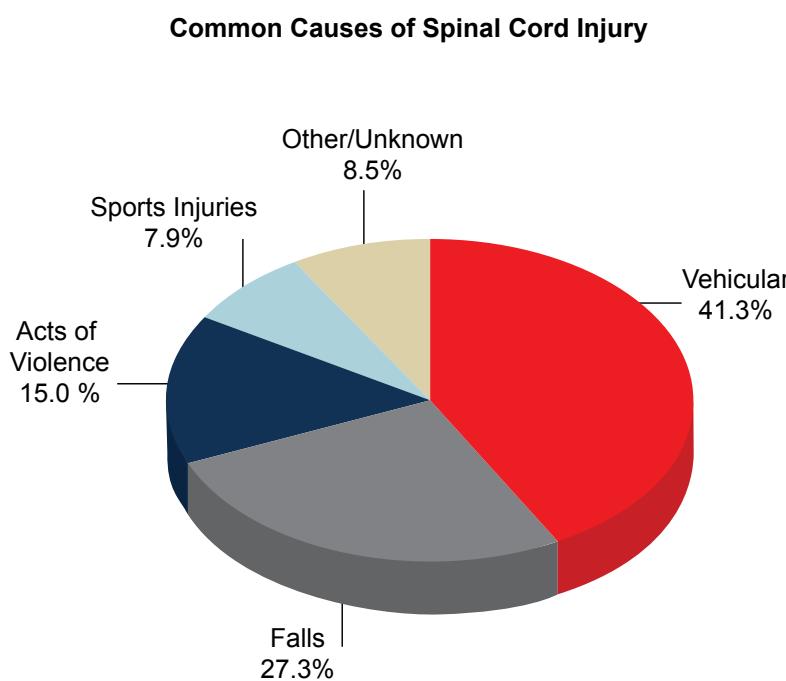
After you have splinted the injury, apply ice to the injured area. Keep the person from getting chilled or overheated and be reassuring.

Head, Neck and Spinal Injuries

Although head, neck and spinal injuries make up only a small fraction of all injuries, these injuries may be life threatening or cause permanent life-altering damage. Each year, approximately 12,000 Americans suffer a spinal cord injury. Most are male victims with an average age of about 40 years. The leading causes of spinal cord injuries are motor vehicle crashes, followed by falls, violence and sports (Fig. 8-13).

Injuries to the head, neck or spine can cause paralysis, speech or memory problems or other disabling conditions. These injuries can damage bone and soft tissue, including the brain and spinal cord. Since generally only x-rays, CAT scans or MRIs can show the severity of a head, neck or spinal injury, you should always care for such injuries as if they were serious.

An injury to the brain can cause bleeding inside the skull (Fig. 8-14). The blood can build up and cause pressure, resulting in more damage. The first and most important signal of brain injury is a change in the person's level of consciousness. He or she may be dizzy or confused or may become unconscious.



Source: National Spinal Cord Injury Statistical Center 2010

FIGURE 8-13 The leading causes of spinal cord injuries are motor vehicle crashes, followed by falls, violence and sports.

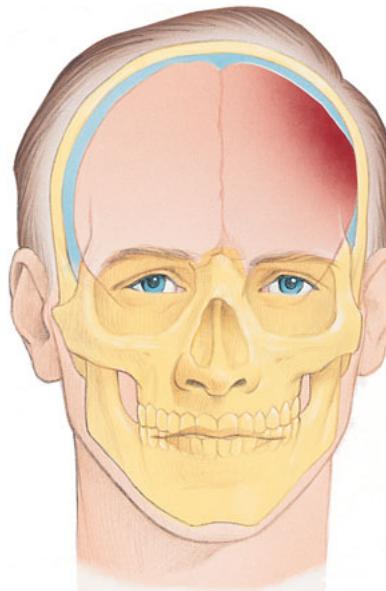
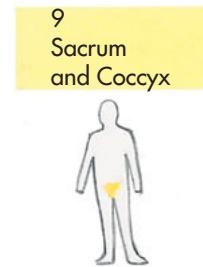
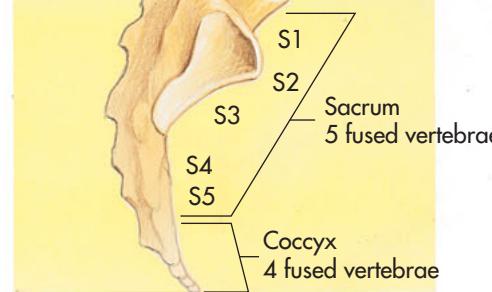
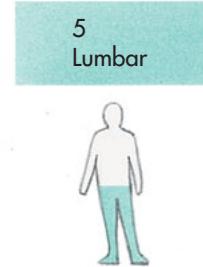
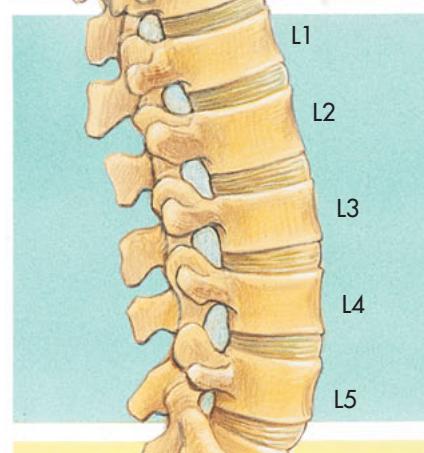
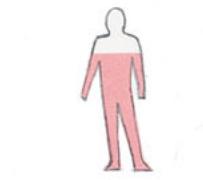
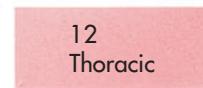
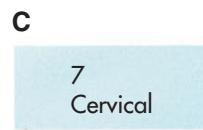
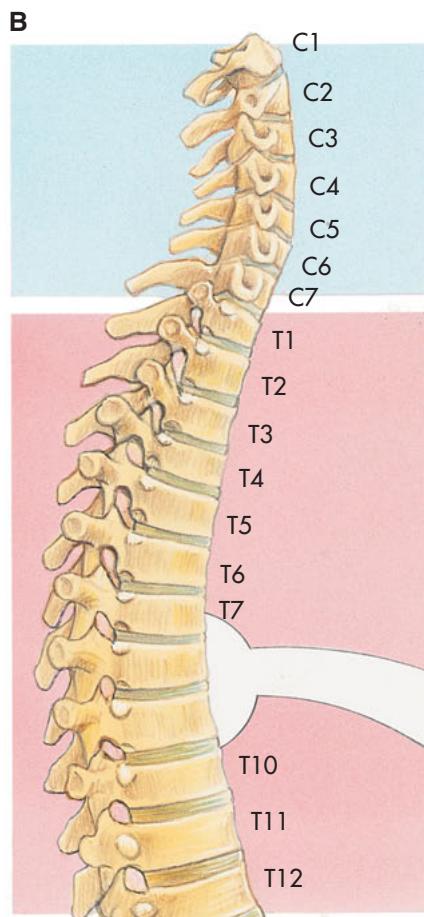
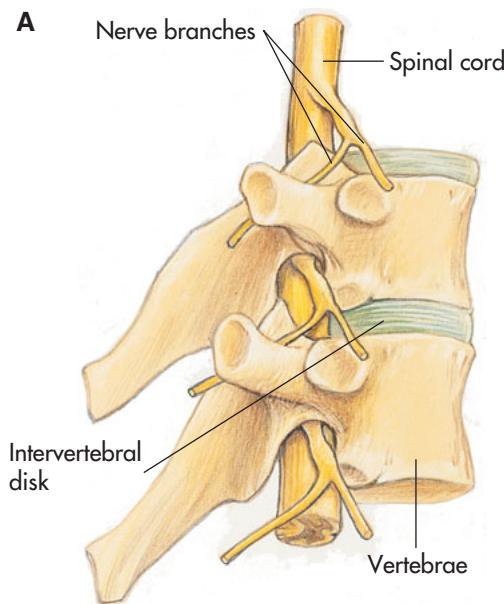


FIGURE 8-14 Injuries to the head can rupture blood vessels in the brain. Pressure builds within the skull as blood accumulates, causing brain injury.

The spine is a strong, flexible column of small bones that support the head and trunk (Fig. 8-15, A–C). The spinal cord runs through the circular openings of the small bones called the *vertebrae*. The vertebrae are separated from each other by cushions of cartilage called *disks*. Nerves originating in the brain form branches extending to various parts of the body through openings in the vertebrae. Injuries to the spine can fracture vertebrae and tear ligaments. In some cases, the vertebrae can shift and cut or squeeze the spinal cord. This can paralyze the person or be life threatening.

What to Look For

When you encounter an injured person, try to determine if there is a head, neck or spinal injury. Think about whether the forces involved were great enough to cause one of these injuries. Someone may have fallen from a significant height or struck his or her head while diving. He or she might have been in a motor vehicle crash and had not been wearing a safety belt. Maybe the person was thrown from the vehicle. Perhaps the person was struck by lightning, or maybe a bullet that pierced his or her back struck the spine. Always suspect



a head, neck or spinal injury if a person is unconscious and/or if his or her safety helmet is broken.

You also should suspect a head, neck or spinal injury if the injured person:

- Was involved in a motor vehicle crash or subjected to another significant force.
- Was injured as a result of a fall from greater than a standing height.
- Is wearing a safety helmet that is broken.
- Complains of neck or back pain.
- Has tingling or weakness in the extremities.
- Is not fully alert.
- Appears to be intoxicated.
- Appears to be frail or older than 65 years.
- Is a child younger than 3 years with evidence of a head or neck injury.

When to Call 9-1-1

If you think a person has a head, neck or spinal injury, call 9-1-1 or the local emergency number.

What to Do Until Help Arrives

While you are waiting for emergency medical services (EMS) personnel to arrive, the best care you can give is to minimize movement of the person's head, neck and spine. As long as the person is breathing normally, support the head and neck in the position

FIGURE 8-15, A-C A, Vertebrae are separated by cushions of cartilage called disks. B, The spine is divided into five regions. C, Traumatic injury to a region of the spine can paralyze specific body parts.



FIGURE 8-16 Place your hands on both sides of the person's head and support it in the position in which you found it until EMS personnel take over.

found. Do this by placing your hands on both sides of the person's head in the position in which you found it. Support the person's head in that position until EMS personnel take over supporting the person's head (Fig. 8-16). If the head is sharply turned to one side, do not move it. Support the head and neck in the position found.

If a person with a suspected head, neck or spinal injury is wearing a helmet, do not remove it unless you are specifically trained to do so *and* it is necessary to assess or access the person's airway. Minimize movement using the same manual technique you would use if the person were not wearing headgear.

The person may become confused, drowsy or unconscious. Breathing may stop. The person may be bleeding. If the person is unconscious, keep the airway open and check breathing. You should take steps to control severe bleeding and keep the person from getting chilled or overheated.

Concussion

A concussion is a type of brain injury that involves a temporary loss of brain function resulting from a blow to the head. A person with a concussion may not always lose consciousness. The effects of a concussion can appear immediately or very soon after the blow to the head and include sleep, mood and cognitive disturbances, and sensitivity to light and noise. However, some effects do not appear for hours or even days and may last for several days or even longer.

When to Call 9-1-1

Every suspected concussion should be treated seriously—call 9-1-1 or the local emergency number.

What to Look For

Signals of a concussion include:

- Confusion, which may last from moments to several minutes.
- Headache.
- Repeated questioning about what happened.

- Temporary memory loss, especially for periods immediately before and after the injury.
- Brief loss of consciousness.
- Nausea and vomiting.
- Speech problems (patient is unable to answer questions or obey simple commands).
- Blurred vision or light sensitivity.

What to Do Until Help Arrives

To care for a person with a suspected concussion:

- Support the head and neck in the position in which you found it.
- Maintain an open airway.
- Control any bleeding and apply dressings to any open wounds.
- Do not apply direct pressure if there are any signs of an obvious skull fracture.
- If there is clear fluid leaking from the ears or a wound in the scalp, cover the area loosely with a sterile gauze dressing.
- Monitor the person for any changes in condition.
- Try to calm and reassure the person. Encourage the person to talk with you; it may prevent loss of consciousness.

Chest Injuries

Injuries to the chest may be caused by falls, sports mishaps or crushing or penetrating forces. Chest injuries range from a simple broken rib to serious life-threatening injuries.

What to Look For

Although painful, a simple broken rib rarely is life threatening. A person with a broken rib generally remains calm. However, a person with a broken rib will take small, shallow breaths because normal or deep breathing is uncomfortable or painful. The person usually will attempt to ease the pain by supporting the injured area with a hand or arm.

If the injury is serious, the person will have trouble breathing. The person's skin may appear flushed, pale or ashen and he or she may cough up blood. Remember that a person with a serious chest injury also may have a spinal injury.

Broken ribs are less common in children because children's ribs are more flexible and tend to bend rather than break. However, the forces that can cause a broken rib in adults can severely bruise the lung tissue of children, which can be a life-threatening injury. Look for signals, such as what caused the injury, bruising on the chest and trouble breathing, to determine if a child has potential chest injury.



FIGURE 8-17 Use an object, such as a pillow or rolled blanket, to support and immobilize the injured area.

When to Call 9-1-1

If you think that the injury is serious, involves trouble breathing or the spine also has been injured, do not move the person and call 9-1-1 or the local emergency number. If the person is standing, do not have the person lie down. Continue to watch the person and minimize movement until EMS personnel take over.

What to Do Until Help Arrives

If you suspect injured or broken ribs, have the person rest in a position that will make breathing easier. Binding the person's upper arm to the chest on the injured side will help to support the injured area and make breathing more comfortable. You can use an object, such as a pillow or rolled blanket, to support and immobilize the area (Fig. 8-17). Monitor breathing and skin condition, and take steps to minimize shock.

Pelvic Injuries

The large, heavy bones of the hip make up the *pelvis*. Like the chest, injury to the pelvic bones can range from simple to life threatening.

What to Look For

An injury to the pelvis may be serious or life threatening because of the risk of damage to major arteries or internal organs. Fractures of bones in this area may

cause severe internal bleeding. Signals of a pelvic injury include the following:

- Severe pain.
- Bruising.
- Possible external bleeding.
- Nausea.
- Vomiting (which may include blood).
- Weakness.
- Thirst.
- Tenderness or a tight feeling in the abdomen.
- Possible loss of sensation in the legs or inability to move the legs.

Be alert for the signals of shock, which could indicate internal bleeding and/or blood loss. Signals of shock include:

- Nausea and vomiting
- Restlessness or irritability.
- Altered level of consciousness.
- Pale, ashen or grayish, cool, moist skin.
- Rapid breathing and pulse.

When to Call 9-1-1

Call 9-1-1 or the local emergency number if you suspect a pelvic injury.

What to Do Until Help Arrives

Because an injury to the pelvis also can involve injury to the lower spine, it is best not to move the person. If possible, try to keep the person lying flat. Watch for signals of internal bleeding and take steps to minimize shock until EMS personnel take over.

PUTTING IT ALL TOGETHER

Most of the time, injuries to muscles, bones and joints are painful but not life threatening. Be prepared to recognize signals of these types of injuries. The general care for a muscle, bone or joint injury is to minimize movement of the injured area, follow the RICE mnemonic and make sure that the person gets medical care in a timely manner.

Although head, neck and spinal injuries make up only a small fraction of all injuries, these injuries may be life threatening or cause permanent life-altering damage. Recognizing signals of these types of injuries, calling 9-1-1 or the local emergency number and knowing how to give proper care could save a life or prevent further injury.

APPLYING AN ANATOMIC SPLINT

AFTER CHECKING THE SCENE AND THE INJURED PERSON:

1 GET CONSENT

2 SUPPORT INJURED PART

Support both above and below the site of the injury.



3 CHECK CIRCULATION

Check for feeling, warmth and color beyond the injury.



4 POSITION BANDAGES

Place several folded triangular bandages above and below the injured body part.



Continued on next page

5 ALIGN BODY PARTS

Place the uninjured body part next to the injured body part.

**6 TIE BANDAGES SECURELY****7 RECHECK CIRCULATION**

Recheck for feeling, warmth and color.

TIP: If you are not able to check warmth and color because a sock or shoe is in place, check for feeling.



APPLYING A SOFT SPLINT

AFTER CHECKING THE SCENE AND THE INJURED PERSON:

1 GET CONSENT

2 SUPPORT INJURED PART

Support both above and below the site of the injury.



3 CHECK CIRCULATION

Check for feeling, warmth and color beyond the injury.



4 POSITION BANDAGES

Place several folded triangular bandages above and below the injured body part.



Continued on next page

5 WRAP WITH SOFT OBJECT

Gently wrap a soft object (e.g., a folded blanket or pillow) around the injured body part.



6 TIE BANDAGES SECURELY



7 RECHECK CIRCULATION

Recheck for feeling, warmth and color.

TIP: If you are not able to check warmth and color because a sock or shoe is in place, check for feeling.



APPLYING A RIGID SPLINT

AFTER CHECKING THE SCENE AND THE INJURED PERSON:

1 GET CONSENT

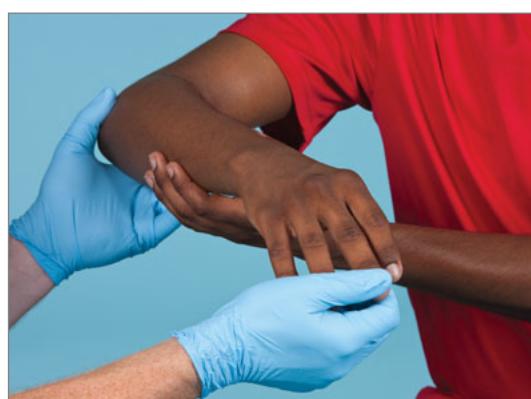
2 SUPPORT INJURED PART

Support both above and below the site of the injury.



3 CHECK CIRCULATION

Check for feeling, warmth and color beyond the injury.



4 PLACE SPLINT

Place an appropriately sized rigid splint (e.g., padded board) under the injured body part.

TIP: Place padding such as roller gauze under the palm of the hand to keep it in a natural position.



Continued on next page

5 SECURE BANDAGES

Tie several folded triangular bandages above and below the injured body part.



6 RECHECK CIRCULATION

Recheck for feeling, warmth and color.

TIP: If a rigid splint is used on an injured forearm, immobilize the wrist and elbow. Bind the arm to the chest using folded triangular bandages or apply a sling. If splinting an injured joint, immobilize the bones on either side of the joint.



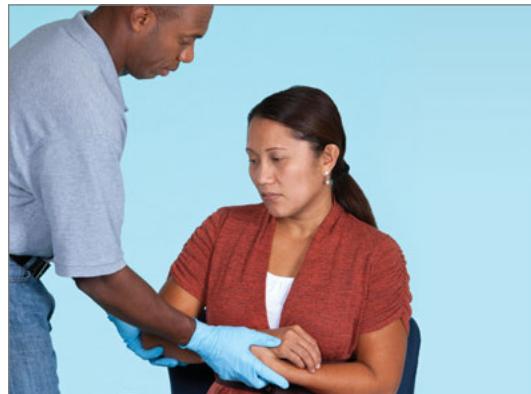
APPLYING A SLING AND BINDER

AFTER CHECKING THE SCENE AND THE INJURED PERSON:

1 GET CONSENT

2 SUPPORT INJURED PART

Support both above and below the site of the injury.



3 CHECK CIRCULATION

Check for feeling, warmth and color beyond the injury.



4 POSITION SLING

Place a triangular bandage under the injured arm and over the uninjured shoulder to form a sling.



Continued on next page

5 SECURE SLING

Tie the ends of the sling at the side of the neck.



6 BIND WITH BANDAGE

Bind the injured body part to the chest with a folded triangular bandage.



7 RECHECK CIRCULATION

Recheck for feeling, warmth and color.



Special Situations and Circumstances



In an emergency, it is helpful to be aware of any unique needs and considerations of the person involved. For example, children, older adults, persons with disabilities and persons who speak a different language than your own have special needs and considerations that affect the care you give. In some emergencies, special circumstances, such as an emergency childbirth or a hostile situation, create additional challenges. In any case, there are steps you can take to be better prepared to respond appropriately.

In this chapter, you will explore ways to recognize and respond to special situations and circumstances. This will help you to better understand the nature of the emergency and give appropriate, effective care.

CHILDREN AND INFANTS

Children and infants have unique needs that require special care. For example, checking the condition of a conscious child or infant can be difficult, especially if the child does not know you. At certain ages, children and infants do not readily accept strangers. Very young children and infants cannot tell you what is wrong.

Communication

We tend to react more strongly and emotionally to a child who is in pain or terrified. In such a situation, try hard to remain calm and avoid showing panic or fear through your actions, speech or facial expressions. Doing so will help both the child and concerned adults.

To help an injured or ill child, try to imagine how the child might feel. A child is afraid of the unknown. This includes being ill or hurt, touched by strangers and being separated from his or her parents. Try not to separate the child or infant from loved ones, if possible. Often a parent will be holding a crying child or an infant, in which case, you perform your assessment while the adult continues to hold him or her.

How you interact with an injured or ill child or infant is very important. You need to reduce the child's anxiety and panic and gain the child's trust and cooperation, if possible. Approach the child slowly. Your sudden appearance may upset the child or infant. Get as close to eye level of the child or infant as you can and keep your voice calm (Fig. 9-1). Smile at the child. Ask the child's name and use it when you talk with him or her. Talk slowly and distinctly, and use words the child will easily understand. Ask questions that the child will be able to answer easily. Explain to the child and the parent what you are going to do. Reassure the child that you are there to help and will not leave.



FIGURE 9-1 To communicate with a child, get as close to eye level as you can.

To be able to effectively check children and infants, it is helpful to be aware of certain characteristics of children in specific age groups. It also is important to communicate effectively with parents. In addition, your care will be more effective if you know how to address the specific communication issues of a child with special needs.

Characteristics of Children and Infants

Children up to 1 year of age are commonly referred to as *infants*. Infants younger than 6 months are relatively easy to approach and are unlikely to be fearful of strangers. However, older infants often show "stranger anxiety." They may turn away from you, cry and cling to their parent. If the parent is calm and cooperative, ask for his or her assistance. Try to check the infant while he or she is held by or seated in the parent's lap.

One- and 2-year-old children commonly are referred to as *toddlers*. Toddlers may not cooperate with your attempts to check them. They usually are concerned about being separated from a loved one. If you reassure the toddler that he or she will not be separated from the parent, the toddler may be comforted. If possible, give the toddler a few minutes to get used to you before attempting to check him or her, and check the toddler in the parent's lap. A toddler also may respond to praise or be comforted by holding a special toy or blanket.

Three- to 5-year-old children commonly are referred to as *preschoolers*. Children in this age group usually are easy to check if you make use of their natural curiosity. Allow them to inspect items such as bandages. Opportunities to explore can reduce children's fears and distract them while you are checking them and giving care. Reassure the child that you are going to help and will not leave him or her. Sometimes you can show what you are going to do on a stuffed animal or doll (Fig. 9-2). If the child is injured, he or she may be upset by seeing



FIGURE 9-2 Demonstrating first aid steps on a stuffed animal or doll helps a child to understand how you will care for him or her.

the cut or injury, so cover it with a dressing as soon as possible.

School-age children are between 6 and 12 years of age. They often are more comfortable speaking with adults and can be a good source of information concerning what happened. Usually you can talk readily with school-age children. However, do not expect a child to always behave in a way that is consistent with his or her chronological age. Be especially careful not to “talk down” to school-age children. Let them know if you are going to do anything that may be painful. Children in this age group are becoming conscious of their bodies and may not like exposure. Respect their modesty.

Children between 13 and 18 years of age are considered *adolescents*. Typically they behave more like adults than children. Direct your questions to the adolescent rather than to a parent but allow input from a parent. Adolescents are modest and often react better to a responder of the same gender.

Interacting with Parents, Guardians and Caregivers

If the family is excited or agitated, the child is likely to be so. When you can calm the family, the child often will calm down as well. Remember to get consent to give care from any adult responsible for the child when possible. Concerned adults need your support too, so behave as calmly as possible.

Communicating with Children Who Have Special Health Care Needs

When communicating with children and parents, remember to observe the whole situation and ask questions to determine if the child has special physical or developmental needs.

If the child has special needs, ask the parent or caregiver if there is a list summarizing vital emergency information such as any unique or specific care procedures associated with the child’s condition or allergies and other medical problems or issues.

Generally, the parents and caregivers can give you the best information since they are the most familiar with any medical equipment needed by the child.

When you attempt to communicate with children who have a developmental disability, the child’s age and developmental level may not be obvious. Do not assume the child has a mental disability because he or she is unable to express thoughts or words. Ask the parents what the child is capable of understanding. Speak directly to the child. Do not speak to the parents as if the child is not in the room.

Observing Children and Infants

You can obtain a lot of information by observing children or infants before actually touching them. Look for signals that indicate changes in the level of consciousness, trouble breathing, and apparent injuries and conditions. Realize that the situation may change as soon as you touch the child or infant because he or she may become anxious or upset.

Unlike some injured or ill adults, a child or an infant is unlikely to try to cover up or deny how he or she feels. A child or an infant in pain, for example, generally will let you know that he or she hurts and will point out the source of the pain.

Ask a young child to point to any place that hurts. An older child can tell you the location of painful areas. If you need to hold an infant, always support the head when you pick up the infant. If a child becomes extremely upset, conduct your check from toe to head instead of head to toe. For more information on checking a child or an infant see Chapter 1.

Common Childhood Injuries and Illnesses

Certain problems are unique to children, such as specific kinds of injury and illness. The following sections highlight some of these concerns.

Abdominal Pain

Abdominal pain in children can be the signal of a large range of conditions. Fortunately, most are not serious and usually go away on their own.

What to Look For

Abdominal pain accompanied by any of the following signals could indicate that the child is suffering from a serious condition or illness:

- A sudden onset of severe abdominal pain or pain that becomes worse with time
- Excessive vomiting or diarrhea
- Blood in the vomit or stool
- Bloated or swollen abdomen
- A change in the child’s level of consciousness, such as drowsiness or confusion
- Signals of shock

When to Call 9-1-1

Call 9-1-1 or the local emergency number if you think the child has a life-threatening condition.

What to Do Until Help Arrives

- Help the child rest in a comfortable position.
- Keep the child from becoming chilled or overheated.
- Comfort and reassure the child.
- Give care based on any conditions found.

Child Abuse

At some point, you may encounter a situation involving an injured child in which you have reason to suspect child abuse. *Child abuse* is the physical, psychological or sexual assault of a child resulting in injury and emotional trauma. Child abuse involves an injury or a pattern of injuries that do not result from an accident. *Child neglect* is a type of child abuse in which the parent or guardian fails to provide the necessary age-appropriate care to a child.

What to Look For

The *signals of child abuse* include:

- An injury whose cause does not fit the explanation of the parent, guardian or caregiver.
- Obvious or suspected fractures in a child younger than 2 years.
- Any unexplained fractures.
- Injuries in various stages of healing, especially bruises and burns.
- Bruises and burns in unusual shapes, such as bruises shaped like belt buckles or handprints or burns the size of a cigarette tip.
- Unexplained lacerations or abrasions, especially to the mouth, lips and eyes.
- Injuries to the genitalia.
- Pain when the child sits down.
- A larger number of injuries than is common for a child of the same age.

The *signals of child neglect* include:

- Lack of adult supervision.
- A child who looks malnourished.
- An unsafe living environment.
- Untreated chronic illness (e.g., a child with asthma who has no medications).

Giving Care

When caring for a child who may have been abused or neglected, your first priority is to care for the child's injuries or illnesses. An abused child may be frightened, hysterical or withdrawn. He or she may be unwilling to talk about the incident in an attempt to protect the abuser. If you suspect abuse, explain your concerns to responding police officers or emergency medical services (EMS) personnel if possible.

If you think you have reasonable cause to believe that abuse has occurred, report your suspicions to a community or state agency, such as the Department of Social Services, the Department of Child and Family Services or Child Protective Services.

You may be afraid to report suspected child abuse because you do not wish to get involved or are concerned about being sued. However, in most states, when you make a report in good faith, you are immune from any civil or criminal liability or penalty, even if you made a mistake. In this instance, *good faith* means that you honestly believe that abuse has occurred or the potential for abuse exists and a prudent and reasonable person in the same position would also honestly believe that abuse has occurred or the potential for abuse exists. You do not need to identify yourself when you report child abuse, although your report will have more credibility if you do. In some areas, certain professions are *legally obligated* to report suspicions of child abuse such as daycare workers or school employees. For more information on reporting child abuse at your workplace, contact your supervisor.

Colic

Colic is a condition in which an otherwise healthy infant cries more than 3 hours a day, for more than 3 days a week, between the ages of 3 weeks and 3 months. The crying usually starts suddenly at about the same time each day. Colic generally starts to improve at about 6 weeks. It often disappears by the time a baby is 12 weeks old.

Causes of colic may include intestinal gas, food sensitivity or allergy, or an immature nervous system. A baby with colic may have a red face and tense, hard belly because the stomach muscles tighten during crying. A baby with colic also may clench his or her legs, feet and fists when crying.

Giving Care

Movement, including walking and driving in a car, may help. White noise, such as the sound of a vacuum in the next room or the clothes dryer, also may be helpful. You also can hold the baby using certain techniques to help relieve gas pain. Consult your health care provider to rule out more serious medical conditions.

Conjunctivitis

Conjunctivitis is commonly known as "pink eye." It is a common childhood eye infection that is contagious. Signals, found in one or both eyes, include redness, swelling, itchiness, a gritty feeling, tearing and a discharge that forms a crust during the night. Seek care from a health care provider as soon as possible for diagnosis. Medication is necessary when the cause of the infection is bacterial.

Diarrhea and Vomiting

Diarrhea, or loose stools, often accompanies an infection in children. Vomiting can be frightening for a young child, but it is rarely a serious problem. However, diarrhea and vomiting both can lead to dehydration. This is more likely to occur in young children.

When to Seek Professional Medical Care

A health care provider should be contacted if:

- Diarrhea or vomiting persists for more than a few days.
- The child is not replacing lost liquids or cannot retain liquids.
- The child has not had a wet diaper in 3 or more hours or, if older, has not had any urine output for more than 6 hours.
- The child has a high fever.
- The child has bloody or black stools.
- The child is unusually sleepy, drowsy, unresponsive or irritable.
- The child cries without tears or has a dry mouth.
- The child has a sunken appearance to the abdomen, eyes or cheeks, or, in a very young infant, has a sunken soft spot at the top of the head.
- The child has skin that remains “tent” if pinched and released.

Giving Care

Remember the following when caring for children and infants with *diarrhea*:

- If the infant will not tolerate his or her normal feedings or if a child is drinking less fluid than normal, add a commercially available oral rehydration solution specially designed for children and infants.
- Do not give over-the-counter anti-diarrhea medications to children younger than 2 years. Use these with the guidance of the health care provider in older children.
- Maintain the child’s normal diet. Try to limit sugar and artificial sweeteners. In addition, encourage the child to eat items like bananas, rice, applesauce and toast.

Remember the following when caring for children and infants who are *vomiting*:

- For a very young child or infant, lay the child on his or her side so that the child does not swallow or inhale the vomit.
- Halt solid foods for 24 hours during an illness involving vomiting and replace with clear fluids, such as water, popsicles, gelatin or an oral rehydration solution specially designed for children and infants.
- Introduce liquids slowly. For instance, wait 2 to 3 hours after a vomiting episode to offer the child some

cool water. Offer 1 to 2 ounces every half hour, four times. Then alternate 2 ounces of rehydration solution with 2 ounces of water every 2 hours.

- After 12 to 24 hours with no vomiting, gradually reintroduce the child’s normal diet.

Ear Infections

Ear infections are common in young children. Nearly 90 percent of young children have an ear infection at some time before they reach school age.

What to Look For

Common signals of an ear infection include:

- Pain. Older children can tell you that their ears hurt, but younger children may only cry or be irritable or tug on the affected ear.
- Loss of appetite.
- Trouble sleeping.
- Fever.
- Ear drainage.
- Trouble hearing.

When to Seek Professional Medical Care

A health care provider should be contacted if:

- The child’s signals last longer than a day.
- You see a discharge of blood or pus from the ear. This could indicate a ruptured eardrum.
- The child’s signals do not improve or get worse after he or she has been diagnosed by a health care provider.

Giving Care

Pain symptoms may be treated with ibuprofen or acetaminophen. In children younger than 2 years, watch for sleeplessness and irritability during or after an upper respiratory infection, such as a cold. Always consult the child’s health care provider before giving any over-the-counter pain relievers.

Fever

Fever is an elevated body temperature of 100.4° F or greater. Fever indicates a problem, and in a child or an infant, it often means there is a specific problem. Usually these problems are not life threatening, but some can be. A high fever in a child or an infant often indicates some form of infection. In a young child, even a minor infection can result in a high fever, usually defined as a temperature 103° F and above.

Fevers that last a long time or are very high can result in seizures. A *febrile seizure* is a convulsion brought on by a fever in infants or small children. It is the most common type of seizure in children. Most

febrile seizures last less than 5 minutes and are not life threatening. However, there are conditions where the child may require additional care (see When to Call 9-1-1 for more information on febrile seizures). Immediately after a febrile seizure, it is important to cool the body if a fever is present (see Chapter 5 for more information on signals of and care for seizures).

What to Look For

Older children with fever will often:

- Feel hot to the touch.
- Complain of being cold or chilled.
- Complain of body aches.
- Have a headache.
- Have trouble sleeping or sleep more than usual.
- Appear drowsy.
- Have no appetite.

Infants with fever will often:

- Be upset or fussy, with frequent crying.
- Be unusually quiet.
- Feel warm or hot.
- Breathe rapidly and have a rapid heart rate.
- Stop eating or sleeping normally.

Taking a Temperature

If children or infants have any of the signals listed above, you will need to take their temperature to determine if they have a fever. A rectal temperature gives the most reliable reading for children younger than 5 years.

(*NOTE:* Before taking a rectal temperature, child care providers should make sure that doing so is not prohibited by state regulations.)

For children age 5 and older, an oral temperature (in the mouth and under the tongue) is the recommended method. You also may take an oral temperature for children age 3 and older.

A child's or an infant's temperature also can be taken in the ear (known as the *tympanic method*) or under the armpit (known as the *axillary method*).

Multiple types of thermometers are available. Do not use glass thermometers, and, whenever possible, use an electronic (digital) thermometer. Also, use a thermometer that is specifically designed for the type of temperature being taken. For example, do not use an oral thermometer to take a rectal temperature. Read the manufacturer's directions carefully so you know how to use the thermometer appropriately.

Always stay with a child while taking a temperature to make sure that the child does not move so the thermometer does not break or cause injury.

When to Call 9-1-1

Call 9-1-1 or the local emergency number if the child or infant has signals of life-threatening conditions, such as unconsciousness or trouble breathing. Also, call if this is the first time that a child has had a febrile seizure, the seizure lasts longer than 5 minutes or is repeated, or the seizure is followed by a quick rise in the temperature of the child or infant. Child care providers should follow state or local regulations regarding emergency care and contact procedures whenever a child in their care becomes injured or ill.

When to Seek Professional Medical Care

A health care provider should be contacted for:

- Any infant younger than 3 months with a fever (100.4° F or greater).
- Any child younger than 2 years with a high fever (103° F or greater).
- Any child or infant who has a febrile seizure.

Giving Care

If the child or infant has a fever, make him or her as comfortable as possible. Encourage the child to rest. Make sure that the child or infant is not overdressed or covered with too many blankets. A single layer of clothing and a light blanket usually is all that is necessary. Make sure that the child or infant drinks clear fluids (e.g., water, juice or chicken broth) or continues nursing or bottle-feeding to prevent dehydration.

Acetaminophen or ibuprofen may be given for a fever. *Do not give the child aspirin for fever or other signals of flu-like or other viral illness.* For a child, taking aspirin can result in an extremely serious medical condition called *Reye's syndrome*. Reye's syndrome is an illness that affects the brain and other internal organs. Always consult the child's health care provider before giving any over-the-counter pain relievers.

If the child has a *high fever*, it is important to gently cool the child. Never rush cooling down a child. If the fever is caused a febrile seizure, rapid cooling could bring on other complications. Instead, remove any excessive clothing or blankets and sponge the child with lukewarm water. *Do not* use an ice water bath or rubbing alcohol to cool down the body. Both of these approaches are dangerous. Continue caring for the child or infant with a high fever as described above.

Foreign Objects in the Nose

If a child has an object in the nose, *do not* try to remove the object. Special lighting and instruments are necessary. It is important to go to a health care provider for removal of the object. Also, try to calm the child and parents as best as possible.

Injury

Injury is the number one cause of death for children in the United States. Many of these deaths are the result of motor-vehicle crashes. The greatest dangers to a child involved in a motor-vehicle crash are airway obstruction and bleeding. Severe bleeding must be controlled as quickly as possible. A relatively small amount of blood lost by an adult is a large amount for a child or an infant to lose.

Because a child's head is large and heavy in proportion to the rest of the body, the head is the area most often injured. A child injured as the result of force or a blow also may have damage to the organs in the abdominal and chest cavities. Such damage can cause severe internal bleeding. A child secured only by a lap belt may have serious abdominal or spinal injuries in a motor-vehicle crash. Try to find out what happened because a severely injured child may not immediately show signals of injury.

To avoid needless deaths of children caused by motor vehicle crashes, laws have been enacted requiring that children ride in the backseat of the car in approved safety seats or wearing safety belts (see the Appendix: Injury Prevention and Emergency Preparedness for detailed information on vehicle safety). As a result of these laws, more children's lives have been saved. You may have to check and care for an injured child while he or she is in a safety seat. A safety seat does not normally pose problems while you are checking a child. Leave the child in the seat if the seat has not been damaged. If the child is to be transported to a medical facility for examination, he or she often can be safely secured and transported in the safety seat.

Meningitis

Meningitis is a disease that occurs when the tissues that cover the brain and spinal cord become inflamed. It is caused by viruses or bacteria. The bacterial form of the disease is less common but more serious.

What to Look For

Signals of meningitis include the following:

- Fever
- Irritability
- Loss of appetite
- Sleepiness
- In addition, older children may complain of a stiff neck, back pain or a headache.

When to Seek Professional Medical Care

A health care provider should be contacted if a child has been in contact with a person who has been diagnosed with bacterial meningitis. The health care provider may prescribe preventative antibiotics.

If the child shows any signals of meningitis, go immediately to a health care provider. It is important to find out whether the illness is caused by bacteria or a virus. Bacterial meningitis requires prompt treatment with antibiotics.

There is no medication to treat viral meningitis. Give supportive care for the fever and pain with acetaminophen or ibuprofen.

Poisoning

Poisoning is one of the top 10 causes of unintentional death in the United States for adolescents, children and infants.

Children younger than 6 years account for half of all exposures to poisonous substances in the United States. Children in this age group often are poisoned by ingesting household products or medications (typically those intended for adults). Although children in this age group are exposed more often than any other, only 3 percent of these cases result in death.

There has been a decrease in child poisonings in recent years due in part to child-resistant packaging for medications. This packaging makes it harder for children to get into these substances. The decrease also is a result of preventive actions taken by parents and others who care for children. For more information on poisoning, refer to Chapter 5.

Rashes

Young children and infants have sensitive skin. Their skin develops rashes easily. Two common rashes in young children and infants are heat rash and diaper rash.

Heat Rash

Heat rash is a red or pink rash that forms on any skin covered by clothing. It is most common in infants and looks like red dots or small pimples.

If the child or infant develops heat rash, give care by:

- Removing or loosening clothing to cool down the child or infant.
- Moving the child or infant to a cool location.
- Cooling the area with wet washcloths or a cool bath and letting the skin air-dry.

If the area remains irritated, use calamine lotion or a hydrocortisone cream if the child is not sensitive or allergic to these products. Avoid ointments or other lotions. They could further irritate the skin.

Diaper Rash

Diaper rash is another common rash in young children and infants. When skin is wet for too long, it begins to break down. When wet skin is rubbed, it becomes more

FOCUS ON PREVENTION

SIDS

Infants who sleep on their stomach at night or naptimes seem to have an increased risk for SIDS. Therefore, to help reduce the risk of SIDS:

- *Always place an infant on his or her back at night or naptimes, using a firm mattress in a safety-approved crib or bassinet.*

- *Make sure that there is no soft bedding, such as pillows, blankets and bumpers, or soft toys, such as stuffed animals, in the crib. These items could cause suffocation.*
- *Check the sleeping infant frequently.*

damaged. Moisture from a dirty diaper can harm the skin of a toddler or infant, making it more irritated. This causes diaper rash to develop.

Seek care from a health care provider if diaper rash:

- Develops blisters or pus-filled sores.
- Does not go away within 2 to 3 days.
- Gets worse.

Give care for diaper rash in toddlers and infants by applying a thick layer of over-the-counter zinc oxide or petroleum jelly to the affected area. This creates a barrier between the infant's delicate skin and the urine or feces.

To prevent diaper rash and help it to heal:

- Keep the area as dry as possible by changing wet or soiled diapers immediately.
- Clean the area with water and a soft washcloth. Avoid wipes that can dry the child's skin.
- Pat the skin dry or let it air dry.
- Keep the diaper loose so wet and soiled parts do not rub against the skin.

Sudden Infant Death Syndrome

Sudden infant death syndrome (SIDS) is the sudden, unexpected and unexplained death of a seemingly healthy infant. In the United States, approximately 2300 infants die every year of SIDS. SIDS is the third leading cause of death for infants between 1 month and 1 year of age. It occurs most often in infants between 4 weeks and 7 months of age. SIDS usually occurs while the infant is sleeping.

The condition does not seem to be linked to a disease. In addition, the cause(s) of SIDS are not yet understood. It is not thought to be hereditary, but it does tend to recur in families. Because of these factors, there is no way of knowing if a child is at risk for SIDS. Sometimes it is mistaken for child abuse because of the unexplained

death in an apparently healthy child. In addition, SIDS sometimes causes bruise-like blotches to appear on the infant's body. However, SIDS is not related to child abuse.

When to Call 9-1-1

By the time the infant's condition has been discovered, he or she may be in cardiac arrest. If you encounter an infant in this condition, make sure that someone has called 9-1-1 or the local emergency number or call yourself.

What to Do Until Help Arrives

If there is no breathing, perform CPR until EMS personnel take over, an automated external defibrillator (AED) becomes available or you see an obvious sign of life, such as breathing.

After a SIDS Incident

An incident involving a severely ill child or infant or one who has died can be emotionally upsetting. After such an episode, find someone whom you trust to talk about the experience and express your feelings. If you continue to be distressed, seek professional counseling. The feelings caused by such incidents need to be dealt with and understood or they can result in serious stress reactions.

EMERGENCY CHILDBIRTH

Words such as exhausting, stressful, exciting, fulfilling, painful and scary sometimes are used to describe a planned childbirth. A planned childbirth is one that occurs in the hospital or at home under the supervision of a health care provider. If you find yourself assisting with the delivery of a newborn, however, it probably will not be happening in a planned situation. Therefore, your feelings, as well as those of the expectant mother, may be intensified by fear of the unexpected or the possibility that something might go wrong.

Take comfort in knowing that things rarely go wrong. Childbirth is a natural process. Thousands of children all over the world are born without complications each day, in areas where no medical care is available.

When to Call 9-1-1

If a woman is giving birth, call 9-1-1 or the local emergency number immediately. Give the EMS call taker the following important information:

- The woman's name, age and expected due date
- How long she has been having labor pains
- Whether this is her first child

What to Do Until Help Arrives

By following a few simple steps, you can effectively assist in the birth process while you wait for EMS personnel to arrive. If a woman is giving birth:

- Talk with the woman to help her remain calm.
- Place layers of clean sheets, towels or blankets under her and over her abdomen.
- Control the scene so that the woman will have privacy.
- Position the woman on her back with her knees bent, feet flat and legs spread wide apart.
- Avoid contact with body fluids; wear disposable gloves and protective eyewear if possible.
- Remember, the woman delivers the baby, so be patient and let it happen naturally.
- The baby will be slippery; use a clean towel to receive and hold the baby; avoid dropping the baby.
- Keep the baby warm; have a clean, warm towel or blanket handy to wrap the newborn.

CAUTIONS:

- Do not let the woman get up or leave to find a bathroom (most women want to use the restroom).
- Do not hold the woman's knees together; this will not slow the birth process and may complicate the birth or harm the baby.
- Do not place your fingers in the vagina for any reason.
- Do not pull on the baby.

OLDER ADULTS

Older adults, or the elderly, generally are considered to be those older than 65 years. They are quickly becoming the fastest growing age group in the United States. Since 1900, life expectancy in the United States has increased by over 60 percent. In 1900, for example, the average life expectancy was 46 years for men and 48 years for women. Today, it is 75 years for men and 80 years for women. The main explanations for the increase in life expectancy are medical advancements and improvements in health care.

Normal aging brings about changes. People age at different rates, and each person's organs and body parts age at different rates as well. For example, a person with wrinkled, fragile skin may have strong bones or excellent respiratory function.

Overall, however, body function generally declines as we age. Some changes begin as early as age 30 years. The lungs become less efficient, so older people are at higher risk of developing pneumonia and other lung diseases. The amount of blood pumped by the heart with each beat decreases, and the heart rate slows. The blood vessels harden, causing increased work for the heart. Hearing and vision usually decline, often causing some degree of sight and hearing loss. Reflexes become slower, and arthritis may affect joints, causing movement to become painful.

Checking an Older Adult

The physical and mental changes associated with aging may require you to adapt your way of communicating and to be aware of certain potential age-related conditions, such as hearing loss.

To check an injured or ill older adult, attempt to learn the person's name and use it when you speak to him or her. Consider using "Mrs.," "Mr." or "Ms." as a sign of respect. Make sure that you are at the person's eye level so that he or she can see and hear you more clearly (Fig. 9-3).

If the person seems confused at first, the confusion may be the result of impaired vision or hearing. If he or she usually wears eyeglasses and cannot find them, try to locate them. Speak slowly and clearly, and look at the person's face while you talk. Notice if he or she has a hearing aid. Someone who needs glasses to see or a hearing aid to hear is likely to be very anxious without them. If the person is truly confused, try to find out if the confusion is the result of the injury or an



FIGURE 9-3 Speak to an elderly person at eye level so that he or she can see and hear you more clearly.

existing condition. Be sure to get as much information as possible from family members or bystanders. The person may be afraid of falling, so if he or she is standing, offer an arm or hand. Remember that an older person may need to move slowly.

Try to find out what medications the person is taking so that you can tell EMS personnel. Look for a medical identification (ID) tag, bracelet or necklace that lists the person's name, address and medical information. Be aware that an elderly person may not recognize the signals of a serious condition. An elderly person also may minimize any signals for fear of losing his or her independence or being placed in a nursing home.

Common Injuries and Illnesses in Older Adults

Certain problems are more prevalent in older adults, such as specific kinds of injury and illness. The following sections discuss some of these concerns.

Confusion

Older adults are at increased risk of altered thinking patterns and confusion. Some of this change is the result of aging. Certain diseases, such as Alzheimer's disease, affect the brain, resulting in impaired memory and thinking and altered behavior. Confusion that comes on suddenly, however, may be the result of medication, even a medication the person has been taking regularly. An injured or ill person who has problems seeing or hearing also may become confused when injured or ill. This problem increases when the person is in an unfamiliar environment. A head injury also can result in confusion.

Confusion can be a signal of a medical emergency. An elderly person with pneumonia, for example, may not run a fever, have chest pain or be coughing, but because not enough oxygen is reaching the brain, the person may be confused. An older person can have a serious infection without fever, pain or nausea. An elderly person having a heart attack may not have chest pain, pale or ashen skin or other classic signals but may be restless, short of breath and confused.

Depression is common in older adults. A depressed older adult may seem to be confused initially. A person suffering from depression also may show signals that have no apparent cause, such as sudden shortness of breath or chest pain. Whatever the reason for any the confusion, be respectful and do not talk down to or treat him or her like a child.

Falls

Older adults are at increased risk of falls. In fact, falls are the leading cause of death from injury for older adults.

Falls in older adults are due to slower reflexes, failing eyesight and hearing, arthritis and problems such as unsteady balance and movement. Falls frequently result in fractures because the bones become weaker and more brittle with age.

Head Injuries

An older adult is at greater risk of serious head injury. As we age, the size of the brain decreases. This decrease results in more space between the surface of the brain and the inside of the skull. This space allows more movement of the brain within the skull, which can increase the likelihood of serious head injury. Occasionally, an older adult may not develop the signals of a head injury until days after a fall. Therefore, unless you know the cause of a behavior change, you should always suspect a head injury as a possible cause of unusual behavior in an elderly person. This is especially true if you know that the person had a fall or a blow to the head.

Problems with Heat and Cold

An elderly person is more susceptible to extremes in temperature. The person may be unable to feel temperature extremes because his or her body may no longer regulate temperature effectively. Body temperature may change rapidly to a dangerously high or low level.

The body of an elderly person retains heat because of a decreased ability to sweat and the reduced ability of the circulatory system to adjust to heat. This can lead to heat exhaustion or heat stroke.

An elderly person may become chilled and suffer hypothermia simply by sitting in a draft or in front of a fan or air conditioner. Hypothermia can occur at any time of the year. People can go on for several days suffering from mild hypothermia without realizing it. The older person with mild hypothermia will want to lie down frequently; however, this will lower the body temperature even further.

Giving Care for a Heat-Related Illness

See Chapter 6 for information about caring for heat-related illnesses.

Giving Care for a Cold-Related Emergency

See Chapter 6 for information about caring for cold-related emergencies.

PEOPLE WITH DISABILITIES

According to the American with Disabilities Act (ADA), a person with a disability is someone who has a physical or mental impairment that substantially limits one or more major life activities such as walking, talking, seeing, hearing or learning. This includes, for example,

a blind person who cannot read information posted on a bulletin board or a deaf person who may need a sign language interpreter.

The Centers for Disease Control and Prevention (CDC) estimates that over 33 million people in the United States have disabilities. When giving care to people with disabilities, communication can be a challenge. It may be difficult to find out what has happened and what might be wrong in an emergency situation.

Physical Disability

A person is considered to have a physical disability if his or her ability to move (also called *motor function*) is impaired. A person also is considered to have a physically disability if his or her sensory function is impaired. Sensory function includes all of the senses: sight, hearing, taste, smell and touch. A person with a physical disability may have impairments in motor function, sensory function or both.

General hints for approaching an injured or ill person whom you suspect may have a physical disability include:

- Speak to the person before touching him or her.
- Ask, “How can I help?” or “Do you need help?”
- Ask for assistance and information from the person who has the disability—he or she has been living with the disability and best understands it. If you are not able to communicate with the person, ask family members, friends or companions who are available to help.
- Do not remove any braces, canes, other physical support, eyeglasses or hearing aids. Removal of these items may take away necessary physical support for the person’s body.
- Look for a medical ID tag, bracelet or necklace at the person’s wrist or neck.

- A person with a disability may have a service animal, such as a guide or signal dog. Be aware that this animal may be protective of the person in an emergency situation. Allow the animal to stay with the person if possible, which will help to reassure both of them.

Deaf and Hard of Hearing

Hearing loss is defined as a partial or total loss of hearing. Some people are born with a hearing loss. Hearing loss also can result from an injury or illness affecting the ear, the nerves leading from the brain to the ear or the brain itself. You may not immediately realize that the injured or ill person has a hearing loss. Often the person will tell you, either in speech or by pointing to the ear and shaking the head no. Some people carry a card stating that they have a hearing loss. You may see a hearing aid in a person’s ear.

The biggest obstacle you must overcome in caring for a person with a hearing loss is communication. You will need to figure out how to get that person’s consent to give care, and you will need to assess the problem.

Sometimes the injured or ill person will be able to read lips. To assist him or her, position yourself where the person can clearly see your face. Look straight at the person while you speak, and speak slowly. Do not exaggerate the way you form words. Do not turn your face away while you speak. Many people with a hearing impairment, however, do not read lips. In these cases, using gestures and writing messages on paper may be the most effective way to communicate.

If you and the person know sign language, use it. Some people who are deaf or hard of hearing have a machine called a telecommunications device for the deaf (TDD). You can use this device to type messages and questions, and the person can type replies back to you (Fig. 9-4, A–B). Many people who have a hearing



FIGURE 9-4, A–B Communicate with a person who has a hearing loss in the best way possible. **A**, Use sign language, lip reading or writing to communicate. **B**, You may also use a telecommunications device for the deaf.

impairment can speak, some distinctly, some not so clearly. If you have trouble understanding, ask the person to repeat what he or she said. Do not pretend to understand.

Blind or Visually Impaired

Vision loss is a partial or total loss of sight. Vision loss can have many causes. Some people are born with vision loss. Others lose vision as a result of disease or injury. Vision loss is not necessarily a problem with the eyes. It can result from problems with the vision centers in the brain.

It is no more difficult to communicate verbally with a person who has a partial or total loss of sight than with someone who can see. You do not need to speak loudly or in overly simple terms. The person may not be able to tell you certain things about how an injury occurred but usually can give an accurate account based on his or her interpretation of sound and touch.

When caring for a person with vision loss, help to reassure him or her by explaining what is going on and what you are doing. If you must move a visually impaired person who can walk, stand beside the person and have him or her hold onto your arm. Walk at a normal pace, alert the person to obstacles in the way, such as stairs, and let the person know whether to step up or down. If the person has a service animal, try to keep them together. Ask the person to tell you how to handle the dog or ask him or her to do it.

Motor Impairment

A person with motor impairment is unable to move normally. He or she may be missing a body part or have a problem with the bones or muscles or the nerves that control movement. Causes of motor impairment could include stroke, muscular dystrophy, multiple sclerosis, paralysis, cerebral palsy or loss of a limb.

Determining which problems are pre-existing and which are the result of immediate injury or illness can be difficult. Care for all problems you detect as if they are new.

Mental Impairment

Mental, or cognitive, function includes the brain's capacity to reason and process information. A person with a mental impairment has problems performing these operations. Some types of mental impairment are genetic. Others result from injuries or infections that occur during pregnancy, shortly after birth or later in life. Some causes never are determined.

In some situations, you will not be able to determine if a person has a mental impairment; in others, it will

be obvious. If you suspect that a person has a mental impairment, approach him or her as you would any other person in his or her age group. If the person appears not to understand you, rephrase what you were saying in simpler terms. Listen carefully to what the person says. An injury or a sudden illness can be disruptive to some individuals who have a cognitive impairment, causing them a great deal of anxiety and fear. Take time to explain who you are and what you are going to do. Offer reassurance. Try to gain the person's trust. If a parent, guardian or caregiver is present, ask that person to help you give care to the person.

People with certain types of mental illness might misinterpret your actions as being hostile. If the scene becomes unsafe, you may need to remove yourself from the immediate area. Call 9-1-1 or the local emergency number and explain your concerns about a potential psychiatric emergency. If possible, keep track of the person's location and what he or she is doing. Report this information to the emergency responders.

LANGUAGE BARRIERS

Getting consent to give care to a person with whom you have a language barrier can be a problem. Find out if any bystanders speak the person's language and can help to translate. Do your best to communicate nonverbally. Use gestures and facial expressions. If the person is in pain, he or she probably will be anxious to show you where the pain is located. Watch his or her gestures and facial expressions carefully. When you speak to the person, speak slowly and in a normal tone. The person probably will have no trouble hearing you.

When you call 9-1-1 or the local emergency number, explain that you are having difficulty communicating with the person and tell the call taker which language you believe the person speaks. The EMS system may have someone available who can help with communication. If the person has a life-threatening condition, such as severe bleeding, consent is implied.

CRIME SCENES AND HOSTILE SITUATIONS

In certain situations, such as giving care to a person in a crime scene or an injured person who is hostile, you will need to use extreme caution. Although your first reaction may be to go to the aid of a person, in these situations you should call 9-1-1 or the local emergency number and stay at a safe distance.

Do not enter the scene of a suicide. If you happen to be on the scene when an unarmed person threatens suicide, call 9-1-1 or the local emergency number. Do not argue with the person. Remain at a safe distance.

Leave or avoid entering any area considered to be a crime scene, such as one where there is a weapon, or the scene of a physical or sexual assault. Call 9-1-1 or the local emergency number and stay at a safe distance.

You may encounter a situation where there is a hostile or angry person. A person's rage or hostility may be caused by the injury, pain or fear. Some individuals, afraid of losing control, may act resentful and suspicious. Hostile behavior also may result from the use of alcohol or other drugs, a lack of oxygen or a medical condition.

If a person refuses your care or threatens you, remove yourself from the situation and stay at a safe distance.

Never argue with or restrain an injured or ill person. Call 9-1-1 or the local emergency number if someone has not already done so. Never put your own safety at risk.

Uninjured family members also may display anger. This anger may stem from panic, anxiety or guilt. Try to remain calm and explain what you plan to do in giving emergency care. If possible, find a way that family members can help, such as by comforting the person.

PUTTING IT ALL TOGETHER

It is important to be aware of the special needs and considerations of children and infants, older adults, people with disabilities and people who speak a different language than your own. In rare circumstances, you could find yourself in a position to give help in an emergency childbirth or help an older person who has become suddenly ill. Knowing what to do in these types of situations will help you to act calmly and give the right care. Interacting and communicating with all types of people in many different situations will enable you to respond quickly and effectively in an emergency.

Asthma



Note: The instructions for administering asthma medication found in this chapter should not be substituted for those given by a medical professional to an individual person. Nor should these instructions be substituted for directions given by a medical professional in consultation with a site where asthma medication will be administered. Consult a health care professional for specific advice on the use of asthma inhalers and nebulizers.

Asthma is a life-long lung disease. It affects millions of adults and children in the United States. Cases of severe asthma and deaths from asthma are increasing. As a first aid responder, there is a good chance that you could be asked to help a person with a breathing emergency caused by asthma.

In this chapter, you will read about how to identify the signals of an asthma attack. This chapter also covers how to give care to a person having an asthma attack, which includes helping the person to use an inhaler to administer quick-relief medications.

ASTHMA

Asthma is an illness in which certain substances or conditions, called “triggers,” cause inflammation and constriction of the *airways* (small tubes in the lungs through which we breathe), making breathing difficult. Triggers of an asthma attack include exercise, cold air, allergens or irritants, such as perfume.

In 2008, the Centers for Disease Control and Prevention (CDC) estimated that over 23 million Americans were affected by asthma. Asthma is more common in children and young adults. However, its frequency and severity is increasing in all age groups in the United States. Asthma is the third-ranking cause of hospitalization among those younger than 15 years.

People diagnosed with asthma can reduce the risk of an attack by controlling environmental variables when possible. This helps to limit exposure to the triggers that can start an asthma attack.

When an attack does occur, they can use medications and other forms of treatment. Asthma medications stop the muscle spasm and open the airway, which makes breathing easier.

Asthma Triggers

A trigger is anything that sets off or starts an asthma attack. A trigger for one person is not necessarily a trigger for another. Asthma triggers include the following:

- Dust and smoke
- Air pollution
- Respiratory infections
- Fear or anxiety
- Perfume
- Exercise
- Plants and molds
- Medications, such as aspirin
- Animal dander
- Temperature extremes
- Changes in weather

These are only a few of the things that can trigger asthma in people.

Preventing Asthma Attacks

Prevention is key. A person can follow these preventative measures to reduce his or her risk of an attack:

- Limit triggers in the home.
- Control emotions.

- Prevent infections.
- Reduce environmental triggers.
- Exercise carefully.

Limiting Triggers in the Home

You can reduce the chances of triggering an asthma attack at home by:

- Keeping plants outside.
- Washing bedclothes and pajamas weekly in hot water.
- Using hypoallergenic covers on mattresses and pillows.
- Eliminating or reducing the number of carpets and rugs.
- Regularly steam cleaning all carpets, rugs and upholstery.
- Keeping the home clean and free of dust and pests—wet dusting can be more effective than dry dusting.
- Not allowing, or being around, smoke.
- Regularly changing the air filter in the central air conditioning or heating unit.
- Eliminating or minimizing the number of stuffed toys.
- Using hypoallergenic health and beauty products.
- Washing pets weekly.
- Keeping pets outside of the house.

Controlling Emotions

Certain strong emotions can trigger an asthma attack. When you feel a strong emotion, such as anger or fear, the following suggestions can reduce the chances that the emotions will trigger an asthma attack:

- Take a long deep breath in through the nose and slowly let it out through the mouth.
- Count to 10.
- Talk with a family member, trusted friend or health care provider.
- Do a relaxing activity.

Preventing Infections

Colds and other respiratory infections can make an asthma condition worse. One of the most common ways to catch colds is by rubbing the nose or eyes with hands contaminated with a cold virus. Contamination often occurs by touching surfaces (such as doorknobs) or objects that other people have touched.

Some ways to reduce the chances of getting a cold or other respiratory infection include:

- Washing hands regularly, especially after using the restroom or shaking hands with other people and before eating.

- Cleaning environmental surfaces, such as telephones and counters, with a virus-killing disinfectant. The viruses that cause colds can survive up to 3 hours on objects such as telephones, counters and stair railings. Disinfecting them regularly can help to prevent the spread of colds and viruses.
- Getting vaccinated for illnesses when a vaccine is available, such as for influenza and whooping cough (pertussis).

Your health care provider might have other suggestions based on your medical history.

Reducing Environmental Triggers

Sudden changes in the weather, heavy mold or pollen content in the air and pollution can trigger an asthma attack. To avoid attacks brought on by triggers in the environment:

- Wear the right clothing for the weather conditions.
- Stay indoors on days when there is a high risk of respiratory trouble.
- Take preventative medications, as prescribed by your health care provider.
- Stay away from places with high amounts of dirt, smoke and other irritants.
- Know how the weather affects your condition.
- Talk to your health care provider about other prevention strategies.

Exercising Carefully

Exercise-induced asthma happens during or shortly after exercise. Having this type of asthma does not mean one cannot or should not exercise or play sports. It is, however, important to know what to do to prevent an asthma attack. Things to keep in mind when you have exercise-induced asthma include the following:

- Take prescribed medications 30 to 60 minutes before exercising.
- Slowly warm up before exercising. Cool down gently after exercising.
- Make sure that you drink plenty of fluids during exercise.
- Seek and follow the advice of your health care provider.
- If participating in organized sports, notify the coach of your condition.

Using Medications to Control Asthma

People who have been diagnosed with asthma will have a personalized medication plan. They should take all medications exactly as prescribed by their health care provider.

Asthma medications are available in two forms: long-term control and quick relief.

Long-Term Control Medications

Long-term control medications prevent or reverse *inflammation* (swelling) in the airway. They also help to decrease sensitivity, which helps to keep the airways from reacting to asthma triggers.

The long-term control medicines work slowly. They help to control asthma over many hours. They should be taken every day whether or not signals of asthma are present.

Quick-Relief Medications

Quick-relief or rescue medications are used to stop an asthma attack. These medications work quickly to relieve the sudden swelling. They lessen wheezing, coughing and chest tightness. This allows the person to breathe easier. They also are called *short-acting bronchodilators*.

Methods of Delivery

The most common way to take long-term control and quick-relief asthma medications is by inhaling them. Inhalation allows the medication to reach the airways faster and work quickly. There also are fewer side effects.

Medications are inhaled using a metered dose inhaler (MDI), a dry powder inhaler (DPI) or a small-volume nebulizer (Fig. 10-1). Both long-term and quick-relief medications also are available in pill and liquid form. In addition, long-term medications are available in the form of an injection given just under the skin.



FIGURE 10-1 Long-term and quick-release medications are inhaled using an MDI, a DPI or a small-volume nebulizer.

MDI

An MDI sends a measured dose of medicine in mist form directly into the person's mouth. The person gently presses down the top of the inhaler. This causes a small amount of pressurized gas to push the medicine out quickly. Sometimes a "spacer" is used to control the amount of medication that is inhaled. The medicine goes into the spacer and then the person inhales the medication through the mouthpiece on the spacer.

DPI

A DPI is similar to an MDI. It is a hand-held device that delivers a dry powder form of the medication. Some dry powders are tasteless. Others are mixed with lactose to give them a sweet taste. The DPI is administered by breathing in quickly to activate the inhaler. The person does not have to press down the top of the inhaler. DPIs may be difficult for some people to use because of the need to take in a quick, strong breath.

Small-Volume Nebulizers

Small-volume nebulizers deliver medication in the form of a mist. The mist is delivered over several minutes. This is especially helpful when the person is unable to take deep breaths. Nebulizers are commonly used for children younger than 5 years and the elderly. They also are used for people who have trouble using inhalers and for those with severe asthma.

What to Look For

You often can tell when a person is having an asthma attack by the hoarse whistling sound made while exhaling. This sound, known as *wheezing*, occurs because air becomes trapped in the lungs. Coughing after exercise, crying or laughing are other signals that an asthma attack could begin.

Signals of an asthma attack include:

- Trouble breathing or shortness of breath.
- Rapid, shallow breathing.
- Sweating.
- Tightness in the chest.
- Inability to talk without stopping for a breath.
- Feelings of fear or confusion.



FIGURE 10-2 To assist a person having an asthma attack, remain calm and help the person to sit comfortably.

When to Call 9-1-1

Call 9-1-1 or the local emergency number if the person's breathing trouble does not improve in a few minutes after using the quick-relief medication.

What to Do Until Help Arrives

Remain calm. This will help the person to remain calm and ease breathing troubles. Help the person to sit comfortably (Fig. 10-2). Loosen any tight clothing around the neck and abdomen. Assist the person with his or her prescribed quick-relief medication if requested and if permitted by state or local regulations.

PUTTING IT ALL TOGETHER

Asthma is a life-long lung disease that affects millions of adults and children in the United States. Asthma can be controlled. Knowing the triggers for asthma and how to limit those triggers, and taking prescribed medications as directed can help to prevent an asthma attack.

It is important to be prepared to help people with breathing emergencies caused by asthma. The first step is to know the signals of an asthma attack. When you recognize the signals, act quickly and give appropriate care. Your care could help to save the life of a person with asthma.

ASSISTING WITH AN ASTHMA INHALER

TIP: Always obtain consent and wash your hands immediately after giving care. Read and follow all instructions printed on the inhaler prior to administering the medication to the person.

IF THE PERSON HAS MEDICATION FOR ASTHMA, HELP HIM OR HER TAKE IT IF ASKED:

1 HELP PERSON SIT UP

Help the person sit up and rest in a position comfortable for breathing.

2 CHECK PRESCRIPTION

- Ensure that the prescription is in the person's name and is prescribed for "quick relief" or "acute" attacks.
- Ensure that the expiration date has not passed.



3 SHAKE INHALER

4 REMOVE MOUTHPIECE COVER

If an extension tube (spacer) is available, attach and use it.



5 INSTRUCT PERSON TO BREATHE OUT

Tell the person to breathe out as much as possible through the mouth.

TIP: The person may use different techniques, such as holding the inhaler two-finger lengths away from the mouth.

6 ADMINISTER MEDICATION

Have the person place his or her lips tightly around the mouthpiece and take a long, slow breath.

- As the person breathes in slowly, administer the medication by quickly pressing down on the inhaler canister, or the person may self-administer the medication.
- The person should continue a full, deep breath.
- Tell the person to try to hold his or her breath for a count of **10**.
- When using an extension tube (spacer) have the person take **5** to **6** deep breaths through the tube without holding his or her breath.



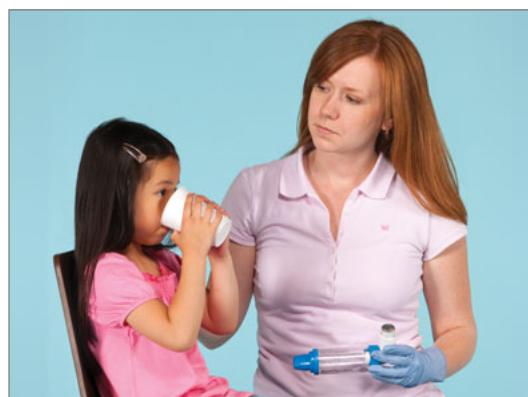
7 RECORD TIME OF ADMINISTRATION

- Note the time of administration and any change in the person's condition.
- The medication may be repeated once after **1** to **2** minutes.

8 HAVE PERSON RINSE MOUTH

Have the person rinse his or her mouth out with water to reduce side effects.

- Stay with the person and monitor his or her condition and give CARE for any other conditions.



9 CARE FOR SHOCK

Care for shock.

- Keep the person from getting chilled or overheated.
- CALL 9-1-1 or the local emergency number if trouble breathing does not improve quickly.

TIP: These medications might take **5** to **15** minutes to reach full effectiveness. Follow label instructions regarding additional doses of the medication.

Anaphylaxis and Epinephrine Auto-Injectors



Note: The instructions in this chapter are not a substitute for the directions given by a medical professional to an individual person. Nor should these instructions be substituted for directions given by a medical professional in consultation with a site where epinephrine auto-injectors will be used. Consult a health care professional for specific advice on the use of epinephrine auto-injectors.

A severe allergic reaction can bring on a condition called *anaphylaxis*, also known as *anaphylactic shock*. Anaphylaxis can quickly cause trouble breathing. It is a life-threatening emergency that must be recognized and cared for immediately.

In this chapter you will learn to identify the signals of anaphylaxis. You also will learn what care to give to a person in anaphylactic shock. Part of giving care may mean helping the person use an epinephrine auto-injector.

ANAPHYLAXIS

Every year in the United States, between 400 and 800 deaths are caused by anaphylaxis. Respond quickly if a person is exposed to an *antigen*—a foreign substance that brings on an allergic reaction. Fortunately, some deaths can be prevented if anaphylaxis is recognized immediately and cared for quickly.

Allergic Reactions

Allergic reactions are caused by the activity of the *immune system*. The body recognizes and protects itself from antigens by producing *antibodies*. These antibodies fight antigens. Antibodies are found in the liver, bone marrow, spleen and lymph glands. When the immune system recognizes an antigen, it releases chemicals to fight these foreign substances and eliminate them from the body.

Antigens that cause an allergic reaction—are called *allergens*. Allergic reactions range from mild to very severe. A common mild reaction is skin irritation from contact with poison ivy. A severe, life-threatening reaction is swelling of the airway, trouble breathing and an obstructed airway.

Some common allergens include bee or insect venom, certain antibiotics, pollen, animal dander and sulfa drugs.

Over 12 million people in the United States have food allergies. Every year there are over 30,000 cases of food-related anaphylaxis. Certain types of food commonly cause an allergic reaction in individuals with sensitivities to those foods. Peanuts and tree nuts cause the most cases of fatal and near-fatal allergic reactions to food. Other common food allergens include cow's milk, eggs, seafood (especially shellfish), soy and wheat.

What to Look For

Anaphylaxis usually occurs suddenly, within seconds or minutes after contact with the substance. The skin or area of the body that comes in contact with the substance usually swells and turns red (Fig. 11-1). Other signals include the following:

- Difficulty breathing, wheezing or shortness of breath
- Tight feeling in the chest and throat
- Swelling of the face, throat or tongue
- Weakness, dizziness or confusion
- Rash or hives
- Low blood pressure
- Shock

Trouble breathing can progress to a blocked airway due to swelling of the lips, tongue, throat and larynx (voice box). Low blood pressure and shock may accompany



FIGURE 11-1 In anaphylaxis, air passages can swell, restricting breathing.

these reactions. Death from anaphylaxis may happen because the person's breathing is severely restricted.

When to Call 9-1-1

Call 9-1-1 or the local emergency number if the person:

- Has trouble breathing.
- Complains of the throat tightening.
- Explains that he or she is subject to severe allergic reactions.
- Is or becomes unconscious.

What to Do Until Help Arrives

If you suspect anaphylaxis, and have called 9-1-1 or the local emergency number, follow these guidelines for giving care:

- Monitor the person's breathing and for changes in his or her condition.
- Give care for life-threatening emergencies.
- Check a conscious person to determine:
 - The substance (antigen) involved.
 - The route of exposure to the antigen.
 - The effects of the exposure.

If the person is conscious and is able to talk, ask:

- What is your name?
- What happened?
- How do you feel?
- Do you feel any tingling in your hands, feet or lips?
- Do you feel pain anywhere?
- Do you have any allergies? Do you have prescribed medications to take in case of an allergic reaction?
- Do you know what triggered the reaction?

- How much and how long were you exposed?
- Do you have any medical conditions or are you taking any medications?

Quickly check the person from head to toe. Visually inspect the body:

- Observe for signals of anaphylaxis including respiratory distress.
- Look for a medical identification (ID) tag, bracelet or necklace.

Check the person's head.

- Look for swelling of the face, neck or tongue.
- Notice if the person is drowsy, not alert, confused or exhibiting slurred speech.

Check skin appearance. Look at person's face and lips. Ask yourself, is the skin:

- Cold or hot?
- Unusually wet or dry?
- Pale, ashen, bluish or flushed?

Check the person's breathing.

- Ask if he or she is experiencing pain during breathing.
- Notice rate, depth of breaths, wheezes or gasping sounds.

Care for respiratory distress.

- Help the person to rest in the most comfortable position for breathing, usually sitting.
- Calm and reassure the person.
- Assist the person with using a prescribed epinephrine auto-injector, if available and if permitted by state regulations.
- Document any changes in the person's condition over time.

Assisting with an Epinephrine Auto-Injector

People who know they are extremely allergic to certain substances usually try to avoid them. However, sometimes this is impossible. These people may carry an anaphylaxis kit in case of a severe allergic reaction.

These kits are available by prescription only. They contain a dose (or two) of the drug *epinephrine*. This drug works in the body to counteract the anaphylactic reaction. Two injectable epinephrine systems are available: the *Epi-Pen®*, which includes one dose; and *Twinject®*, which includes two doses (Fig. 11-2, A–B). The instructions provided by the manufacturer and health care provider always



FIGURE 11-2, A–B A, An Epi-Pen® is preloaded with a single dose of the drug epinephrine. B, A Twinject® is preloaded with a double dose of epinephrine.



FIGURE 11-3 *Forcefully pushing the auto-injector against the skin activates the device. It should be used on a muscular area, usually the person's mid-outer thigh.*

should be followed when assisting someone with their prescribed epinephrine auto-injector. A second dose should not be given unless recommended by advanced medical personnel or in extremely unusual circumstances, where advanced medical care is not available or is significantly delayed and signals of anaphylaxis persist after a few minutes.

Note: *Only the person having the reaction should self-administer the second dose included with the Twinject® injector.*

An auto-injector contains a preloaded dose of 0.3 mg of epinephrine for adults or 0.15 mg of epinephrine for children weighing 33 to 66 pounds. The injector has a spring-loaded plunger. When activated, it injects the epinephrine. The auto-injector is activated when it is forcefully pushed against the skin.

It should be used on a muscular area, usually the person's mid-outer thigh (Fig. 11-3). The injector needs to stay in place for 10 seconds. This allows the medication to fully empty. When the auto-injector is removed, handle it carefully and do not touch the needle if it is exposed.

If a person is conscious and able to use the auto-injector, help him or her in any way asked. If you know that a person has a prescribed auto-injector and is unable to administer it him- or herself, then you may help the person use it where allowed by state or local laws or regulations. Remember, for a person experiencing anaphylaxis, time is of the essence.

Helping the Person Self-Administer an Antihistamine

Some anaphylaxis kits also contain an *antihistamine* in pill form. An antihistamine is a type of medication. It lessens the effects of compounds released by the body during an allergic reaction.

The person should read and follow all medication labels. It also is important for the person to follow any instructions given by the health care provider. Check state and local regulations about assisting someone with the use of prescription and over-the-counter medications.

PUTTING IT ALL TOGETHER

Anaphylaxis is a life-threatening emergency. Knowing how to give immediate care and help someone use an epinephrine auto-injector could mean the difference between life and death.

ASSISTING WITH AN EPINEPHRINE AUTO-INJECTOR

Determine whether the person has already taken epinephrine or antihistamine. If so, administer a second dose only when EMS personnel are not present or delayed and if signals of anaphylaxis persist after a few minutes. Check the label to confirm that the prescription of the auto-injector is for this person.

Check the expiration date of the auto-injector. If it has expired, DO NOT USE IT. If the medication is visible, confirm that the liquid is clear and not cloudy. If it is cloudy, DO NOT USE IT.

NOTE: *If possible, help the person self-administer the auto-injector.*

TO CARE FOR A CONSCIOUS PERSON WHO IS UNABLE TO SELF-ADMINISTER THE AUTO-INJECTOR, AND LOCAL OR STATE REGULATIONS ALLOW:

1 LOCATE INJECTION SITE

Locate the outside middle of one thigh to use as the injection site.

NOTE: *If injecting through clothing, press on the area with a hand to determine that there are no obstructions at the injection site, such as keys, coins, the side seam of trousers, etc.*



2 REMOVE SAFETY CAP

Grasp the auto-injector firmly in your fist, and pull off the safety cap with your other hand.



3 POSITION AUTO-INJECTOR

Hold the tip (needle end) near the patient's outer thigh so that the auto-injector is at a 90-degree angle to the thigh.

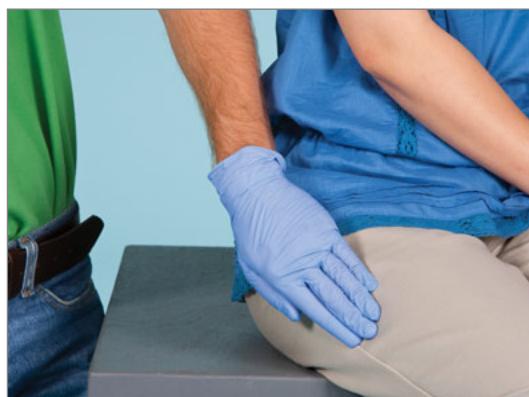
4 ADMINISTER INJECTION

Quickly and firmly push the tip straight into the outer thigh. You will hear a click.



5 HOLD IN PLACE

Hold the auto-injector firmly in place for **10 seconds**, then remove it from the thigh and massage the injection site with a gloved hand for several seconds.



6 RECHECK BREATHING

Recheck the person's breathing and observe his or her response to the medication.

7 HANDLE USED AUTO-INJECTOR CAREFULLY

Handle the used auto-injector carefully, placing it in a safe container. Give it to EMS personnel when they arrive.



Injury Prevention and Emergency Preparedness



Unintentional injuries cause disability and death for thousands of people in the United States each year. These injuries incur billions of dollars in lost wages, medical expenses, insurance, property damage and other indirect costs.

Injuries are not always inevitable. Being prepared and following established safety precautions can reduce risk, prevent injuries and save lives.

INJURIES

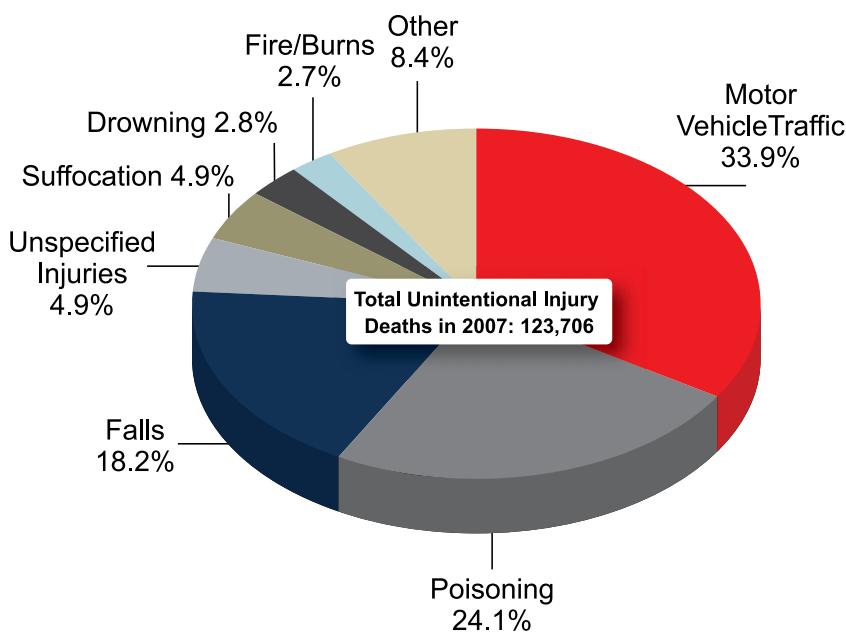
Every year in the United States millions of people suffer an unintentional injury. In 2007, nearly 124,000 Americans died from these injuries. That year, unintentional injury was the leading cause of death for people 1 to 44 years of age; of these, motor-vehicle crashes were the number one cause of death from unintentional injury, followed by poisoning and falls (Fig. A-1). In 2007, Americans also sustained approximately 34.3 million nonfatal injuries that required medical attention.

Injury Risk Factors

Several factors affect a person's risk of being injured. These factors include age, gender, geographic location, economic status and alcohol misuse and abuse.

- Nonfatal injury rates remain highest among people younger than 39 years; however, deaths from injury are more common in people 40 years of age and older. Also of note is this age group has the highest rate of injuries that result in death.
- Gender also is a significant factor in risk of injury. Males are at greater risk than females for any type of injury. In general, men are about twice as likely to suffer a fatal injury as women.

**Leading Causes of Unintentional Injury Deaths
United States, 2007**



Source: National Center for Injury Prevention and Control

FIGURE A-1 The leading causes of unintentional death in the United States in 2007.

- Environmental and economic factors influence injury rates. Living on a farm or in the city, having a home made of wood or brick, using a specific type of heat in your home and your local climate all affect your degree of risk. For instance, death rates from injury are higher in rural areas as opposed to metropolitan areas. The death rate from injuries is twice as high in low-income areas as in high-income areas.
- Alcohol misuse and abuse is a significant factor in many injuries and fatalities, in both teenagers and adults. In 2008, 32 percent of all motor-vehicle deaths were alcohol related. It is estimated that a significant number of victims who die as a result of falls, drowning and fires were under the influence of alcohol.

Reducing Your Risk of Injury

Statistics show that people of certain ages and gender are injured more often than others. However, the chances of injury have more to do with a person's behavior. Many injuries are preventable and result from the way people interact with potential dangers in the environment.

Risks of an injury can be reduced by taking the following steps:

- Know the risk.
- Take measures that make a difference. Change behaviors that increase your risk of injury and your risk injuring others.
- Think safety. Be alert for and avoid potentially harmful conditions or activities that increase your risk of injury. Take precautions, such as wearing appropriate protective devices, including helmets, padding and eyewear. Always buckle up when driving or riding in motor vehicles.
- Learn and use first aid skills. There have been dramatic improvements in emergency medical systems nationwide over the past decade; however, you are the person who often makes the difference between life and death. Apply your first aid training when necessary.

In addition to these personal steps, laws and consumer protection regulations have been put in place to reduce or prevent injury. Examples include laws on the mandatory use of safety belts, manufacturers' requirements to build air bags into motor vehicles and restrictions on the use of cell phones while driving.

DEVELOPING A PLAN OF ACTION

Emergencies can happen quickly. There may not be time to consider what to do, only time to react. You can improve your response and the outcome of emergencies by developing a plan. Meet with your family or household members to gather information for an emergency action plan.

Think about your home:

- Style of home (e.g., mobile, high-rise apartment, single family) and type of construction (e.g., wood, brick)
- Location of sleeping areas (e.g., basement, ground floor, second floor)
- Location of windows
- Number and location of smoke alarms
- Location of gasoline, solvent or paint storage
- Number and types of locks on doors
- Location of telephones, flashlights, fire extinguisher and first aid kit

Think about who lives in your home:

- Total number of people and number of people older than 65 years or younger than 6 years of age
- Number of people sleeping above or below the ground floor
- Number of people who are unable to exit without help

Think about the types of possible emergencies that you may face:

- Injuries (e.g., fall or cut)
- Illnesses (e.g., stroke or heart attack)
- Natural disasters (e.g., tornado or earthquake)
- Fire

Write down the list of emergencies that you could face. Under each one write:

1. How the emergency would affect your home.
2. How you would like the people in your home to react. Specifically, what would be the responsibilities for each member of the household in an emergency?
3. The steps you have already taken to prevent or minimize the effect of the emergency.
4. The steps you still need to take.

Try to imagine as many situations as possible for each emergency. Gather information from sources such as insurance companies, your city or county emergency management office and your police, fire or rescue department.

When thinking about emergencies away from home:

- Use the same process to decide what to do.

When you reach a decision, write it down. You now have a personal emergency plan. Practice it. Keep it current.

It also is important to develop a plan of action in case of an emergency. Being prepared for an emergency before it actually occurs will help you, and those with whom you live, to react calmly in a stressful situation. See Focus on Preparedness: Developing a Plan of Action above.

Vehicle Safety

Tens of thousands of people in the United States die in motor-vehicle crashes each year. Crash injuries result in nearly 5 million emergency department visits annually. The economic burden of these motor-vehicle-related deaths and injuries is significant.

Do not drink and drive. If you are going to consume alcohol, plan ahead to find a ride, or take a cab or public

transportation. If you are with a group, designate a driver who agrees not to drink on this occasion.

Do not become distracted. Doing things that take your eyes off the road, your hands off the wheel or your mind off of driving are distractions that can be dangerous or even fatal. The use of electronic devices while driving, such as talking on hand-held cell phones and text messaging, causes thousands of collisions and highway fatalities. Other distractions while driving include eating and drinking; talking to passengers; reading; using navigation systems; and operating radios and CD or MP3 players. Many states and the District of Columbia have enacted laws restricting the use of hand-held cell phones and electronic devices.

When riding in a motor vehicle, always buckle up. Although cars more often are equipped with airbags than not, wearing a safety belt is the easiest and best way to prevent injury in a motor-vehicle collision. Always wear a safety belt, including a shoulder restraint, when riding in either the front or back seat. In 49 states and the District of Columbia, wearing a safety belt is required by law. In 2007, safety belts saved more than 13,000 lives.

Although airbags have saved many lives, they pose several risks to children. The amount of force during airbag deployment can kill or severely injure children occupying the front seat. Even when in a car seat, infants could be at risk. An infant in a rear-facing car seat is close to the dashboard and therefore could easily be struck by the airbag with sufficient force to cause serious harm or even death. Always have children younger than 13 years sit in the back seat, away from airbags.

Child Safety Seats

Motor-vehicle crashes are the leading cause of injury-related deaths for children. All 50 states and the District of Columbia require the use of child safety seats and child safety belts. *Always* have infants and children ride in the back seat in safety seats that are approved for the child's weight and/or age (Fig. A-2).



FIGURE A-2 Infants and children always should ride in an approved safety seat.

Choosing the proper child safety seat to fit the weight and age of your child is only the first step. Another important child-safety-seat issue is making sure that the child safety seat is installed correctly in your vehicle. The National Highway Traffic Safety Administration (NHTSA) estimates that three out of four parents do not properly use child restraints. It is essential to always read the instruction manual. Every manufacturer of child safety seats provides specific instructions about how to use and install its seat. To make sure that you installed your child safety seat correctly in your vehicle, you can have it checked by professionals. Contact NHTSA for information on finding a nearby child safety seat inspection station.

Fire Safety

Fire safety in the home and in hotels is essential. You should learn how to prevent fires but also know what to do in case a fire does occur.

Home Fire Safety Prevention and Preparation

In 2006, 3,202 people died in unintentional fires in the United States. Approximately four of 10 deaths from fires occurring in the home occurred in homes without smoke alarms. To prevent fires:

- Install a smoke alarm on every floor of your home. Check the batteries once a month, and change the batteries at least twice a year.
- Keep fire extinguishers where they are most likely to be needed and keep matches out of children's reach.
- Always keep space heaters away from curtains and other flammable materials.
- Install guards around fireplaces, radiators, pipes and wood-burning stoves.

Regardless of the cause of fires, everyone needs to know how to respond in case of fire. Plan and practice a fire escape route with your family or roommates (Fig. A-3):

- Gather everyone together at a convenient time.
- Sketch a floor plan of all rooms, including doors, windows and hallways, for all floors of the home.
- Draw the escape plan with arrows showing two ways, if possible, to get out of each room. Sleeping areas are the most important, since many fires happen at night.
- Plan to use stairs only, never an elevator.
- Plan where everyone will meet after leaving the building.
- Designate who should call the fire department and from which phone.

- Plan to leave the burning building first and then call from a phone nearby, if possible.

Remember and use the following guidelines to escape from fire:

- If smoke is present, crawl low to escape. Because smoke rises in a fire, breathable air is often close to the floor.
- Make sure that children can open windows, go down a ladder and lower themselves to the ground. Practice with them. Always lower children to the ground first before you go out of a window.
- Get out quickly and do not, under any circumstances, return to a burning building.
- If you cannot escape, stay in the room and stuff door cracks and vents with wet towels, rags or clothing. If a phone is available, call the fire department—even if rescuers are already outside—and inform the call taker of your location.

Contact your local fire department for additional fire safety guidelines.

Hotel Fire Safety

In addition to fire safety at home, knowing how to exit from a hotel in a fire could save your life. Locate the fire exits on your floor. If you hear an alarm while in your room, feel the door first and do not open it if it is hot. Do not use the elevator. If the hall is relatively smoke-free, walk to the stairs to exit; if the hall is filled with smoke, crawl to the exit. If you cannot get to the exit, return to your room. Turn off the ventilation system, stuff door cracks and vents with wet towels and call the front desk or the fire department to report the fire and your location.

Safety at Home

In 2007, 44 percent of all nonfatal injuries requiring medical attention in the United States occurred in or around the home.

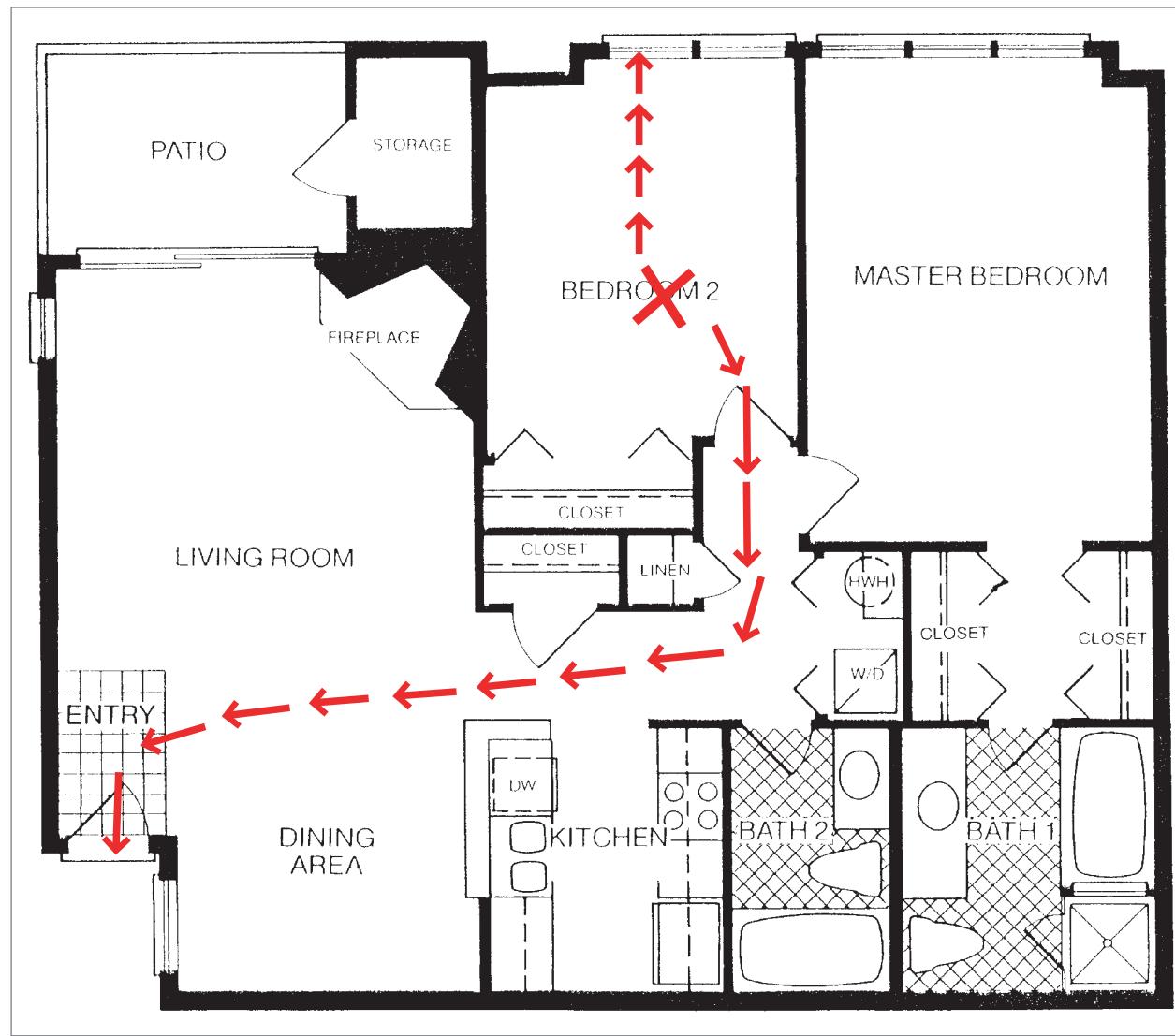


FIGURE A-3 Plan and practice a fire escape route with your family or roommates.

Removing hazards and practicing good safety habits will make your home safer. You can get a good start on this by making a list of the needed improvements. Safety at home is relatively simple and relies largely on common sense. Take the following steps to make your home a safer place:

- Post emergency numbers near every phone. Include 9-1-1 or the local emergency number, National Poison Control Center Hotline (1-800-222-1222), primary health care provider, as well as any other important numbers.
- Make sure that stairways and hallways are well lit.
- Equip stairways with handrails, and use nonslip treads or securely fastened rugs.
- Secure rugs to the floor with double-sided tape.
- If moisture accumulates in damp spots, correct the cause of the problem. Clean up spills promptly.
- Keep medicines and poisonous substances separate from each other and from food. They should be out of reach of children and in secured cabinets.
- Keep medicines in their original containers with safety caps.
- Keep your heating and cooling systems and all appliances in good working order. Check heating and cooling systems annually before use.
- Read and follow manufacturers' instructions for electrical tools, appliances and toys.
- Turn off the oven and other appliances when not in use. Unplug certain appliances, such as irons, curling irons, coffeemakers and portable heaters, after each use. These items can easily overheat or spark a fire when unattended.
- Make sure that your home has at least one working, easily accessible fire extinguisher. Make sure that everyone knows how to use it.
- Keep firearms in the home unloaded in a locked place, out of the reach of children. Store ammunition separately in a locked location.
- Practice safe firearms handling and safety education.
- Ensure that cords for lamps and other items are not placed where someone can trip over them.

This list does not include all of the safety measures needed in your home. If young children or elderly or ill people live with you, you will need to take additional steps, depending upon the individual characteristics of your home.

Try crawling around your home to see it through the eyes of an infant or a young child. You may become

aware of unsuspected hazards. See Focus on Prevention: Make Your Home Safe for Kids in this chapter for additional safety measures geared for young children.

For elderly people, you may need to install handrails in the bathtub or shower and beside the toilet. You may need a bath chair or bench. Always have a mat with a suction base if your tub does not have built-in nonslip strips. A safe temperature for bath water is 101° F.

Safety at Work

Most people spend approximately one-third of their day at work. To improve safety at work, you should be aware of the following:

- Fire evacuation procedures
- How to activate your emergency response team and how to call 9-1-1 or the local emergency number
- Location of the nearest fire extinguisher and first aid kit
- How to use recommended safety equipment and how to follow safety procedures if you work in an environment where hazards exist
- Workplace safety training

Safety at Play

Make sports and other recreational activities safe by always following accepted guidelines for the activity. Before undertaking an activity that is unfamiliar to you, such as boating, skiing or riding a motorcycle, take lessons to learn how to perform the activity safely. Many accidents result from inexperience. Make sure that your equipment is in good working order.

Bicycle Safety

Each year, approximately 500,000 people are injured while riding a bicycle, and most bicycle accidents happen within a mile of home.

Ninety-one percent of bicyclists killed in 2008 reportedly were not wearing helmets. The head or neck is the most seriously injured part of the body in most fatally injured cyclists. Children should wear a helmet even if they are still riding along the sidewalk on training wheels.

When cycling, always wear an approved helmet. Look for a helmet that has been approved by the Snell Memorial Foundation or the American National Standards Institute (ANSI), and make sure the helmet is the correct size and it fits comfortably and securely. Laws on wearing bicycle helmets, including age-specific requirements, vary by state and county. For more information about

MAKE YOUR HOME SAFE FOR KIDS

General Safety Precautions

Inside the Home

- Are stairways kept clear and uncluttered?
- Are stairs and hallways well lit?
- Are safety gates installed at tops and bottoms of stairways?
- Do window and balcony doors have childproof latches or window guards?
- Do balconies have protective barriers to prevent children from slipping through the bars?
- Are guards installed around fireplaces, radiators, hot pipes and wood-burning stoves?
- Are sharp edges of furniture cushioned with corner guards or other material?
- Are safety covers placed on all unused electrical outlets?
- Are matches and lighters stored out of the reach of children?
- Are curtain cords and shade pulls wound up and not dangling?
- Are fire extinguishers installed where they are most likely to be needed?
- Is there at least one approved smoke alarm installed and operating on each level of the home? Are batteries changed at least every 6 months?
- Do you have an emergency plan to use in case of fire? Does your family practice this plan?
- Is the water set at a safe temperature? A setting of 120 °F or less prevents scalding from tap water in sinks and in tubs. Let the water run for 3 minutes before testing it.
- If you own a firearm, is it stored in a locked cabinet so that your child, and other unauthorized users cannot use it?
- Are all purses, handbags, briefcases and similar items, including those belonging to visitors, kept out of children's reach?
- Are all poisonous plants kept out of children's reach?
- Is a list of emergency phone numbers posted near telephones?

- Is a list of instructions posted near telephones for use by children or babysitters?
- Is there a first aid kit properly stocked and stored away?
- Are there working flashlights, battery-operated radio and extra batteries available for use in case of emergency?

Storage Areas

- Are pesticides, detergents and other household chemicals stored in locked cabinets and kept out of children's reach?
- Are tools stored in locked cabinets or locked storage areas out of children's reach?

Bathrooms

- Are the toilet seat and lid kept down when the toilet is not in use?
- Are cabinets equipped with safety latches and kept closed?
- Are all medicines in child-resistant containers and stored in a locked medicine cabinet?
- Are shampoos and cosmetics stored out of children's reach?
- Are razors, razor blades and other sharp objects kept out of children's reach?
- Are hair dryers and other appliances stored away from the sink, tub or toilet?
- Does the bottom of tub or shower have non-slip surfacing?
- Are bathroom doors kept closed at all times?
- Are children always watched by an adult while in the bathroom?

Kitchens

- Do you cook on back stove burners when possible and turn pot handles toward the back of the stove?
- Are hot dishes kept away from the edges of tables and counters?
- Are hot liquids and foods kept out of children's reach?

(Continued)

FOCUS ON PREVENTION *(Continued)*

- Are knives and other sharp items kept out of children's reach?
- Is the highchair placed away from stove and other hot appliances?
- Are matches and lighters kept out of children's reach?
- Are all appliance cords secured and out of children's reach?
- Are cabinets equipped with safety latches?
- Are cleaning products stored in locked cabinets out of children's reach?
- Do you test the temperature of heated food before feeding children?

Children's Rooms

- Is the bed or crib placed away from radiators and other hot surfaces?
- Is the bed or crib placed away from curtain and blind cords?
- Are crib slats no more than $2\frac{3}{8}$ inches apart?
- Does the mattress fit the sides of the crib snugly? Are toys, blankets and pillows removed from the crib?
- Is paint or finish on furniture and toys nontoxic?
- Is children's clothing, especially sleepwear, flame resistant?
- Does the toy box have ventilation holes? If there is a lid, it is lightweight and removable and has a sliding door or panel or is a hinged lid with a support to hold it open?

- Are electric cords secured and kept out of children's reach?
- Are toys in good repair?
- Are toys appropriate for children's ages?

Adult Bedrooms

- Are space heaters kept away from curtains and flammable materials?
- Are cosmetics, perfumes and breakable items stored out of children's reach?
- Are small objects, such as jewelry, buttons and safety pins, kept out of children's reach?

Outside the Home

- Are trash and recycling materials stored in tightly covered containers?
- Are walkways, stairs and railings in good repair?
- Are walkways and stairs free of toys, tools and other objects?
- Are sandboxes and wading pools emptied when not in use?
- Are nearby swimming pools completely enclosed with a 4-ft-high self-locking, self-latching gate or fence? Does the pool have an alarm system?
- Is the backyard pool separated from the home by a fence?
- Is playground equipment safe? Is it assembled according to the manufacturer's instructions?

helmet laws in your area, contact state or local officials.

Observe these rules of the road for bike safety:

- Avoid roads that are busy or have no shoulder.
- Wear reflective clothing at night.
- Use a headlight, taillight and high-visibility strobe lights on your bicycle wheels.
- Keep bicycles properly maintained.

Eye Safety

Wear protective goggles while doing any activity in which eyes could be injured, such as racquetball, or using tools like electric drills or power saws.

Foot Safety

Appropriate sport-specific footwear also is important in preventing injuries. Shoes often are designed to perform a particular function and provide support for certain movements. Basketball shoes, for example, offer lateral (side-to-side) support, and the durable, rubber soles on hiking boots improve traction to help prevent slipping on varied terrain.

Swimming and Water Safety

If you or a family member does not know how to swim, or you would like to improve your swimming skills, contact your local chapter of the American Red Cross. You can sign up for a Red Cross swimming and water safety class.