Chapter 22

Assessing Patients and Managing Acute Situations

Learning Objectives

At the conclusion of this chapter, you will be able to:

- List four personal comfort needs common to most patients and describe appropriate responses to meet these needs
- Assist patients who need to use bedpans or urinals
- Obtain and record a patient history
- Accurately observe patients' physical status and report status using appropriate terminology
- Take and record temperature (oral, rectal, and axillary), pulse rate (at four common sites), respiration rate, and blood pressure; state normal adult values for each
- Administer oxygen or suction appropriately in an emergency
- Recognize acute life-threatening conditions, such as shock, heart attack, respiratory arrest, and cardiac arrest, and respond appropriately
- List the four levels of consciousness (LOCs) and discuss possible causes for changes in level of consciousness
- Demonstrate correct handling of patients with extremity fractures and recently applied casts
- Assist patients who experience asthma attack, hyperventilation, nausea and vomiting, epistaxis, hypoglycemia, vertigo, seizures, or syncope

Key Terms

anaphylaxis
angina
anoxia
apex
asthma
cerebrovascular accident (CVA)
cyanotic
diabetic coma
diaphoretic
diastolic
dyspnea
epistaxis
erythema
fibrillation
hemorrhage
hyperglycemia
hypertension
hyperventilation
hypoglycemia
hypotension
incontinence
shock
sphygmomanometer
syncope
systolic
tachycardia
tachypnea
thready pulse
transient ischemic attack (TIA)
urticaria
vertigo

This chapter addresses basic principles involved in meeting patient needs, but before these needs can be met, they must be clearly identified. Observation, evaluation, and assessment are the skills needed to determine patient needs. When these skills are consciously practiced in the clinical area, they increase your value as a limited operator. They help you become more sensitive to the safety of the environment and the conditions of your patients.

The dictionary defines an *emergency* as a serious event that happens unexpectedly and demands immediate attention. Sudden deterioration in the status of any patient under your care is an acute situation requiring an appropriate response. Whether such a situation leads to a more serious problem may depend on whether you are prepared to act quickly and efficiently. Seen from this perspective, no patient problem can be considered trivial. Acute situations are bound to occur when you are dealing with patients who are ill or injured, and you must be prepared to cope in a way that will minimize the possibility of further injury or complication.

ASSESSING THE PERSONAL CONCERNS OF PATIENTS

Uncertainty about the coming procedure, fear of a possible diagnosis, or concern about the effect of illness on family members can cause varying reactions in patients. Sometimes these concerns are expressed as anger and demonstrated by inappropriate speech or rude behavior toward personnel. Other expressions of anxiety may be a need to talk constantly or, conversely, a tendency to become quiet and withdrawn. You may observe fidgeting or other nervous mannerisms.

Anxiety can also be caused by a concern over modesty, especially when patients must undress for examinations or treatments. Reassure patients by displaying a matter-of-fact attitude while providing ample cover and an explanation of the procedure.

Your presence is comforting to the anxious patient. Touch patients reassuringly and tell them what to expect. Let them know when you leave the area and when you expect to return. Escort ambulatory patients to the bathroom or back to the waiting area. It can be very distressing to patients if they must wander about in an examination gown wondering where to go. Once you start a procedure, try to remain near the patient. If patients must wait in an x-ray room or dressing room, let them know that you are within hearing distance and that they may call on you for help. If a call button is available, show patients how to use it and assure them that someone will assist them promptly if they call. If no call signal is available, check with patients frequently while they wait.

Physical discomfort adds to tension as well. Remember that most patients will find it hard to remain still during a long procedure on a hard surface. This is especially difficult for a thin patient or an elderly person with kyphosis. Note whether an obese patient has difficulty breathing when lying flat on the table. Note skin temperature when you touch the patient and inquire whether the patient is warm enough. If the patient feels chilled, provide a blanket and tuck it around the patient to provide both warmth and a sense of security. As you move briskly around the room the temperature may seem warm enough to you, but elderly or frail patients may not be active enough to keep warm. If the patient is coughing or sniffling, offer paper handkerchiefs and position a waste container within reach for the soiled tissues.

Fig. 22.1 Valuables are placed in a suitable container within sight of the patient.

If dentures must be removed, provide a suitable disposable container and place it in a safe and visible location. Dentures slide in much more easily when wet, so add water to the container or direct the patient to a sink when dentures are replaced. Eyeglasses and hearing aids are also items essential to activities of daily living and are difficult and expensive to replace or repair. A bright-colored plastic box or basket is a useful container for these items and other small valuables (Fig. 22.1). Choose a safe location in view of the patient. Use the same place consistently and point out the location to the patient.

PHYSIOLOGIC NEEDS

Water

A dry mouth can be caused by thirst but can also result from anxiety or medication. A drink of water, offered with a straw if the patient is lying down, may be very comforting. Because some tests require that the patient have nothing by mouth, even water, be sure to check that water is permitted.

Elimination

An urgent need to void can be very distressing to a patient. A full bladder may cause discomfort, irritability, and

difficulty remaining still during the procedure. If this need is ignored in an older or debilitated patient, **incontinence** (loss of bladder control) may result, causing embarrassment for the patient and cleanup problems for you. Be especially sensitive to the need for bathroom facilities when procedures are prolonged.

Before a patient uses the bathroom, check to see if a specimen of urine or feces should be collected. If so, provide instructions and the correct container. Urine collection procedure is explained in Chapter 24. When a patient needs to defecate or urinate and is unable to walk or be taken to the bathroom in a wheelchair, a bedpan or urinal is used. This is not a common requirement in most outpatient facilities, but assisting patients with bedpans or urinals is a basic clinical skill.

When a bedpan is necessary, follow the procedure outlined in Box 22.1. Be sure that the patient is adequately covered for privacy. When a female patient is placed on the bedpan, the upper torso needs to be slightly elevated to prevent urine from running up her back. When a patient is restricted in mobility, two people may be needed to assist the patient onto the bedpan. If the patient is on the x-ray table, one person should stand on each side of the table to prevent the patient from falling.

When the patient is finished, you may have to assist with wiping. Wear gloves and have toilet tissue, a wet washcloth, and a dry towel conveniently placed. Assist the patient to lift the hips or roll away from you onto one side while you steady and remove the pan. Place it safely aside and, if necessary, help the patient by wiping from front to back with paper first, and then with a wet cloth before drying. Offer the patient a disposable moist towelette or a clean wet cloth and towel to cleanse the hands.

Male patients may need to use a urinal. Usually this is simply a matter of providing the urinal and removing it again when the patient is finished. If the patient is unable to use it himself, don protective gloves and spread the patient's legs; lift the sheet with one hand and slide the penis into the urinal with the other. It may be advisable to hold the urinal in position until the patient is finished.

Patients may find it difficult to use a bedpan or urinal if they feel that they are under observation. If possible, you should remain out of the patient's line of sight while staying close enough to ensure patient safety.

Empty the bedpan or urinal carefully into the toilet to avoid splashing. Remember to perform hand hygiene after removing your gloves.

Placing a patient on the bedpan or offering the urinal is not a complex task. Once you are familiar with this procedure, the chief obstacle to overcome is embarrassment. A cheerful, matter-of-fact attitude will make the process easier for you and for the patient.

Box 22.1

Assisting Patients with the Bedpan

1. Assemble your equipment. You will need a bedpan and bedpan cover (a towel or pillowcase may be used), toilet tissue, washcloth and towel, and sheet or blanket.
2. Perform hand hygiene and don disposable gloves.
3. Close the door to provide privacy.
4. If the patient is on the x-ray table, elevate the upper torso with pillows or angle sponges. Cover the patient.
5. Ask the patient to bend the knees and raise the hips.
6. Assist the patient by lifting with one hand under the small of the back while you slide the bedpan under the buttocks with the other.
7. Ask the patient to call when finished. If the patient is on the x-ray table, remain nearby but out of the patient's line of sight.
8. When the patient is finished, provide toilet tissue, then a wet washcloth and towel or a moist towelette for the patient's hands.
9. Ask the patient to raise the hips and remove the bedpan.
10. Cover the bedpan and place it aside until the patient is settled and secure.
11. Dispose of the contents in the toilet; remove the gloves and perform hand hygiene.

Sanitary Supplies

Occasionally a patient requires a sanitary napkin. Know where these are kept. If a soiled napkin is to be removed, direct the patient to a bathroom or place a paper bag within reach. Dispose of the bag with the soiled napkin in the appropriate container.

TAKING A HISTORY

It is important for you and the physician who interprets the images to know why an examination is being done. If the images are sent out to a radiologist, this information must accompany them. If the requisition does not provide complete and accurate information about the patient's history and condition, you will need to obtain this information from the patient. The answers you receive may influence how the examination is conducted. The history also aids the radiologist in focusing the interpretation to meet the referring physician's needs. This does not need to be a detailed medical history, but rather a thoughtful consideration of the patient's current status and why this particular radiographic study is being done.

The process of taking a history presents an opportunity for you to give the patient individual attention and build rapport. In addition, your ability to gain the patient's confidence will influence the amount of relevant information you obtain. Remember to introduce yourself, call the patient by name, and deal with immediate patient concerns as soon as possible.

Begin the history by asking a general question about the nature of the problem, such as, "Do you know why Dr. Chen wants you to have an x-ray of your chest?" Be

realistic in the scope of your questions. Focus on expanding the information provided on the x-ray requisition. This is especially important when the request or order does not indicate the rationale for ordering the procedure. Most requisition forms have a place for this information, but in practice the history is often absent or is so limited that it does not seem relevant without further explanation. The information you obtain is most useful when recorded on the appropriate form. You may also need to enter it into the computer record.

History requirements vary with the nature of the examination. Table 22.1 provides history questions and observations pertinent to many patient complaints. You can use it to become familiar with the types of information that will be most useful in specific situations. The history examples in this table use common abbreviations that are also used in charting and other medical recording.

Patients may have been asked to complete a history questionnaire on their initial visit, but this information may be out of date. Examinations for patients with chronic conditions or those receiving post-treatment follow-up may require a comparison with prior imaging studies. If these are not part of the current file, your history should contain information on previous relevant examinations, including when and where they were done.

Some medical assistants take preliminary histories before the physician sees the patient. Al-though the physician is responsible for taking the official medical history, a preliminary history can save time, allowing the physician to focus quickly on details of the patient's problem.

TABLE 22.1

Guidelines for Taking a History of a Patient's Chief Complaint

Type of Examination	Questions	Observations	Example of History
Orthopedic, acute injury	How did the injury occur? When? Can you show me exactly where it hurts?	Swelling, deformity, discoloration, laceration, abrasion	Twisting injury, left ankle, while skiing today; swelling and pain over lateral malleolus.
Orthopedic, not involving acute injury	Where does it hurt? How long has it been bothering you? Were you ever injured there? How was the injury treated (cast, surgery)? Has there been any recent change?	Deformity, scars, range of motion, weight bearing	Chronic pain, R knee 2 year, worse since building fence Sat. Prev Rx cortisone inj. No known injury.
Neck	Did you injure your neck? How? When? Where does it hurt? Do you have any pain, numbness, or tingling of the shoulder or arm? Which side?	Range of motion	MVC 10/12/15; lower neck pain and left shoulder pain numbness and tingling, left hand.
Spine	Did you injure your back? How? When? Do you have pain, numbness, tingling, or weakness of the hip or leg? Which side? Any bowel or bladder problems?	Gait, range of motion	Lifting injury 2 week ago. LBP radiating to right hip.
Head	Were you injured? When? How? Do you have pain? Where? Did you lose consciousness? For how long?	Speech: clarity, confusion; gait	Severe HA, blurred vision, dizziness, and gen'l weakness, 24 h. No known injury. Speech slurred.
Chest	Do you know why your doctor ordered this examination? Are you short of breath? Do you have a cough? Do you cough up anything? Do you cough up blood? Have you had a fever? Do you have any heart problems?	Respirations, cough	SOB, wheezing, and right chest pain since resp. flu 4 weeks ago. Moderate, nonproductive cough.
Abdomen, gastrointestinal examinations	Do you know why your doctor ordered this examination? Do you have pain? Where? Do you have nausea? Diarrhea? Have you had any other tests for this problem (lab tests, ultrasound)? Do you know the results? Have you ever had abdominal surgery? When? Why?		LLQ pain, increased over past month? mass seen on US done here 10/21/11.
Urology	Do you know why your doctor ordered this examination? Do you have any pain? Where? For how long? Do you have trouble passing urine? Pain? Urgency? Frequency? Have you ever had this problem before? Do you have high blood pressure?		Two prior episodes of UTI; current malaise, fever, and mid back pain.

?, Question of; *gen'l*, general; *inj*, injection; *LLQ*, left lower quadrant; *resp*, respiratory; *SOB*, shortness of breath; *US*, ultrasound; UTI, urinary tract infection. To identify other common abbreviations used in charting (e.g., *MVC*, motor vehicle crash), see Appendix J.

If taking patients' preliminary histories is one of your accepted responsibilities, the standard format that follows can serve as a guide. Using this outline will allow you to elicit the greatest amount of information about the patient's chief complaint in the least amount of time and will help you avoid missing relevant facts.

Onset: How did it start? What happened? When did it first trouble you? Was it sudden or a complaint that gradually got worse?

Duration: Have you ever had it before? If so, when? Has it been continuous? Does it bother you all the time? How long has this attack been bothering you?

Specific location: Where does it hurt (or where is the problem)? Can you put your finger on where it hurts the most? Does it hurt anywhere else?

Quality of pain: What does it feel like? Sharp, stabbing pain? Dull ache? Throbbing pain? How severe is it? Mild, moderate, severe? (Some like to use a pain scale of 0 to 5 or 0 to 10, with 0 being no pain at all and the highest number representing the worst pain the patient can imagine.) Does it wake you up at night?

What aggravates: When is it worse? What seems to aggravate it? Is it worse after meals (at night, when you walk)?

What alleviates: What has helped in the past? Does that still help? What seems to help now? Does the time of day (amount of rest or change in position) make a difference?

Tact and caution are required when obtaining a history. Anxious patients may read too much into your questions. Information regarding such serious matters as cancer, surgery, or heart attack is best elicited in a general way rather than through blunt questions. "Do you know why your doctor ordered this examination?" is less threatening than "Is your doctor checking for cancer?" Victims of accidents for which legal liability is in question may be reluctant to provide information that could increase their liability or jeopardize a legal settlement. Minors may be hesitant to reveal personal information in the presence of their parents. When information is difficult to obtain, it is usually wise for the physician to take the complete history.

At this point the process of taking a history may seem complex and confusing. This is a skill that improves with practice. Role-playing with other students, including a critical observer, will improve your ability to take a history with sensitivity and confidence. As clinical practice provides additional knowledge and experience, you will find that your observation and history-taking skills become increasingly accurate and pertinent.

ASSESSING CURRENT PHYSICAL STATUS

Establishing a Baseline

You may be the first and primary observer of a significant change in the patient's current condition. To accurately assess change, you must first establish a baseline for your observations.

Before you begin a radiographic procedure, it is important to review the requisition. Unfortunately, the requisition may not have enough specific information, and this is a place where your skill in history taking will prove valuable. If you have access to the medical record, read the diagnosis and the most recent chart notes. An order for the x-ray study should be there. Some notations have special significance. It is important to note any allergies, as a patient with a history of allergies is more likely to have an adverse reaction to medications, especially when administered by injection.

Physical Evaluation

In the context of this chapter, evaluation is an ongoing process of observation, assessment, and measurement to note and evaluate changes in patient condition. How do you know when the condition of a patient is changing for the worse? What do you look for?

The most important process is sometimes called *eyeballing the patient*, a skill of acute observation that compares the actions and appearance of *this* patient with those of similar patients you have seen. You also use this skill to compare the appearance of this patient *now* with the way he or she appeared earlier. Although this may seem intuitive, you are actually responding to subtle changes in the overall appearance of the patient.

One of the easiest signs to recognize is a change in skin color. Individual complexions vary, but when pale skin becomes **cyanotic** or olive skin becomes pale and waxen, the change is usually quite apparent. The term *cyanotic* denotes a bluish coloration in the skin and indicates a lack of sufficient oxygen (O_2) in the tissues. This is most easily seen on the mucous membranes, such as the lips or the lining of the mouth. Nail beds may also show a bluish tinge. For some patients with heart or lung conditions, this may be a chronic or usual state, but the patient who *becomes* cyanotic needs oxygen and immediate medical attention. Any patient who looks pale and anxious and does not feel well is subject to fainting and needs to sit or lie down immediately. Do not leave the patient! A patient who loses consciousness and falls to the floor may suffer injuries far more serious than the cause of the fainting.

We have discussed the importance of touch as a form of communication and reassurance, but contact with your hands also allows you to make physical observations. The acutely ill patient in pain may be pale, cool, and **diaphoretic** (perspiring) in what is frequently called a *cold sweat*. Hot, dry skin may indicate a fever, whereas warm, moist skin may only be a response to the weather or the room temperature. Cool, moist skin may indicate acute anxiety. Wet palms and shaking hands are typical of the apprehensive individual who will need an unusual amount of reassurance. These patients may find it difficult to concentrate. They often need more frequent instructions during the

procedure and should receive written directions for any required follow-up care.

If you note any of these signs, it is important to determine whether this is a new symptom. Has the patient just received any new medication? If so, notify your supervisor or the physician immediately. You may be observing the first signs of an impending allergic reaction.

Vital Signs

The next four procedures used for assessment are usually referred to as *vital signs*. They involve the measurement of temperature, pulse rate, respiratory rate, and blood pressure (BP). The ability to take vital signs is a valuable clinical skill. Even if taking vital signs is not a part of your usual job description, you may need to assess them in an emergency. If you do not take vital signs routinely, keep your skills sharp by reviewing your technique frequently. When time allows, check your co-workers. We should all be aware of our own baseline vital signs, so your practice will benefit you, the person on whom you practice, and the patient who may need your skill in an emergency. Know the location of equipment for measuring vital signs and other items that might be needed in an emergency. Even before you are proficient in their use, you may be asked to obtain them for a nurse or physician. Table 22.2 provides a reference to normal vital sign measurements by age.

Temperature

The first of the vital signs is temperature. Taking a temperature is a basic clinical skill that can also be used in your own home. An accurate temperature reading measures the body's basic metabolic state, the rate at which it uses energy.

Body temperatures vary during the day, being lowest in the morning and highest in the evening. Normal oral temperatures vary from 96.8°F to 99.6°F (36°C to 37.6°C). Rectal temperatures range from 0.5°F to 1.0°F (0.28°C to 0.56°C) higher than oral temperatures; axillary temperatures range from 0.5°F to 1.0°F lower. In addition, normal temperatures vary slightly from person to person. A tense, quick-moving individual is likely to have a higher basal temperature than a placid, slow-moving person, all else being equal.

Fever, also termed *pyrexia* or *hyperthermia*, is a sign of an increase in body metabolism, usually in response to an infectious process. For adults, fever commonly refers to any temperature of 100.4°F (38°C) or higher when taken orally, or 101.4°F (38.6°C) taken rectally.

Temperatures may be obtained by the oral, rectal, axillary, temporal artery, or tympanic routes. Alert, cooperative patients usually prefer the familiar oral route. It has long been held that the oral method is less accurate than the rectal method, but research does not confirm this belief. The oral route provides an accurate measure of changes in body core temperature when taken correctly with the probe of the thermometer well under the base of the tongue.

The oral method is *not* appropriate when the patient has recently had a hot or cold beverage, is receiving oxygen, or breathes through the mouth. In these situations, the rectal or axillary method may be used. The rectal temperature is both more accurate and faster to take than the axillary temperature; however, the axillary method is sometimes preferred because it is less invasive. Taking the rectal temperature may be contraindicated to avoid stimulating the vagus nerve, the tenth cranial nerve, which has connections to the sympathetic nervous system throughout the thoracic, abdominal, and pelvic cavities, and within the rectum. Stimulation of this nerve produces physiologic changes called the *vasovagal response:* relaxation of the muscles in the walls of the blood vessels, slowing of the heart rate, lowering of BP, and sometimes fainting. A vasovagal response can cause serious problems for certain patients with cardiac conditions.

TABLE 22.2
A Quick Reference for Normal Vital Signs by Age

Age	Temperature (Oral)	Temperature (Rectal, Tympanic, and Temporal)	Pulse	Respirations	Blood Pressure (Systolic)
Premature newborn		99.6°F (37.5°C)	140	<60	50–60
Full-term newborn		99.6°F (37.5°C)	125	<60	70
6 months		99.6°F (37.5°C)	120	24–36	90
1 year		99.6°F (37.5°C)	120	22–30	96
3 years		99.6°F (37.5°C)	110	20–26	100
5 years	98.6°F (37°C)	99.6°F (37.5°C)	100	20–24	100
6 years	98.6°F (37°C)	99.6°F (37.5°C)	100	20–24	100
8 years	98.6°F (37°C)	99.6°F (37.5°C)	90	18–22	105
12 years	98.6°F (37°C)	99.6°F (37.5°C)	85–90	16–22	115
16 years	98.6°F (37°C)	99.6°F (37.5°C)	75–80	14–20	Below 120
Adult female	98.6°F (37°C)	99.6°F (37.5°C)	60–100	12–20	Below 120
Adult male	98.6°F (37°C)	99.6°F (37.5°C)	60–100	12–20	Below 120

You may be familiar with the use of glass thermometers. They are no longer recommended for clinical use because they contain mercury, a toxic substance, and it is the goal of the Occupational Safety and Health Administration (OSHA) to remove mercury from the workplace when the same result can be obtained with products that do not involve mercury. Most health care facilities now use digital electronic thermometers with interchangeable oral and rectal probes (Fig. 22.2). These instruments can be read in 1 minute or less. They emit a short beep when the highest temperature is recorded. The temperature is read from a digital display on the thermometer itself or on a handheld display unit. Disposable sleeves are used to cover the probes, which avoids the need to disinfect the thermometer after each use.

Digital tympanic thermometers (Fig. 22.3) are also used, primarily with pediatric patients. They measure temperature at the tympanic membrane (eardrum) in the ear.

Disposable thermometers that consist of a strip of temperature-sensitive paper are available in two forms, one for oral use and one with adhesive backing that may be attached to the forehead.

Temporal artery–scanning thermometers (Fig. 22.4) contain an infrared sensor that measures the temperature over the temporal artery in the region of the forehead and predicts the body core temperature based on this reading. The gentle scan across the forehead and temporal region is easily and quickly accomplished and is not objectionable to patients. Research indicates that this method is more consistently accurate than the tympanic method.

Temporal artery or tympanic routes are best for children under the age of 6 years and for anyone who is confused or unable to follow directions. A general procedure for obtaining accurate temperature readings for each common route is found in Box 22.2. Remember to tell your patient what you are about to do. When taking an oral temperature, remind the patient not to bite down and to keep the lips closed. *Never leave a patient alone with a rectal or axillary thermometer in place.*

Fig. 22.2 Digital thermometer used for oral, rectal, and axillary temperature measurements.

Fig. 22.3 Tympanic thermometer probe is inserted into external auditory canal.

Fig. 22.4 Temporal artery scanning thermometer.

Box 22.2
Measuring Temperature with a Digital Thermometer

Oral Route
- Perform hand hygiene.
- Cover the oral probe with a clean plastic sleeve.
- Turn on the thermometer.
- Insert the probe under the patient's tongue. Instruct the patient to keep lips closed.
- Remove the probe when the audible tone or flashing number indicates that the maximum temperature has been reached (about 1 min).
- Note the temperature reading.
- Remove and discard the plastic sleeve.
- Repeat hand hygiene.
- Make sure the thermometer is off and return it to storage.
- Record the temperature.

Axillary Route
- Perform hand hygiene.
- Cover the probe with a clean plastic sleeve.
- Turn on the thermometer.
- Place the probe in the axilla so that the skin folds are in direct contact with the probe. Instruct the patient to hold the upper arm firmly against the chest wall.
- Remove the probe when the audible tone or flashing number indicates that the maximum temperature has been reached (about 1 min).
- Note the temperature reading.
- Remove and discard the plastic sleeve.
- Perform hand hygiene.
- Make sure the thermometer is off and return it to storage.
- Record the temperature.

Rectal Route
- Perform hand hygiene and don disposable gloves.
- Cover the rectal probe with a clean plastic sleeve.
- With the patient in a lateral recumbent position, cover the patient and expose the anus by raising the top fold of the buttocks.
- Slowly insert the probe until the anal sphincter is passed. Hold the probe in place.
- When the audible tone or flashing number indicates that the maximum temperature has been reached (about 1 min), remove the probe slowly.
- Note the temperature reading.
- Remove and discard the plastic sleeve.
- Remove and discard the gloves.
- Repeat hand hygiene.
- Make sure the thermometer is off and return it to storage.
- Record the temperature.

Pulse

A pulse is the advancing pressure wave in an artery caused by the expulsion of blood when the left ventricle of the heart contracts. Because this wave occurs with each contraction, it provides an easy and effective way to measure the rate at which the heart is beating.

Average normal pulse rates in adults vary between 60 and 100 beats per minute (bpm). The tense, nervous individual is more likely to be in the upper range, whereas athletes tend to have a slower rate. A rapid pulse, called **tachycardia**, occurs when the heart rate is greater than 100 bpm. This may be a temporary state, as after exertion or when the person is nervous or excited, or it may be constant, caused by a damaged heart or an endocrine disorder. A rapid pulse rate may also result from interference with oxygen supply or from significant blood loss. In these cases, the heart must beat faster to circulate the remaining blood and to supply oxygen to the cells of the body. In addition to rate, the pulse volume or quality may vary. A weak, rapid pulse is described as *thready*. A **thready pulse** may indicate that the heart is not pumping enough blood.

Common pulse points are shown in Fig. 22.5. The most common site for palpation of the pulse is the radial artery on the lateral aspect of the wrist at the base of the first metacarpal. Because your own thumb has a pulse, you cannot take an accurate pulse using your thumb. Place your fingers over the artery with your thumb on the back

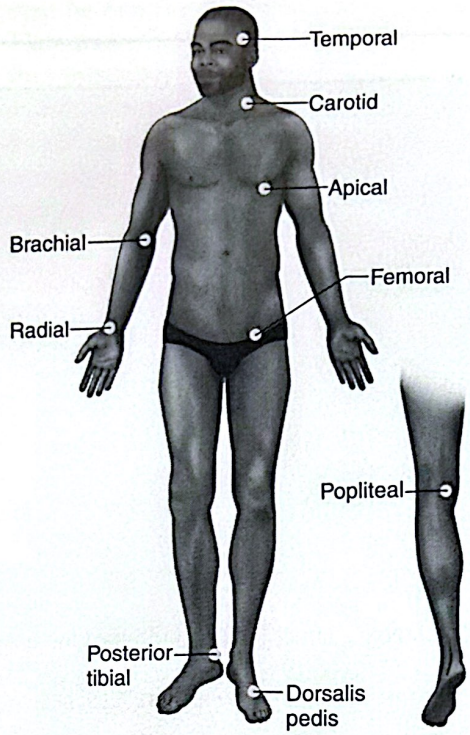

Fig. 22.5 Common pulse points.

Fig. 22.6 Taking a radial pulse with the palm down.

of the wrist. Compress gently but firmly. When the artery is compressed against the radius, the pulse is easy to feel, especially if the patient's wrist is held palm down (Fig. 22.6).

If the pulse is weak or difficult to count, you can use the carotid artery. Place your fingers against the neck below the angle of the mandible (Fig. 22.7). This site is easily accessible and is particularly important if a patient loses consciousness. If the pulse is not palpable at this site, the heart is not beating effectively and emergency measures are necessary. These measures are discussed later in this chapter.

Fig. 22.7 Palpate for the carotid pulse below the angle of the mandible.

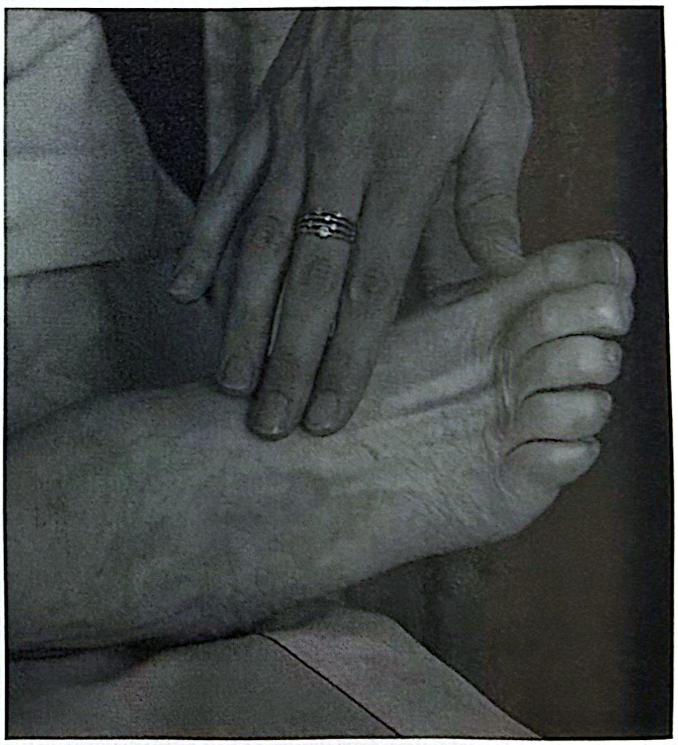

Fig. 22.8 Taking a pedal pulse.

The *dorsalis pedis* or pedal pulse is taken over the instep of the foot (Fig. 22.8). This pulse may be significant when there is a question of compromise in the peripheral circulation. For example, you may be requested to check the pedal pulse following the application of a cast to the lower extremity. Because inability to feel this pulse may be an

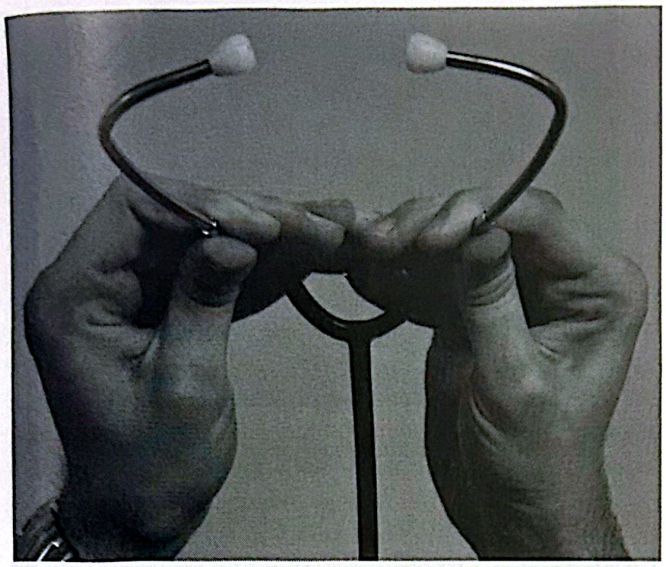

Fig. 22.9 Stethoscope ear tips should point up slightly. Correct placement of ear tips improves accuracy.

important diagnostic sign, you must practice until you are certain that you can detect the pulse when it is present.

If the pulse is slow or irregular, it may be important to use a stethoscope to take an apical pulse. Look at the stethoscope carefully and become familiar with its use. It may have a bell and a diaphragm; less expensive models may have a diaphragm only. On the bimodal stethoscope, you can switch from bell to diaphragm. For most purposes, however, the diaphragm is preferred.

When you hold the earpieces of the stethoscope horizontally in front of you, the ear tips should point up slightly (Fig. 22.9). Insert the tips in your ears and then tap the diaphragm gently with your finger to be sure you can hear. Now press the diaphragm firmly over the **apex** or tip of the heart. This is normally found in the fifth anterior intercostal space at the left midclavicular line. Count the pulse for a full minute and record the rate, noting any irregularities.

When the radial pulse rate is taken routinely, it is common to count for 15 seconds and multiply the count by 4 to obtain a measurement of the total bpm. Whenever there is an irregular rate or rhythm, count for a full 60 seconds. If the apical rate is faster than the radial rate, the heart is not beating efficiently. This should be recorded on the chart or requisition. If the patient also shows signs of distress, report them to the physician immediately.

Respirations

When a patient shows evidence of respiratory distress, a measurement of respiratory rate will help in making an assessment. To count respirations, simply note the number of inhalations per minute. This can be done while continuing to hold the wrist after the pulse has been counted, because some patients may force a change in the respiratory rate if aware that a count is being made. If you are having difficulty counting breaths, place one hand lightly over the patient's diaphragm. Compare your findings with the normal adult range of 12 to 20 breaths/min. If a patient complains of **dyspnea** (difficulty in breathing) or has extremely rapid breathing (**tachypnea**), you should inform the physician and prepare oxygen equipment for immediate use in the event that it is ordered. Oxygen administration is discussed later in this chapter.

Blood Pressure

A BP reading is usually expressed in two figures, such as 120/78. The top figure is the **systolic** pressure and is a measure of the pumping action of the heart muscle itself. The bottom figure is the **diastolic**[a] pressure and indicates the ability of the arterial system to accept the pulse of blood forced into the system when the left ventricle contracts. If you are angry, afraid, or exercising, the top figure greatly increases. The diastolic figure may also rise, but to a lesser degree. What is a normal BP? As a rule of thumb, an average diastolic pressure greater than 90 mm Hg indicates some degree of **hypertension** (abnormally high BP). Less than 50 mm Hg indicates **hypotension** (abnormally low BP) and may signal shock. A systolic pressure of 95 to 120 mm Hg is within normal limits, as is a diastolic pressure of 60 to 90 mm Hg. A measurement between 120 and 140 is termed *prehypertension*. The acceptable range of BP varies depending on age, weight, and physical status.

To establish a baseline or average BP, at least two readings are customarily taken. These may be measured over a period of time and on some occasions are taken sitting, standing, and lying down. In an emergency, however, a single reading can be reported to the physician and should be compared with prior recorded results, if available. Take an additional reading as soon as possible.

To measure BP, you will need a stethoscope and a **sphygmomanometer**, often called a *blood pressure cuff*. Sphygmomanometers once measured pressure by using a mercury column that rose or fell according to the pressure. For this reason, BP is measured in units of millimeters of mercury (mm Hg). Equipment containing mercury is no longer used. Digital electronic models and aneroid manometers using air pressure have now replaced mercury units to meet OSHA requirements for eliminating mercury from the workplace. The procedure for measuring BP is detailed in Box 22.3 and is illustrated in Fig. 22.10.

Blood Oxygen Saturation

Although the O_2 saturation of the blood is not considered one of the vital signs, measurement of O_2 saturation using a pulse oximeter is often included in the process of measuring vital signs. This is especially true for patients with cardiac or pulmonary conditions that may affect the level of blood O_2. A pulse oximeter has a sensor that attaches to

[a] An easy way to remember is to think, "D is for down."

a finger or earlobe (Fig. 22.11). The sensor unit contains or is connected to a display unit that provides a digital readout of the pulse rate and the O_2 saturation. Normal O_2 saturation levels range between 95% and 100%.

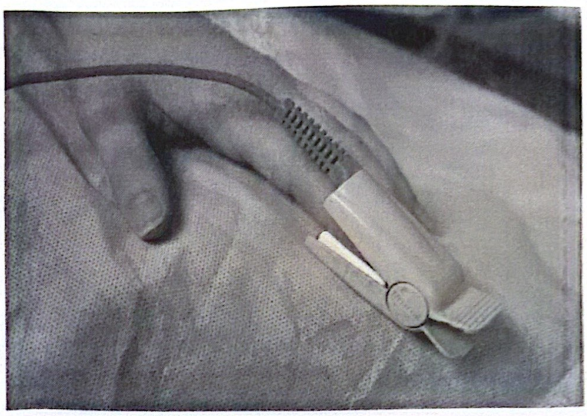

Fig. 22.11 Pulse oximeter sensor in place on finger.

Box 22.3
Measuring Blood Pressure

- Perform hand hygiene and explain the procedure to the patient.
- The patient may be sitting or lying down, but the cuff should be at the level of the heart. Either arm may be used unless the patient has had surgery in one breast, arm or shoulder area, in which case the other arm should be used.
- Wrap the cuff snugly with the bottom edge above the antecubital space. Most cuffs are self-securing.
- Place the gauge where you can easily read the dial.
- Palpate the brachial artery pulse in the antecubital space.
- Place the stethoscope's ear tips in your ears and press its diaphragm over the brachial artery.
- Close the valve on the bulb pump and inflate the cuff rapidly to approximately 180 mm Hg.
- Open the valve on the pump and *slowly* release the pressure.
- Listen for the beat of the pulse while watching the gauge. Note the figure at which the pulse is first heard. Note this as the systolic reading.
- As the pressure is released, the sound increases in intensity and then, suddenly, becomes much softer. Note this point as the diastolic reading.
- Release the remaining pressure.
- If the situation permits, ask the patient to raise the arm and then clench and release the fist. Lower the arm and repeat the procedure to check the results.
- Remove the cuff and record the results as systolic over diastolic (e.g., 140/86).
- Clean the ear tips and diaphragm of the stethoscope with alcohol and return the equipment to its storage place.
- Repeat hand hygiene.

ACUTE SITUATIONS

You will see patients in widely varying states of health. Using assessment skills learned earlier in this chapter, you will be able to evaluate patients and note changes in their symptoms and conditions. Individuals suffering from prolonged illness, the onset of acute illness, or recent trauma may undergo a sudden change in status that could be life-threatening. In obvious emergency situations, patients are usually taken directly to a hospital emergency department. Sometimes, however, the seriousness of a patient's condition may not be immediately recognized or the patient may be reluctant to go to the emergency room. These patients may seek care in a physician's office or an urgent care center.

Patients who have been involved in car crashes are subject to sudden changes in condition and may go into physical or psychologic shock. Once the acute phase of an accident is over, many patients who were full of fortitude experience a delayed emotional reaction. This may take the form of uncontrollable crying or a compulsive urge to tell everyone about the accident. They may also have a physical reaction, such as fainting, trembling, or violent nausea. Your most positive action is to be available, offer nonverbal support, and watch carefully for any signs of

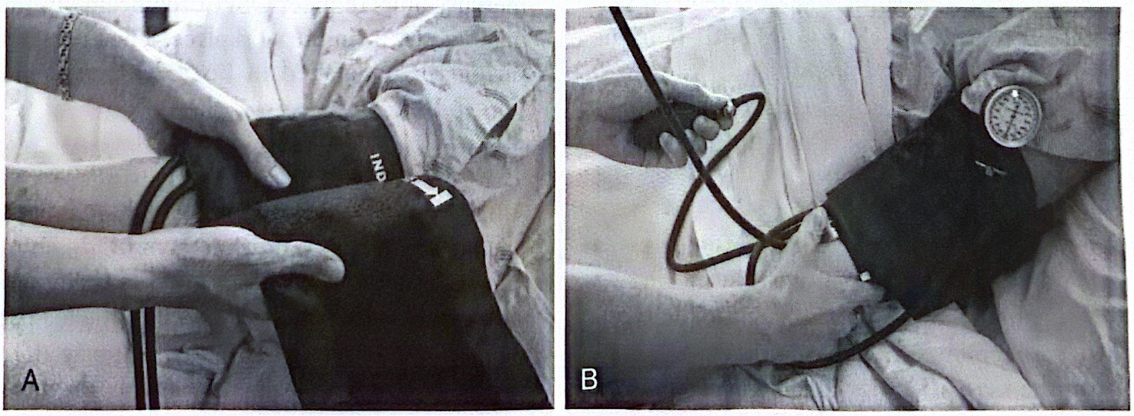

Fig. 22.10 Measuring blood pressure. (A) Wrap the cuff snugly above the antecubital space. (B) Place the gauge for easy visibility, place the stethoscope over the brachial artery, and inflate the cuff. Release pressure while noting pressures at start and end of audible pulse.

deteriorating physical condition. Your ability to speak calmly and work competently under pressure is reassuring to the patient.

Emergency Supplies and Equipment

All health care facilities are prepared for emergencies to some degree. The extent of preparation will depend on the facility and the likelihood of dealing with a life-threatening condition. For example, a cardiologist's office should be equipped to handle a heart attack or a cardiac arrest, but a chiropractic clinic would be less likely to be prepared for these events. *If a life-threatening situation occurs in any facility that is not prepared to deal with the emergency, the standard procedure is to call 911.*

Essential items for emergency preparedness include airways, emergency medications and the equipment for administering them, a sphygmomanometer, and a stethoscope. In some facilities, the emergency equipment may also include a board to slip under the patient when giving external cardiac massage, artificial ventilation equipment, and a defibrillator. Emergency items may be kept in a box or drawer or on an emergency cart. It should be possible to move the entire set quickly to any location within the facility where it might be needed. Emergency equipment and supplies should be inspected regularly to ensure that they are up-to-date and available for instant use. It is helpful to have a current list of contents with the kit so that precious time is not wasted searching for items that are not present.

It is your duty to know the extent of emergency equipment and supplies available and to know where they are kept. *Never borrow equipment or supplies from the emergency set for routine use.* This practice results in the absence of lifesaving items when they are most needed. When you use these items in an emergency, be sure that supplies are replenished and the kit is ready for use before returning it to storage.

Fig. 22.12 A simple oxygen face mask.

Oxygen and Suction

You may encounter patients who need supplemental O_2. The administration of O_2 is noninvasive and, if permitted in your facility, can be administered safely without an order. If a physician has not yet evaluated the patient, it is appropriate to provide a low flow rate of O_2 to any patient who experiences acute anxiety accompanied by a rapid heart rate and shortness of breath. O_2 is prescribed for patients with a wide range of illnesses.

Because the need for O_2 and/or suction can be sudden and dramatic, you should be familiar with the mechanics of the O_2 and suction systems available in your facility.

Oxygen Administration

O_2 can be administered by various means. A simple face mask (Fig. 22.12) is often used to provide O_2 temporarily. It is shaped to conform to the face and held in place by an elastic strap. The mask is used primarily for short-term therapy. It fits loosely and delivers O_2 concentrations that can vary from 30% to 50%, depending on the fit and the O_2 flow rate. Attach the mask to the O_2 supply and adjust the flow meter to deliver 3 to 5 L/min. Place the mask over the nose and mouth and slip the elastic band over the patient's head.

Most patients receiving long-term O_2 therapy use a portable tank with nasal prongs (sometimes called a nasal cannula) (Fig. 22.13). Make certain that the O_2 is flowing through the nasal prongs before placing the unit on the patient. Position the prongs at the nasal openings and place the tubing over each ear, securing it snugly under the chin. When nasal prongs are used, the O_2 flow rate should be adjusted to 4 L/min or less, because higher rates are drying to the nasal mucosa.

Although some outpatient facilities have O_2 available from wall outlets, portable O_2 units are commonly used. You must be familiar with the operation of these units and with the procedure for checking to ensure that they will be immediately available when needed. The O_2 tank has an on-off

Fig. 22.13 Nasal cannula for oxygen administration.

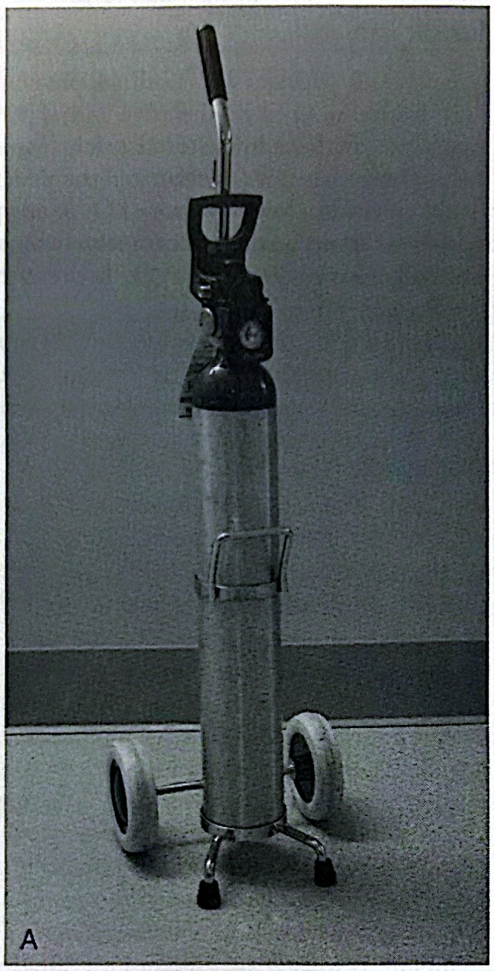

Fig. 22.14 A portable oxygen system supports the oxygen needs of a patient during transport and in areas where oxygen is not otherwise available. (A) Portable oxygen tank. (B) Oxygen tank controls and gauge.

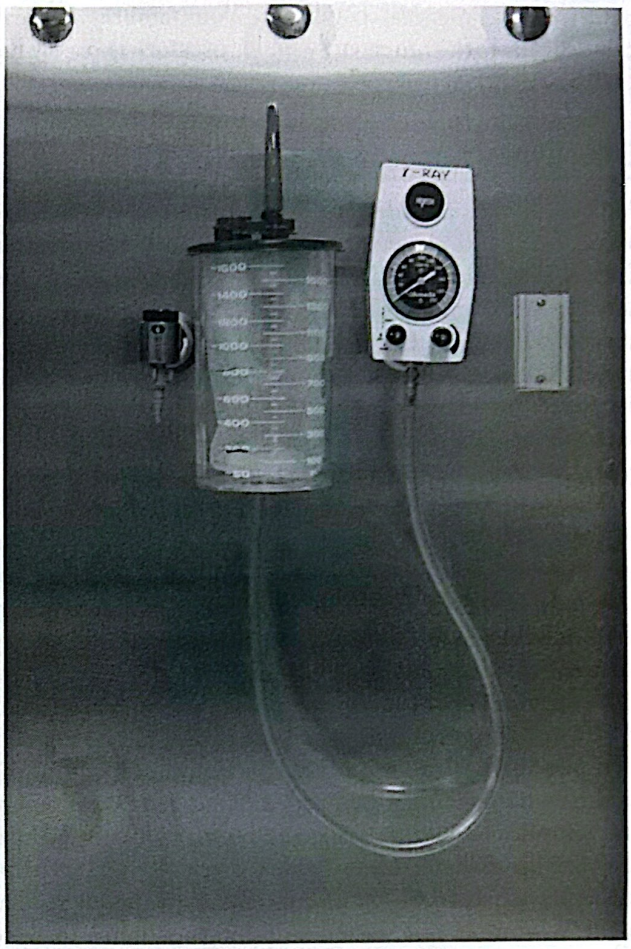

Fig. 22.15 Wall-mounted suction unit.

valve with a dial indicating how much gas remains (Fig. 22.14). A separate valve adjusts the rate of O_2 flow, and an associated flow meter shows the delivery rate in units of L/min. *Both valves must be turned on to provide O_2 to the patient.*

Although the usual O_2 flow rate is 3 to 5 L/min, severely compromised patients, such as trauma victims in shock, may receive O_2 at a much higher rate. In contrast, patients with emphysema (see Chapter 16) should receive O_2 at a slower rate, less than 3 L/min. Unlike other patients whose respiratory rate is controlled by the level of carbon dioxide in the blood, these patients must not receive a higher flow rate because the level of oxygen in the blood controls their rate of respiration. If too much O_2 is administered, their respiratory rate may become too slow for adequate ventilation.

Suction

Mechanical suction (Fig. 22.15) is used when a patient is unable to clear the mouth and throat of secretions, blood, or vomitus. If suction equipment is available for emergency use in your facility, you must assume responsibility for understanding and operating this equipment. If you are responsible for ensuring that the suction system is operational, check to see that:

- The pump is working
- The receptacle is connected to the pump

- An adequate length of tubing connects the suction catheter to the receptacle
- An assortment of disposable suction catheters is on hand

Be alert to the need for suction whenever a patient becomes nauseated, is bleeding from the mouth or nose, or is unable to swallow and cope with secretions because of a low level of consciousness. If a patient does begin to aspirate mucus or vomitus, place the patient immediately in the lateral recumbent position, don gloves and a face shield or a mask and goggles, and attempt to clear the airway manually. Remember to stand to one side when clearing an airway, because the sudden violent expulsion of the obstructing material may spray your face. If a reflex cough does not clear the airway at this point, suction is needed, and your role may be to assist the nurse or physician with the procedure. Unwrap the suction tip attached to the suction apparatus and turn on the suction. At this point the nurse or physician proceeds with suctioning while you assist by holding the patient in position. When the emergency is over, check to be sure that you have cleaned or replaced the receptacle and replaced the disposable tip and tubing so that the suction unit will be ready for use when needed.

In the event that you must suction the patient yourself, call for help while you unwrap the catheter and turn on the suction. After you have cleared the mouth, pull the chin down and forward while inserting the suction catheter tip over the tongue in the midline. Do not insert the catheter forcibly, because you may injure the larynx (voice box). Any suctioning beyond the nasopharynx (back of the throat) should be done by a physician or someone trained in this procedure.

RESPIRATORY EMERGENCIES

Reactive Airway Disease

The term *reactive airway disease* is not a specific diagnosis; it is a general term used to describe conditions characterized by coughing, wheezing, or shortness of breath with an undetermined cause. When these symptoms are present, asthma is one of the possible causes. Some doctors use the terms "reactive airway disease" and "asthma" interchangeably, but they are not necessarily the same thing.

Asthma is difficulty in breathing caused by bronchospasm, which restricts the patient's ability to take in a sufficient volume of air. Asthmatic attacks are sometimes related to allergies and are frequently precipitated by stress. If the radiologic procedure is new or frightening, dyspnea may result. Most chronic asthmatic individuals carry a metered dose inhaler with a bronchodilating medication. Patients with asthma should take their medication into the examining room.

In the event of an acute episode of reactive airway disease, call for [illegible]ment is to administer oxygen to keep the O_2 saturation level above 92%. The administration of albuterol by inhaler or nebulizer and parenteral administration of corticosteroids may be ordered by the responding physician. Subcutaneous injections of epinephrine or terbutaline (Brethine, a bronchodilating medication) may be ordered in cases of a severe attack. Medication administration is addressed in Chapter 23. Although an asthma attack can be frightening for both the patient and the limited operator, a single attack is seldom fatal.

Airway Obstruction

Blockage of a patient's airway is a life-threatening situation that can cause respiratory arrest if not successfully treated immediately. The obstruction may be caused by a solid object but is more likely to involve liquid or semiliquid material. This may be mucus, blood, or vomitus that cannot be expelled by a patient who is unconscious or semiconscious. If your facility has emergency response codes, call the code for a respiratory emergency. If a code system is not in place, call for a physician and prepare suction for use. The use of suction is discussed earlier in this chapter.

Cardiac Emergencies

Angina Pectoris

Angina pectoris, often simply called **angina**, is the term for chest pain that occurs when the coronary arteries are unable to supply the heart with sufficient O_2 to meet current needs. Episodes of chest pain are precipitated by exertion or stress and are usually relieved by rest or nitroglycerin tablets administered under the tongue. The discomfort caused by angina often presents as pain under the sternum and may vary from a vague ache to an intense crushing sensation. Sometimes it resembles the distress of severe indigestion. Most patients who are known to suffer from angina carry their medication with them at all times. An emergency supply of nitroglycerin is usually stocked in medical health care facilities.

Heart Attack

Patients experiencing the early onset of a heart attack sometimes seek immediate care in physicians' offices or clinics. If at any time a patient suddenly develops an irregular pulse; appears diaphoretic and pale and is feeling short of breath, faint, weak, or nauseated; or has a sudden onset of pain in the chest, shoulder, or jaw, *a physician must be notified immediately* regarding the possible onset of a heart attack. Patients experiencing a heart attack may complain of sudden, intense chest pain, often described as a crushing pain, but pain may not be present at all. Because the symptoms are caused when a portion of the heart wall becomes ischemic (lacking O_2), you must prevent further damage by minimizing patient exertion. Patients may underestimate the importance of this type of pain and assume instead that it is caused by heartburn or

indigestion. These patients often appear diaphoretic and pale. They may feel nauseated and short of breath and may have an irregular heartbeat. Assist the patient to a comfortable position, obtain help, and stay with the patient. If the patient has shortness of breath, raise the head and administer O_2 at a rate of 3 to 5 L/min.

Cardiac Arrest

One of the most anxiety-producing situations encountered by health care workers is the discovery of an unconscious patient or the observation of a patient suddenly losing consciousness. When this occurs, it is important to initiate the "shake and shout" maneuver. Most patients who have simply fainted will respond if you call out their name and give them a gentle shake. If there is no response, feel for the carotid pulse and observe for respiration. If the patient has stopped breathing or no pulse is detected, the attention of a specially trained medical team is required. Summon help using the procedure prescribed by your facility for this type of emergency. You must be familiar with this protocol. If no protocol exists, call 911 and then summon the physician, telling him or her that emergency medical services are on the way.

Time is vital, because lack of effective circulation to the central nervous system can cause irreparable brain damage in 3 to 5 minutes. While awaiting the emergency medical team, you should proceed with cardiopulmonary resuscitation (CPR) only if you are trained and certified in this procedure.

CPR is the basic life support system that is used to ventilate the lungs and circulate the blood in the event of respiratory or cardiac arrest. Correct instruction and certification in CPR are important for all health care personnel. Your class should be taught by a certified instructor, and you should take responsibility for updating your CPR card every 2 years. CPR instruction is not provided in this text, because recommendations are updated frequently and printed materials are easily obtained from the American Heart Association or the American Red Cross. Practice on a resuscitation mannequin is essential. Your local college, fire department, and hospital may also offer courses taught by certified instructors that include lecture, video, practice time, and review and testing sessions.

Even if you are certified in adult CPR, do not attempt CPR on infants or children unless you are currently certified specifically in pediatrics as well. Courses for health care personnel usually include the techniques for infants and children.

Once the emergency medical team has arrived, you may no longer feel needed, but you still can perform several important tasks. Record-keeping is essential. Write down the time the attack started and when the emergency team responded. You may be asked to record times and amounts of medications. It may be necessary to obtain equipment, call for other personnel, or monitor a telephone.

During cardiac arrest and/or resuscitation, a rapid, weak, and ineffective heartbeat may be present. This state is called **fibrillation** and is caused by interruption of the electric signals that control the heart muscle. An electric shock to the chest from a defibrillator can stimulate the heart to return to a normal rhythm. One development in treating cardiac arrest is the use of automatic external defibrillators (AEDs). These devices are very effective when used by personnel with only a limited amount of training. They are often part of a clinic's emergency equipment. Learning to use an AED is much easier than learning to use a conventional defibrillator or to perform CPR. Some of these defibrillators are completely automatic and have the ability to analyze cardiac rhythm, identify the need for defibrillation, and automatically deliver a shock. A semiautomatic version also exists in which the operator presses a button to start rhythm analysis. If the AED identifies the need for defibrillation, an indicator signal is given, instructing the operator to press the shock control.

The use of AEDs has been reduced to four simple steps:

1. Turn on the power.
2. Attach the adhesive pads on both sides of the victim's chest.
3. Turn on rhythm analysis.
4. Check that all persons present are at least two feet from the patient and any metal items, such as the bed or stretcher, that are in contact with the patient.
5. Press the shock control to deliver the shock, if indicated.

While different brands and models have a variety of features, including different monitors, paper strip readouts, and instructions to the operator, application of the device is simple. If your facility has an AED, periodic instruction should be provided. Your participation in both CPR and AED classes can help you to be both prepared and effective in cardiac emergencies.

TRAUMA

Head Injuries

Patients who have received a blow to the head may have sustained serious injury, even when no external signs of trauma are present. Damage may occur with or without a skull fracture. The brain is soft, has a rich blood supply, and is suspended in cerebrospinal fluid within the skull. A blow to the head may cause a concussion or contrecoup damage as discussed in Chapter 17. If bleeding or swelling occurs inside the skull, a rise in intracranial pressure (ICP, pressure within the skull) may cause seizures, loss of consciousness, or respiratory arrest. Brain tumors can also result in increased ICP, causing patients to exhibit similar symptoms.

Sometimes the signs and symptoms of serious head injuries develop slowly. A patient might seek treatment at an outpatient facility following a fall or a minor car crash because of other less severe injuries. If there has been a blow to the head, be alert for any change in the patient's level of consciousness that could signal a head injury.

Four LOCs are generally recognized and may be described as follows:

1. Alert and conscious
2. Drowsy but responsive
3. Unconscious but reactive to painful stimuli
4. Comatose

The patient who is alert and oriented on arrival and then becomes increasingly incoherent and drowsy may be showing signs of ICP. The earliest signs of increasing pressure may be irritability and lethargy, often associated with a slowing pulse and slow respirations. Notify the physician immediately if you suspect a change in LOC.

Extremity Fractures

Trauma involving the long bones of the body may be classified into two categories: (1) compound fractures, in which the splintered ends of bone are forced through the skin, and (2) closed fractures. Compound fractures are usually partially reduced and have a dressing applied to them before radiographic examination. They are more commonly treated in trauma centers. Some common fracture types are described and illustrated in Chapters 12 to 14.

There are many ways to temporarily immobilize extremity fractures. The two legs may be fastened together for stability during transportation (self-splinting) or a stiff object, such as a board or rolled-up magazine, may serve as a splint. Splinting devices should not be removed except under the physician's direct supervision.

It is important to minimize motion of the fracture fragments. This helps avoid unnecessary pain and, more importantly, the initiation of a muscle spasm that could interfere with the physician's attempt to reduce (realign) and immobilize the fracture more permanently. Movement of fracture fragments may tear surrounding soft tissues, nerves, and blood vessels, seriously complicating the patient's condition. When you must position a fractured extremity that is not supported by a splint, maintain a *gentle* traction (pull) while supporting and moving the arm or leg. Traction helps prevent the fracture fragments from rubbing against each other. Two people may be required to support and position a patient with a potential long bone fracture because the extremity must be supported at sites both proximal and distal to the injury.

Special care is required when positioning extremities following application of a plaster cast. Undue pressure against a fresh (wet) cast may cause it to change shape. Lift the casted extremity by placing your open hands underneath it; never grasp it from above. Observe the patient's fingers or toes for evidence of impaired circulation. They should be warm, pink, and sensitive to touch and pressure. Coldness, numbness, or lack of normal coloration should be reported to the physician at once. Swelling within the cast and subsequent pressure can cause permanent nerve and tissue damage if not relieved promptly.

Wounds

Patients with open wounds have usually been treated before you see them in the radiology suite. Bleeding has been controlled, and a dressing has been applied. Your primary responsibility regarding open wounds is to maintain the dressings and to report promptly any significant amount of fresh bleeding. This is usually considered to be the amount of bright red blood sufficient to soak through a fresh dressing. If a laceration or incision opens, causing severe **hemorrhage** (continuous abnormal blood flow), apply direct pressure to the site of bleeding while summoning immediate assistance.

MEDICAL EMERGENCIES

Drug Reactions

The administration of any medication has the potential to cause a medical emergency. The reaction can range in severity from a sudden bout of nausea and vomiting to cardiac arrest. The nature of the symptoms will determine the appropriate treatment. Treatments for the various conditions seen in response to drug administration are found throughout this chapter. Individuals who have been sensitized to an over-the-counter medication may be just as prone to an allergic reaction as those who are receiving prescription medications. Reactions may occur to medications administered orally or by injection. When drugs are administered intravenously (directly into a vein), the effects will appear more rapidly.

A moderate allergic reaction is characterized by **erythema** (redness of the skin), **urticaria** (hives), and/or dyspnea. In the event of such a reaction, the physician should be notified while you remain with the patient. The treatment for these patients is administration of an antihistamine medication, such as diphenhydramine, intravenously or intramuscularly, depending on the severity of the reaction. Some physicians prefer to give epinephrine at this point.

A severe allergic reaction is called **anaphylaxis** or *anaphylactic shock*. This life-threatening condition may result in respiratory or cardiac arrest and less often in seizures. The earliest symptoms of anaphylaxis include a sense of warmth, tingling, and itching of palms and soles. Within seconds or minutes, the patient experiences difficulty swallowing, constriction in the throat, a feeling of doom, an expiratory wheeze, and then progression into laryngeal and bronchial edema (swelling) that can block the airway completely. In addition to the administration of epinephrine, the treatments for shock, respiratory arrest, and cardiac arrest are appropriate and are discussed elsewhere in this chapter. At the onset of anaphylaxis, you should maintain the patient's airway, alert the physician, and call 911.

Diabetic Emergencies

Patients who have diabetes mellitus (DM) are seen in clinics for diabetic monitoring and care as well as for the same variety of problems that bring other patients to the physician. The diabetic patient can often be identified by means of a pendant or bracelet with a medical alert message. Persons with medical conditions that may require emergency

treatment often wear this type of identification, which can be a great help in rapidly diagnosing urgent conditions and providing an appropriate emergency response.

Diabetes is a disease characterized by the body's inability to metabolize blood glucose. Insulin is an enzyme normally produced in the pancreas in response to food intake. Insufficient insulin prevents the use of glucose by the muscles. When the muscles cannot use glucose, excess ketone bodies appear in the blood, causing *ketoacidosis*, a change in the pH of the blood. The body attempts to compensate for the acidosis by **hyperventilation** (air hunger with rapid respirations) and excretion of minerals and water into the urine. This condition is termed **hyperglycemia**, an elevated blood glucose level; it is characterized by a relatively slow onset. When the blood glucose level is very high, glucose also "spills over" into the urine. The individual who is terribly thirsty, urinates copious amounts frequently, and has fruity-smelling breath (because of ketones excreted via the respiratory tract) may be approaching **diabetic coma**. Diabetes is diagnosed through blood and urine tests and treated with diet, exercise, and medication, such as insulin or oral hypoglycemic agents.

The diabetic patient who has taken insulin but no food may develop **hypoglycemia**, a low blood glucose level. Unlike the slow onset of diabetic coma, hypoglycemia is characterized by a *sudden* onset of weakness, sweating, tremors, hunger, and finally loss of consciousness. While the patient is still alert and cooperative, hypoglycemia can be quickly remedied by administration of a small amount of candy or sweet fruit juice. Squeeze tubes containing a measured amount of glucose may be stored with the emergency medications. These prepackaged tubes are useful because the gel-like material can be placed inside the patient's cheek. This decreases the chance that a semiconscious or confused patient will aspirate it, as might be the case with candy or juice.

Report the occurrence of hypoglycemia to the physician. You must help these patients to sit or lie down until the sugar takes effect. Occasionally individuals with the same symptoms do not have diabetes. They may have hypoglycemia without diabetes; the treatment is the same.

There are two major classifications of DM: type I and type II. Type I, or insulin-dependent diabetes, may be characterized by a lean individual under age 25 who produces little or no insulin and may develop circulatory impairment of vision, the kidneys, or the extremities. Blood glucose levels must be closely monitored, and insulin is administered by injection. Diabetic coma is more likely to occur with type I DM.

Type II DM, on the other hand, occurs most commonly in the obese individual over the age of 40 with a marked family tendency. This type of diabetes usually responds to oral hypoglycemic medications and to changes in diet and lifestyle.

Table 22.3 summarizes the physical findings associated with both hyperglycemia, which is indicative of approaching diabetic coma and hypoglycemia, which may signify an impending insulin reaction.

Cerebrovascular Accidents

A **cerebrovascular accident (CVA)**, also called a *stroke*, is caused by lack of adequate blood circulation to the brain. This occurs most frequently in the elderly, but can occur at any age. Rupture of a cerebral artery can cause a hemorrhage into the brain tissue, or an artery may become occluded (blocked) and cause an interruption in the blood supply to the area beyond the occlusion.

A patient who is beginning to suffer a stroke may stumble or complain of a headache or of feeling faint. The symptoms may occur very suddenly or may develop over a period of hours, and may include extreme dizziness, severe headache, muscle weakness on one or both sides, difficulty in vision or deviation in one eye, slurred or difficult speech, and temporary loss of consciousness.

The American Stroke Association reports that widespread awareness could result in prompt diagnosis and treatment of strokes and the prevention of brain damage. This organization recommends that the acronym FAST be used to help remember and identify the warning signs of a stroke:

- **F**—Face drooping: Does one side of the face droop or is it numb? Ask the person to smile. Is the smile uneven?

TABLE 22.3
Diabetic Crises

Crisis	Cause	Symptoms	Treatment
Hyperglycemia; impending diabetic coma	Food consumption over dietary allowance; fever, infection, stress; insufficient insulin	Increased thirst; increased urinary output; decreased appetite; nausea, vomiting; weakness; confusion; coma	Inform physician immediately; administer sugar-free liquids if conscious
Hypoglycemia; insulin reaction	Insufficient food; excessive exercise	Headache; hunger; diaphoresis; tremors; tachycardia; impaired vision; personality change; loss of consciousness	Administer food or juice with high sugar content if conscious; glucose gel may be placed inside the cheek; inform physician immediately. Glucagon may be ordered.

- **A**—Arm weakness: Is one arm weak or numb? Ask the person to raise both arms. Does one arm drift downward?
- **S**—Speech difficulty: Is speech slurred? Is the person unable to speak or hard to understand? Ask the person to repeat a simple sentence, like "The sky is blue." Is the sentence repeated correctly?
- **T**—Time to call 9-1-1: If someone shows any of these symptoms, even if the symptoms go away, call 9-1-1 and get the person to a hospital immediately. Check the time so you will know when symptoms first appeared.

In the event of a suspected stroke, report the situation to a physician. If this occurs outside a health care facility, call 9-1-1 and describe the symptoms to the dispatcher. These symptoms may be only temporary, but should be reported immediately. The patient should be helped to a recumbent position with the head elevated. Do not leave the patient but summon assistance and have the emergency supplies and O_2 at hand. Monitor vital signs every 5 minutes or as ordered by the physician.

A **transient ischemic attack (TIA)** presents similar symptoms but usually lasts only minutes or, at most, a few hours. These temporary attacks should not be ignored, because they are frequently precursors to more permanent damage.

Seizure Disorders

A seizure occurs as a result of a focal or generalized disturbance of brain function and is accompanied by a change in the LOC. A major motor (grand mal or tonic-clonic) seizure may be preceded by an aura, or premonitory sign. The patient may say, "I'm going to have a spell" and should be assisted to a supine position as rapidly as possible. Often a major motor seizure begins with a hoarse cry when air is forced past the vocal cords by a sudden contraction of all the abdominal and chest muscles. In the event of a seizure, your first duty is to keep the patient as safe as possible. Notify the physician immediately, request assistance, and *do not leave the patient.* If the patient is on the x-ray table, your first concern is to prevent a fall. Remove any objects that might be hazardous and place padding under the patient's head. Do not attempt to restrain the patient and do not attempt to force objects into the patient's mouth. If a padded tongue blade is available and can be easily inserted, it may help avoid a laceration of the tongue.

Loss of consciousness and a rigid arching of the back are followed by alternate relaxation and rigidity of the muscles until the seizure passes and the patient slowly regains consciousness. Have emergency medication (diazepam) ready for administration in the event of prolonged or repeated seizures *(status epilepticus).* While the patient is unconscious, involuntary voiding and defecation may occur. As the seizure passes, turn the patient to a lateral recumbent position to prevent aspiration of secretions and remain with the patient to provide reassurance and assistance. In the period immediately after the seizure (postictal period), the patient may be somewhat irritable or confused and wish only to sleep.

Less intense partial (focal) seizures may cause severe, uncontrollable tremors. This condition often produces extreme anxiety and hyperventilation in a conscious patient. These seizures are exhausting to the patient and may persist for more than an hour unless treatment is given. Instruct the patient to breathe slowly and place a paper bag over the nose and mouth if hyperventilation is otherwise uncontrollable.

Another type of seizure is characterized by a brief loss of consciousness (absence) during which the patient stares or may lose balance and fall. Many patients are not aware that they undergo this loss of consciousness.

Patients taking anticonvulsant medication may not have seizures for long periods. Most of these medications have a relatively slow excretion rate, which allows the patient to miss a dose or two without precipitating an attack. On the other hand, fatigue, stress, or apprehension may initiate a seizure in a previously stable patient.

Realize that the seizure will run its course. The most important actions you can take are to protect the patient from harm and to be an accurate observer. Note when the seizure began and how long it lasted. Did it involve both sides of the body equally, and did the contractions start in one area and progress from one extremity to another? These observations can be helpful to the physician in reaching an accurate diagnosis.

Not all seizure-prone individuals have the same diagnosis. Seizures may be a response to drug sensitivity, infection, epilepsy, tumor, or fever. No direct, consistent correlation exists between seizures and mental acuity, emotional instability, or heredity.

Hyperventilation

Hyperventilation is the term for excessive breathing. The anxious patient who breathes too deeply or too often (hyperventilates) may complain of feeling faint or dizzy and note tingling and numbness in the extremities. These patients have breathed in too much O_2 and have exhaled too much carbon dioxide, which disturbs the chemical balance of the blood. Try to persuade them to breathe more slowly or to breathe into a paper bag, which will help to return their carbon dioxide level to normal.

Vertigo and Postural Hypotension

A lightheaded or dizzy sensation is not unusual when patients sit up suddenly from a recumbent position. This is especially common after prolonged periods of bed rest. This condition is called *postural hypotension* or *orthostatic hypotension* and results from the same basic mechanism that causes syncope, or fainting, which is discussed later in this chapter. Blood pools in the extremities when the torso is elevated and causes momentary cerebral **anoxia**, a lack of O_2 to the brain. This condition can usually be avoided by having the patient sit up gradually. This sensation

frequently affects elderly patients, so remain close to them and provide support when a change in position is necessary.

Vertigo is a sensation of dizziness with a different cause. The patient does not feel lightheaded but feels as if the room is moving or whirling. Such patients frequently cling to the furniture and will fall if not assisted to lie down. They may experience violent nausea. This sensation is usually attributed either to a middle ear disturbance or to a lesion in the brain or spinal cord. Vertigo may also be associated with a TIA or CVA, and alcohol or the administration of certain drugs may affect individuals in a similar manner. A sudden onset of vertigo in a patient who does not have a history of it should be reported immediately to the physician.

Epistaxis

A nosebleed, or **epistaxis**, can be rather frightening to the patient but is usually not serious. Remove eyeglasses when necessary and provide an ample supply of tissues. Instruct the patient to breathe through the mouth and to squeeze firmly against the nasal septum for 10 minutes. The patient should not lie down, blow the nose, or talk. Provide an emesis basin or disposable emesis bag, instructing the patient to spit out blood that runs down the nasopharynx rather than swallow it. If bleeding lasts more than a few minutes, inform the physician, who may want to apply more direct treatment.

Nausea and Vomiting

Nausea and vomiting are not uncommon in health care settings, and a well-prepared health care worker learns to cope easily with this situation. Vomiting can often be prevented by your reassuring presence and by specific breathing instructions. "Breathe through your mouth, taking short, rapid, panting breaths" and "Take some long, slow, deep breaths through your mouth" are both effective instructions, and each has strong adherents. In both cases, the purpose is to focus the patient's attention on a physical function that is controllable. On the other hand, if a patient expresses a need for an emesis basin or bag, offer it immediately and bring the patient a clean one before removing the soiled one. Provide tissues and water to rinse the mouth. It is especially important to support the patient in a sitting or lateral recumbent position to avoid aspiration of vomitus. If the patient loses consciousness, turn the head to the side and clear the airway.

Shock

Shock is a general term used to describe a failure of circulation in which BP is inadequate to support O_2 perfusion of vital tissues and to remove the byproducts of metabolism.

Fainting, also called **syncope**, is a very mild form of shock that sometimes occurs when fright, pain, or unpleasant events are beyond the coping ability of the patient's nervous system. The BP falls as the diameter of the blood vessels increases and the heart rate slows. When the BP is too low to supply the brain with O_2, the patient faints. Placing the patient in a dorsal recumbent position with the feet elevated usually relieves this type of shock. Patients who have not eaten for an extended period and are feeling anxious and stressed may undergo syncope. Patients who feel faint should be assisted into a sitting or recumbent position. If a chair is not within reach, ease the patient to the floor. If the patient does not rouse immediately, spirits of ammonia held under the nose usually produce a rapid return to consciousness. Small, crushable vials of ammonia are usually stocked with the emergency supplies. A physician's order is not required for their use. Anyone who has more than a momentary loss of consciousness should be evaluated by a physician before the examination is resumed.

Shock other than syncope is a dangerous, potentially fatal condition. It may be caused by blood loss, severe infection, head trauma, heart failure, or a severe allergic response. Early signs of shock are pallor, increased heart rate and respiration rate, and restlessness or confusion.

The following symptoms, in any or all combinations, indicate some degree of shock:

- Restlessness and a sense of apprehension
- Increased pulse rate
- Pallor accompanied by weakness or a change in thinking ability
- Cool, clammy skin
- A fall in BP of 30 mm Hg below the baseline systolic pressure or a drop in diastolic pressure below 50 mm Hg

Your responsibility with regard to patients with any type of shock is to recognize its symptoms, to know the location of emergency medical supplies, and to be thoroughly familiar with the emergency protocols of your facility. The physician may call on your knowledge of medications and your medication administration skills during treatment. Your role in suspected shock is as follows:

- Stop the procedure.
- Assist the patient to a supine position to avoid a fall.
- Obtain help. Notify the physician. If in doubt, call 9-1-1. It is much better to be mistaken than to have a patient die because of inadequate treatment.
- Check BP.
- Assist the dyspneic patient with O_2.
- Be ready to perform CPR.
- Assist the physician or emergency medical team as necessary.
- Chart the occurrence, the treatment administered, and the patient's response on an incident report form or in the medical record.

SUMMARY

Quality patient care requires assessment and response to patients' needs, both emotional and physiologic. Assessment of physical status involves trained observation and touch. In addition, physical condition is evaluated by taking vital signs: temperature, pulse, respiration rate, and

BP. When you can take accurate vital signs and recognize abnormal readings, you can use these skills to assist with routine patient evaluation and to identify changes in patient status in an emergency.

Shock, respiratory arrest, heart attack, and cardiac arrest are life-threatening emergencies. You must recognize the signs of these conditions and be capable of responding quickly and appropriately. Other medical emergencies, such as syncope, vomiting, hypoglycemia, and epistaxis, require appropriate responses as well. When you are alert and well prepared, any emergency is more likely to have a positive outcome.