ASSISTING IN PEDIATRICS

SCENARIO

Susie Kwong, CMA (AAMA), who has 2 years of experience, has accepted a new position with North Hills Pediatrics, a large multiphysician practice. Susie’s primary responsibility will be to assist in the clinical area, but she also will have to rotate through the message screening center in the office. Office policy states that telephone screening employees should manage problems as much as possible, but if patient callbacks are needed, they are to be referred to the physician on call that day by noon for morning calls and no later than 5 PM for afternoon calls. Although the physicians in the practice have developed specific guidelines for managing patient problems, Susie is anxious about this responsibility, so she asks to work with the screening staff for several days before she starts answering incoming calls.

While studying this chapter, think about the following questions:

- What other clinical responsibilities should Susie be prepared to perform?
- Are patient and caregiver health education an important part of delivering high-quality care in a pediatric setting?
- Does Susie need to be clinically competent to perform immunizations and document their administration?
- How can Susie maintain her skill level and continue to learn about patient-centered pediatric care?

LEARNING OBJECTIVES

1. Define, spell, and pronounce the terms listed in the vocabulary.
2. Apply critical thinking skills in performing the patient assessment and patient care.
3. Describe childhood growth patterns.
4. Summarize the important features of the Denver II Developmental Screening Test.
5. Identify four different growth and development theories.
7. Classify disorders of the respiratory system in children.
9. Recognize the etiologic factors and signs and symptoms of the two primary pediatric inherited disorders.
10. Summarize the immunizations recommended for children by the Centers for Disease Control and Prevention (CDC).
11. Demonstrate how to document immunizations and maintain accurate immunization records.
12. Compare and contrast a well-child and a sick-child examination.
13. Outline the medical assistant’s role in a pediatric examination.
14. Measure the circumference of an infant’s head.
15. Obtain accurate length and weight measurements and plot pediatric growth patterns.
16. Accurately measure pediatric vital signs and perform vision screening.
17. Correctly apply a pediatric urine collection device.
19. Describe the characteristics and needs of the adolescent patient.
**VOCABULARY**

*attenuated* (uh-ten-yuh-wat'-ed) Weakened or changed; refers to the virulence of a pathogenic microorganism.

*hydrocephaly* (hi-dro-suh-fuh-le) Enlargement of the cranium caused by abnormal accumulation of cerebrospinal fluid within the cerebral system.

*laryngoscopy* (lar-uhn-gahs'-kuh-pe) Visual examination of the voice box area through an endoscope equipped with a light and mirrors for illumination.

*microcephaly* Small size of the head in relationship to the rest of the body.

*serous* A thin, watery, serumlike drainage.

*stridor* A shrill, harsh respiratory sound heard during inhalation when a laryngeal obstruction is present.

*suppurative* Characterized by the formation and/or discharge of pus.

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**Pediatrics**

Pediatrics is the medical specialty that deals with the development and care of children and with the treatment of childhood diseases. Pediatric patients range in age from newborn to puberty. Some practices continue to see the child until he or she graduates from high school. Subspecialties within pediatrics include surgery, cardiology, and psychiatry.

Approximately 50% of the patients in a pediatric office are there for well-baby or well-child visits. The roles of the pediatrician and the medical office staff are to supervise and help maintain the health of these patients. Parents must be involved in the care and development of their young children for treatment to be a success. The medical assistant can help by encouraging therapeutic communication among the patient, parents, and medical staff. The trust a child develops in the relationships and consideration received in the physician’s office forms the basis of good medical care.

Pediatric care actually starts before the child is born, with promotion of good general health for the mother’s before conception and during pregnancy. The confidence and enthusiasm of the parents can have a significant impact on the infant’s physical and emotional well-being.

**NORMAL GROWTH AND DEVELOPMENT**

The terms *growth* and *development* are often used together. They refer to the combination of changes a child goes through as he or she matures. *Growth* refers to measurable changes, such as height and weight. The first determinant of these physical characteristics is the genetics inherited from the parents; however, a child’s growth can be influenced by many factors, including nutritional status, environmental factors, and the presence of disease. *Development* considers qualitative maturation in motor, mental, social, and language skills. A child’s development is determined by a combination of prenatal, environmental, and caregiver factors. Each child has his or her own pattern of growth and development. Pediatric assessments are individualized for each child according to age, developmental level, health condition, family characteristics, and past experiences with healthcare professionals. The pediatrician checks for indications of irregularities in growth and development by comparing a child’s physical, intellectual, and social levels with published national standards. This comparison indicates whether the child is at the appropriate stage of growth and development for his or her chronologic age.

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**Growth Patterns**

Physical growth is one of the most visible changes in childhood. The average birth weight is 7 to 7½ pounds, and in 6 months, the baby’s birth weight doubles. Growth then slows slightly; by 1 year of age, the birth weight has tripled and length has increased by 50%. By age 2, the child has reached approximately 50% of his or her adult height. Between ages 1 and 2, the child gains approximately ½ pound per month. Between ages 2 and 3, weight gain averages 3 to 5 pounds and height increases 2 to 2½ inches. Most children slim down during this period, so that by the time the third birthday arrives, the potbellied toddler has become the characteristic preschooler.

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**THERAPEUTIC APPROACHES FOR INFANTS (NEWBORN TO 12 MONTHS)**

- Crying is normal; use distraction, but do not overstimulate.
- It is important to keep the infant close to the caregiver; either have the parent hold the infant or keep the parent in the child’s line of vision.
- Involve the parent as much as possible, depending on the task and the parent’s level of comfort.
- Place a familiar object near the infant and keep frightening ones out of view.
- An infant’s negative response to strangers usually develops at approximately 8 months; do not take the rejection personally.
- Do not restrain the infant any more than necessary, but be ready to use restraint at times (e.g., when giving an injection) to keep the infant safe.
- Encourage the caregiver to cuddle and hug the child after the procedure is complete.
- Unpleasant procedures are associated with other objects, so do not use play areas for treatment and do not use a favorite toy or object during the procedure; offer it afterward for comfort.

During the preschool period, ages 3 to 6 years, weight increases 3 to 5 pounds per year; height increases at a slower but steady rate of ½ to 2½ inches per year. By age 4, the child usually has doubled the birth length. During this time, the legs are the fastest growing part; fatty connective tissue continues to increase slowly until approximately age 7. This same growth rate continues
through the school-aged period, 6 to 12 years, and as this period of development ends, the child usually is into a growth spurt that indicates impending puberty.

**THERAPEUTIC APPROACHES FOR TODDLERS AND PRESCHOOLERS (2-6 YEARS)**

- Toddlers and preschoolers often fear visits to the doctor; ignore temper tantrums and negative behavior.
- Praise the child as much as possible.
- Perform unpleasant procedures as quickly as possible; the fear of the procedure is worse than the actual discomfort.
- Allow the child to keep on as much clothing as possible for security and comfort.
- Use words familiar to the child and do not use words the child could misinterpret (e.g., “the test uses dye” — the child may think you mean “die”; “the doctor will put you to sleep so it doesn’t hurt” — the family dog may have been put to sleep).
- Explain a procedure as the child would sense it; that is, what it will look like, how it will smell, how it will feel, and so on.
- Allow the child to handle equipment when possible.
- Do not use the child’s favorite doll or stuffed animal to demonstrate; the child may believe the toy feels pain.
- Explain procedures to the parents away from the child when possible; the child may misinterpret the information.

**THERAPEUTIC APPROACHES FOR SCHOOL-AGED CHILDREN (7-10 YEARS)**

- Allow choices when possible, such as which arm to use for an injection.
- A parent or caregiver should always be present during examinations.
- Remove only as much clothing as needed for the examination or procedure.
- Explain procedures in concrete terms; use pictures and diagrams when possible.
- Give the child time to ask questions.
- School-aged children often are curious, and they can be cooperative if they know what is expected of them.
- Address the conversation to the child; involve the child in decision making as much as possible.
- Provide privacy.

Skeletal growth is complete in girls between 15 and 16 years of age and in boys between ages 17 and 18. Skeletal growth is considered complete when the growth plates (epiphyseal plates) of the long bones of the extremities have fused completely.

**THERAPEUTIC APPROACHES FOR ADOLESCENTS (12-18 YEARS)**

- Adolescents are self-conscious and strongly influenced by peers.
- Privacy is very important to them.
- Address how a procedure might affect the adolescent’s appearance.
- Do not be judgmental; listen without condemning.
- Encourage the adolescent to verbalize his or her concerns and fears.
- The adolescent may regress to more childish behaviors when sick.
- Teenagers want to be treated as adults; they want to know what is being done and why.
- Encourage the teenager to see the physician without the parent present.

**CRITICAL THINKING APPLICATION 42-1**

Based on what you have learned about therapeutic approaches for the pediatric patient, what would be the best way to deal with the following patient situations?

1. A crying 3-month-old being seen for a well-child visit
2. A 10-month-old with otitis media
3. A 2-year-old who needs the dressing changed on an infected wound
4. A 5-year-old scheduled for vision and hearing screening
5. An 8-year-old who needs a throat culture to rule out a strep infection
6. A 12-year-old who needs a penicillin injection in the dorsogluteal site
7. A 15-year-old girl who complains of abdominal pain and is accompanied by her mother

Growth charts that can be used to compare the child's individual growth pattern with national standards have been used since 1977, but in 2000 the Centers for Disease Control and Prevention (CDC) revised the charts to reflect cultural and racial diversity (samples are available at www.cdc.gov/growthcharts). The CDC charts take into account whether an infant was formula fed or breast-fed, because breast-fed infants may grow differently during the first year of life.

In addition, the CDC growth charts include information on the average body mass index (BMI) for infants and young adults 2 to 20 years of age, giving pediatricians another weapon in the fight against childhood obesity. As was discussed in Chapter 30, the BMI is a means of assessing the relationship between height and weight. BMI conversion charts typically are available, but the BMI can be calculated by dividing the child’s weight in kilograms by the height in meters squared, or

\[
BMI = \frac{\text{Weight (kg)}}{\text{Height (m)}^2}
\]
Denver II Developmental Screening Test

Each child develops individually and attains developmental plateaus differently. The Denver II Developmental Screening Test is a standardized tool used to screen for developmental delays, to investigate concerns about an infant’s development, or to monitor high-risk children for potential problems (Figures 42-1 and 42-2). The test should be given at ages 3 to 4 months, 10 months, and 3 years. Although it is not difficult to administer, only those trained in the procedure and interpretation of results should give it. The assessment focuses on four developmental areas:

- **Gross motor skills:** Evaluates the child’s ability to control large muscle groups (e.g., standing, kicking, running, and balance).
- **Language:** Assesses the child’s verbal comprehension (e.g., word comprehension, following simple commands, use of subjects, and counting).
- **Fine motor skills:** Tests the child’s coordination of fine motor muscles (e.g., reaching, grasping, piling blocks, and drawing).
- **Personal skills:** Examines the child’s self-confidence and socialization (e.g., playing games, using a fork and spoon, dressing, and brushing the teeth).

The results of the test are analyzed and determined to be normal or suspect, or the child is diagnosed as untestable. With an abnormal finding, the child should be re-screened in 1 to 2 weeks to rule out temporary developmental delays caused by fatigue or anxiety. If those results are abnormal, the child may be retested with other developmental tests, either by the pediatrician or by a professional pediatric testing agency.

Developmental Patterns

General patterns of child development occur rapidly during the first year of life as the infant progresses from reflex activities (e.g., grasping fingers and sucking) to learning to manipulate simple objects (e.g., pulling open drawers or throwing toys out of the crib). In addition to these motor skills, the child learns verbal patterns, progressing from cooing and crying for attention to speaking his or her first words.

By age 3, the child is showing increased autonomy. Now the child can walk, is toilet trained, sits at the table and eats with the family, can make simple sentences, understands the word “no,” and even imitates the parent by using verbal gestures that he or she has used. The child’s vocabulary consists of up to 900 words.

During the preschool stage the child becomes increasingly independent and initiates activities. Preschoolers have mastered many gross motor skills and are perfecting their fine motor development. Verbal communication has increased to full simple and even complex sentences but remains quite literal. For example, if you tell a preschool child that you are going to fly to visit Aunt Sue, the child thinks you are going to flap your arms and fly. Nonverbal communication skills are also being mastered. The vocabulary now includes more than 2,000 words. During this period, children need to develop social skills, such as sharing and taking part in peer group activities.

The school-aged child has perfected fine motor skills and can paint, draw, and play an instrument, enjoys team activities, and expands reading and writing skills. His or her intellectual skills are developing, and social skills are going through refinement as a sense of self-achievement and self-worth is developed. During this time the child learns and tests the rules for socializing outside the immediate family as an independent individual.

Adolescence, or the transition stage, is the time when the individual attempts to establish an adult identity. The teenager proceeds by trial and error, experimenting with adult roles and behavior patterns. Traditional values learned in childhood may be questioned, and peer relationships take on new importance. During this time teenagers must develop the emotional maturity and motivation to make reasonable decisions. The teen looks to family members for encouragement and guidance in making decisions that will help develop self-confidence and to become patient and less impulsive and self-centered.

Critical Thinking Application

Susie receives a call from the mother of a 6-month-old child. She is concerned that her child may not be reaching his developmental milestones. What type of information about the child’s growth and development should Susie gather? If Susie is unable to answer the mother’s questions, what should she do?

Developmental Theories

Psychologists have been researching and developing theories about human behavior since the beginning of the twentieth century. The first of these theorists to gain influence was Sigmund Freud, who believed that the motivating stimulus for human behavior is the libido, which is defined as an individual’s pleasure-seeking instincts. Freud’s theory describes four major components of the mind: the unconscious mind, which cannot be accessed but affects our behavior; the id, which focuses on immediate self-gratification; the ego, which develops throughout life and balances the immediate desires of the id with the reality of the social world; and the superego, the individual’s conscience, which helps the child incorporate social expectations and norms. Freud also was the first therapist to identify developmental stages that all individuals must achieve, including the oral, anal, phallic, latency, and genital stages.

The next developmental theory to gain general acceptance was the psychosocial approach of Erik Erikson. Erikson expanded Freud’s work to recognize cultural and social influences on individual development. His theory is based on eight stages of development that the individual must pass through and master. Each stage focuses on a developmental crisis, starting in infancy and ending in old age. According to Erikson, the stages that children must master include:

- **Trust versus mistrust**—Infants learn to rely on caregivers; mistrust occurs if needs are not met.
- **Autonomy versus shame and doubt**—Toddlers learn language skills and gain independence; they may feel shame and doubt if they cannot meet parental expectations or are overprotected.
- **Initiative versus guilt**—Preschoolers actively seek out new experiences; children become hesitant if restrictions or
DIRECTIONS FOR ADMINISTRATION

1. Try to get child to smile by smiling, talking or waving. Do not touch him/her.
2. Child must stare at hand several seconds.
3. Parent may help guide toothbrush and put toothpaste on brush.
4. Child does not have to be able to tie shoes or button/zip in the back.
5. Move yarn slowly in an arc from one side to the other, about 8" above child's face.
6. Pass if child grasps rattle when it is touched to the backs or tips of fingers.
7. Pass if child tries to see where yarn went. Yarn should be dropped quickly from sight from tester's hand without arm movement.
8. Child must transfer cube from hand to hand without help of body, mouth, or table.
9. Pass if child picks up raisin with any part of thumb and finger.
10. Line can vary only 30 degrees or less from tester's line.√
11. Make a fist with thumb pointing upward and wiggle only the thumb. Pass if child imitates and does not move any fingers other than the thumb.

13. Which line is longer? (Not bigger.) Turn paper upside down and repeat. (pass 3 of 3 or 5 of 6)
15. Have child copy first. If failed, demonstrate.

When giving items 12, 14, and 15, do not name the forms. Do not demonstrate 12 and 14.

16. When scoring, each pair (2 arms, 2 legs, etc.) counts as one part.
17. Place one cube in cup and shake gently near child's ear, but out of sight. Repeat for other ear.
18. Point to picture and have child name it. (No credit is given for sounds only.)
   If less than 4 pictures are named correctly, have child point to picture as each is named by tester.

19. Using doll, tell child: Show me the nose, eyes, ears, mouth, hands, feet, tummy, hair. Pass 6 of 8.
22. Ask child: What do you do with a cup? What is a chair for? What is a pencil used for?
   Action words must be included in answers.
23. Pass if child correctly places and says how many blocks are on paper. (1, 5).
   (Do not help child by pointing, moving head or eyes.)
25. Ask child: What is a ball?... lake?... desk?... house?... banana?... curtain?... fence?... ceiling? Pass if defined in terms of use, shape, what it is made of, or general category (such as banana is fruit, not just yellow). Pass 5 of 8, 7 of 8.
26. Ask child: If a horse is big, a mouse is __? If fire is hot, ice is __? If the sun shines during the __? Pass 2 of 3.
27. Child may use wall or rail only, not person. May not crawl.
28. Child must throw ball 3 feet to within arm's reach of tester.
29. Child must perform standing broad jump over width of test sheet (8 1/2 inches).
30. Tell child to walk forward, → heel within 1 inch of toe. Tester may demonstrate.
   Child must walk 4 consecutive steps.
31. In the second year, half of normal children are non-compliant.

OBSERVATIONS:

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<tbody>
<tr>
<td>Infant</td>
<td>Oral stage; child operates with the pleasure principle, and the id develops.</td>
<td>Sensorimotor level; uses reflexive behavior; has to do things to learn.</td>
<td>Building basic trust versus mistrust; learning drive and hope.</td>
<td>Avoids punishment and obeys for obedience’s sake.</td>
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<tr>
<td>Toddler</td>
<td>Passes through oral aggressive stage to anal stage; elimination is used to control and inhibit.</td>
<td>Coordinates more than one thought at a time; uses thought to create new solutions.</td>
<td>Autonomy versus shame and doubt; learning self-control and willpower.</td>
<td>Avoids punishment and the power of authority figures.</td>
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<tr>
<td>Preschool to early school years</td>
<td>From phallic stage, in which the ego (conscious reality) develops, to latent stage, in which superego (morality) develops.</td>
<td>Intuitive-preoperational; preschoolers are egocentric and have magical thinking. Early school-aged children begin to develop understanding of cause and effect. Child functions symbolically using language; develops understanding of life events and relationships.</td>
<td>Preschool processing initiative versus guilt and attempting to develop direction and purpose. Children mimic others and are more purposeful in establishing goals.</td>
<td>Develops preconventional morality; follows the standards of others to avoid punishment or to earn a reward; recognizes some things are self-satisfying and some are done to satisfy others.</td>
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<tr>
<td>School age</td>
<td>Latent stage continues; superego develops morality or a conscience; represses the sexual drive.</td>
<td>Concrete operations; uses mental reasoning to solve problems; attempts to reach logical solutions; tests beliefs to establish values.</td>
<td>Industry versus inferiority; establishing methods for solving problems and a feeling of competence; mastering tasks and using hands to create things.</td>
<td>Conventional morality; doing what is expected is important. Children need to be good in their own eyes as well as doing what they perceive others expect of them; they want to please others.</td>
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<td>Adolescence</td>
<td>Genital stage</td>
<td>Formal operations developing; adolescents are determining values that will guide their lives and religious affiliations; they develop abstract ideas that can be based in reality.</td>
<td>Identity versus role confusion; developing self-identity that will determine devotion and fidelity in future relationships.</td>
<td>Postconventional morality; developing a respect for the laws of society; adolescents are learning to consider the greatest good for the greatest number; values are related to one’s group. Behavior is controlled internally.</td>
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reprimands make them feel guilty or afraid to try more challenging skills.

- **Industry versus inferiority**—School-aged children enjoy finishing projects and receiving recognition; they develop feelings of inferiority if not accepted by peers or if they cannot please their parents.

- **Identity versus role confusion**—Adolescents face many physical and hormonal changes in this stage. Teenagers work at figuring out who they are and where they fit; they are looking for a direction for their lives. If they are unable to establish an identity and sense of direction, they become role confused.

Jean Piaget’s developmental theory focuses on intellectual growth, with four stages of cognitive development. From birth to 24 months, children progress through the sensorimotor stage, which starts with reflexive behavior and advances to learning by doing. The preoperational stage (2 to 7 years) is characterized by language development and using play to understand the world. In the concrete operational stage (7 to 11 years), children develop logical thinking and become less egocentric. Finally, the formal operational stage (11 years or older) brings abstract thinking and deductive reasoning to establish values and determine the meaning of life.

Lawrence Kohlberg’s theory, which focuses on moral reasoning, involves levels similar to Piaget’s cognitive development theory, yet recognizes the influence of culture and interpersonal relationships on the child’s moral development. In preconventional morality, the child’s behavior is based on the external control of authority figures. The child perceives the goodness or badness of a behavior based on parental reaction. In the conventional level, the child wants to follow the rules of the group or society and internalizes the values of others. As the child reaches adolescence, the postconventional level, he or she develops individual morality and values, and behavior is regulated internally rather than externally. Table 42-1 summarizes these growth and development theories.
PEDIATRIC DISEASES AND DISORDERS

The disease process in pediatric patients poses special problems, because children are constantly changing both physically and functionally. As a child grows and develops, the immune system matures, and with the aid of routine prophylactic immunizations, the child acquires long-term protection against certain infectious diseases.

Gastrointestinal Disorders

Colic

Colic usually is seen in the newborn period or in early infancy. The problem is intermittent. The classic situation is an infant between 2 weeks and 4 months of age that has crying episodes that occur at least three times a week for longer than 3 hours a day and lasting 3 weeks. During an attack, the infant draws up the legs, clenches the fists, and cries incoherently. The abdominal distress of colic usually occurs in the late afternoon and evening. Many theories have been suggested for why infants have colic, but none has been proven correct. If the baby is fed infant formula, pediatricians recommend switching formulas, perhaps to a non-cow's milk type, because this may help relieve the infant's discomfort. Treatment consists of determining the cause; however, the child frequently outgrows the condition before the causative agent can be identified. Drugs are not helpful and in some cases may be dangerous for the infant. Parents need reassurance that they are not responsible for the child's discomfort, and they may find counseling and assistance in developing coping techniques helpful.

Diarrhea

Diarrhea can be caused by a variety of microorganisms, including bacteria, viruses, and parasites. However, children sometimes can have diarrhea without having an infection, such as when diarrhea is caused by food allergies or by certain medications, such as antibiotics. Diarrhea is diagnosed when the child has two or more watery or apparently abnormal stools within 24 hours. The child may not show other signs of illness or may have nausea, vomiting, stomach aches, headache, or fever. If the diarrhea continues for longer than 2 days, medical intervention is needed, because prolonged diarrhea, in which fluid loss becomes excessive, can cause dehydration and electrolyte imbalance. In addition, a resultant diaper rash and excoriation can make defecating painful.

Pediatric diarrhea needs to be followed closely with observation and, in the case of bloody stools, laboratory analysis to determine the causative factors. Infants and small children should be followed up by telephone in 12 hours and then daily until the diarrhea has stopped. Parents should know the indications of dehydration, including lack of tears when crying, lethargy, fewer wet diapers or decreased urination, dry mouth and lips, and weight loss. The physician may recommend the use of oral rehydration therapy, such as Pedialyte or Infalyte; small amounts (approximately 2 tablespoons) are offered at a time (i.e., every 15 minutes) to prevent vomiting. Soft drinks, juices, sport drinks, and tea should be avoided, because they lack electrolytes and may lead to even more diarrhea. Parents should be informed that the child's diarrhea may not stop when the child is given oral rehydra-

CRITICAL THINKING APPLICATION

Susie receives a call from the grandmother of a 3-year-old child who has had diarrhea since last night. What are some questions Susie should ask to determine the seriousness of the problem? Should the child be seen today, even though appointments are already overbooked?

FAILURE TO THRIVE

Failure to thrive is a symptom more than a disease. It is diagnosed in an infant or young child whose weight is consistently below the 3rd percentile on standardized growth charts or one who is 20% below the ideal body weight for length. Physical, mental, and social skills also are delayed in these children. Manifestations include failure to roll over, sit up, or walk or to reach age-appropriate developmental levels. Failure to thrive can be caused by a physiologic factor (e.g., malabsorption disease or cleft palate), or it may be related to a problem with the parent-child relationship. The physician needs an accurately recorded history of the child's birth weight and subsequent length, weight, and head circumference measurements. A comprehensive family history is important to rule out genetic growth abnormalities or a history of malabsorption problems, such as cystic fibrosis or celiac disease.

Children with failure to thrive need more calories than usual—approximately 150% of their normal calorie load—to catch up to their target weight. Both medical and social factors are evaluated in the treatment of children with this problem. Experts believe that infants may suffer from this problem if they are being neglected; however, low weight gains also are possible with extremely attentive and cautious parents. The family must be considered as a whole to treat nonorganic causes effectively. Treatment may include the use of support groups and parental counseling.

OBESITY

Just as with adult weight patterns, children are assessed according to their BMI. A child's level of body fat varies as the child grows; for example, children normally slim down as they reach school age, and very often their weight increases as they mature from adolescence to adulthood. In addition, body fat levels vary between boys and girls as they reach puberty. Pediatricians there-
fore use growth charts that plot the child’s BMI-for-age to determine whether the child’s weight, in comparison with height, is within healthy limits. A child is considered overweight if the BMI-for-age is between the 85th and 94th percentiles; the child is identified as obese if the BMI is at or greater than the 95th percentile. It is estimated that more than 30% of school-aged children are overweight, and almost 16% are considered obese.

The reasons for childhood obesity vary; they include a family history of obesity, inactivity, high-calorie diets, and stress. In rare cases, childhood obesity may be caused by metabolic or endocrine disorders. Overweight and obese children are at greater risk of developing serious health conditions, including asthma, diabetes mellitus type 2, sleep apnea, and hypercholesterolemia, which increases the risk of cardiovascular disease and hypertension. The psychosocial impact of obesity can be overwhelming for many children, because isolation, loneliness, and lack of self-esteem are common. Studies have shown that 70% to 80% of overweight teenagers become overweight adults, with all the health risks and psychological issues that come with weight problems. The pediatrician can provide assistance by recommending a comprehensive diet and exercise program that emphasizes healthy living. The medical assistant can help by providing educational materials, encouragement for the child and parents, and referral to community education and support programs.

Respiratory Disorders

Common Cold
The common cold, or infectious rhinitis, has more than 100 causative pathogens and is highly contagious. It is spread through respiratory droplets from rhinitis, sneezing or coughing, either from direct contact or from touching contaminated items. The signs include nasal congestion, low-grade fever, and general malaise. Most colds are self-limiting and run their course in about a week. In infants and young children, the primary concerns are nasal congestion and loss of appetite. The parent may need to be shown how to use a nasal bulb syringe to suction the nose of an infant (Figure 42-3). Secondary infections in the lower respiratory tract or in the middle ear can occur.

One of the secondary infections that can occur is strep throat, which is caused by group A streptococcus bacteria. It is easily spread when an infected person coughs or sneezes contaminated droplets into the air and another person inhales them. A person also can become infected by touching such secretions and then touching the mouth or nose. Symptoms of strep throat infections may include severe sore throat, fever, headache, and lymphadenopathy; also, the throat appears bright red, and pustules may be present on the tonsils. If they are not treated with antibiotics, strep infections can lead to scarlet or rheumatic fever; infections of the skin, bloodstream, or ears; and pneumonia. Scarlet fever is characterized by a bright red, rough-textured rash that spreads over the child’s body. Rheumatic fever is a serious disease that can damage the heart valves.

Otitis Media
Infection or inflammation of the middle ear usually is a side effect of a cold or other upper respiratory tract disorder, but it also can be caused by allergies. Otitis media usually occurs in children younger than 3 years of age. Signs include inflammation of the middle ear, with fluid building up behind the tympanic membrane. The child may cry persistently, tug at the ear, have a fever, be irritable, and have diminished hearing in the affected ear. These symptoms sometimes may be accompanied by diarrhea, nausea, and vomiting.

Otitis media is classified as either serous (Figure 42-4) or suppurative (Figure 42-5), depending on the composition of the accumulated fluid in the middle ear. Because the condition may be caused by bacteria or a virus, determining the most appropri-
acute treatment can be difficult. Traditionally, children with indications of a middle ear infection were treated with antibiotics; however, if the infection is caused by a virus, antibiotics do not help. Because of concern over the growing problem of antibiotic-resistant strains of bacteria, current recommendations call for treatment with amoxicillin or azithromycin (Zithromax). The medication usually is ordered for a shorter course (i.e., 5 days rather than 10 to 14 days), because patients and their parents comply better with short-term treatment. Regardless of the length of treatment, it is very important that the complete prescription be administered to prevent a relapse.

If fluid in the middle ear persists for longer than 3 months and/or if the child experiences hearing loss, the physician may recommend a myringotomy; in this operation, a small incision is made in the tympanic membrane and a tube is inserted to drain the fluid and balance the pressure between the outer and middle ear. The tube typically stays in the eardrum for 6 to 12 months and falls out as the child grows. While tubes are in place, it is important to keep water out of the child's ears and to report any drainage to the physician.

CAUTIONS ON THE USE OF OVER-THE-COUNTER COUGH AND COLD MEDICINES IN CHILDREN

The U. S. Food and Drug Administration (FDA) strongly recommends that over-the-counter (OTC) cough and cold products not be given to children under 2 years of age. A number of serious complications may occur, including death, convulsions, rapid heart rate, and diminished levels of consciousness. These medications are given for symptomatic relief and have not been proven to be safe or effective for very young children. Manufacturers responded to the FDA's recommendation by voluntarily removing the products from shelves.

The FDA also is concerned about the use of these products in children ages 2 to 11 years. Parents need to know that many OTC cough and cold products contain the same active ingredients. Giving a child more than one product that contains the same active ingredient can result in overdose, especially if the wrong dose is given or the product is administered too frequently. Parents of older children are encouraged to read the drug facts section of each product's label, to familiarize themselves with the active ingredients in the products, and to follow dosing guidelines strictly to reduce the risk of complications.

CROUP

Croup is a viral inflammation of the larynx and the trachea that causes edema and spasm of the vocal cords. This varying degree of obstruction of the cords produces hoarseness, a harsh barking cough, and stridor during inhalation. The episodes usually occur at night, and symptoms ease by morning. The infection usually is self-limiting, and the child typically recovers without treatment. Mild croup can be relieved by using a cool mist humidifier in the child's room, sitting with the child in a steamy bathroom, or even taking the child outside if the air is cool. Children with allergies may require medical treatment. If the problem becomes chronic or continues for a period of time, the child may need to be treated with corticosteroids (e.g., prednisone). The physician may recommend laryngoscopy to visualize the vocal cords or may order throat cultures to determine the underlying cause of the inflammation.

BRONCHIOLITIS

Bronchiolitis is a viral infection of the small bronchi and bronchioles that usually affects children younger than 3 years of age. The infection varies in severity and is seen in children with a family history of asthma and children exposed to cigarette smoke. The child typically has a previous history of rhinitis and cough with an acute onset of wheezing and dyspnea. Symptoms occur because of inflammation, edema, increased secretions, and bronchospasm in the respiratory pathway. Treatment includes acetaminophen for discomfort and fever and a bronchodilator inhaler (albuterol sulfate [Proventil]) or nebulizer treatment for relief of wheezing. Most children fully recover in 2 weeks, but as many as 50% have recurrent wheezing and coughing.

ASTHMA

Asthma is the most common chronic health problem among children. It is the result of two specific reactions, bronchospasm and inflammation. During an asthma attack, the bronchial tubes begin to spasm, which reduces the amount of air that can pass through them. At the same time, the tissue lining the bronchioles becomes edematous and secretes mucus; therefore, in an asthma attack, the smaller Airways are filling up with mucus and secretions. Air passing through these secretions causes the classic symptom of asthma—wheezing on expiration. Asthma has a strong hereditary link. Factors that can trigger an attack include:

- Respiratory infections, including infections caused by common cold viruses
- Exposure to cigarette smoke
- Stress
- Strenuous exercise
- Weather conditions, including cold, windy, or rainy days and extreme humidity
- Allergies to animals, dust, pollen, or mold
- Indoor air pollutants, such as paint, cleaning materials, chemicals, or perfumes
- Outdoor air pollutants, such as ozone

Children with asthma have a nonproductive cough accompanied by an expiratory wheeze and shortness of breath. Shallow breathing makes it difficult for the child to speak more than a few words at a time. The child complains of tightness or pressure.
in the chest, and the physician hears rhonchi on auscultation. An asthma attack can last minutes to days and may develop into a medical emergency. Each child and each attack must be evaluated independently.

The therapeutic plan is determined by the severity and frequency of attacks. Children with mild to moderately persistent disease (i.e., symptoms that occur less often than twice a week to daily symptoms) should be referred to a specialist. A child who experiences symptoms two or more times a week should take daily medication to prevent asthma attacks. Such medications may include inhaled corticosteroids that deliver an antiinflammatory directly to the bronchioles (e.g., fluticasone [Advair Diskus, Flovent]); long-acting bronchodilators, including salmeterol (Serevent); and oral medications such as montelukast (Singulair) or zafirlukast (Accolate). The child also is prescribed a quick-acting medication, or “rescue inhaler,” such as albuterol (Proventil, Ventolin) for acute relief of bronchospasm or exercise-induced asthma; this inhaler should be readily available at all times. Further management of asthma is covered in Chapter 46.

Influenza
Influenza (the “flu”) is an acute, highly contagious viral infection of the respiratory tract. The highest incidence is seen in school-aged children, but it is most severe in infants and toddlers. It is transmitted by direct contact with moist secretions. Children tend to have high fevers with influenza and are susceptible to pulmonary complications. Influenza can vary widely in severity, ranging from very mild to life-threatening. The virus can destroy the respiratory epithelium, which is one of the body's defense mechanisms against bacterial invasion. With the loss of this protective mechanism, bacteria can invade any part of the respiratory tract and cause pneumonia.

No medication cures influenza. Some drugs can shorten the duration of the disease, but they must be taken at the onset of symptoms to be effective. Examples of these are zanamivir (Relenza), which is inhaled every 12 hours, and oseltamivir (Tamiflu), which is available in pill form. Antibiotics are prescribed only if a secondary bacterial infection develops, such as sinusitis. The usual treatment for influenza is bed rest, increased fluids, and a nonaspirin analgesic to reduce fever and relieve discomfort.

Flu vaccines are available but are beneficial only if the individual is vaccinated before the onset of the disease, and annual vaccines do not provide immunity from all strains of the flu virus. The CDC recommends annual flu vaccinations for all healthy children from age 6 months up to the 19th birthday, as well as for their caregivers. The flu vaccine also is recommended for any child over 6 months of age who has a chronic health problem, such as children with chronic heart or lung diseases (including asthma); those undergoing long-term aspirin therapy; children with diabetes mellitus or sickle cell anemia; and those with kidney, blood, or suppressed immune system diseases. The first influenza immunization for children age 6 months to 9 years requires two doses given about 1 month apart. Influenza strains continually change, so the child must receive an updated version of the vaccine each year.

Infectious Diseases

Conjunctivitis
Pinkeye, also called conjunctivitis, was discussed in Chapter 37. It is a common infection in children and is highly contagious, especially in day care centers and schools. It can be caused by a bacterial or viral infection that produces white or yellowish pus that may cause the eyelids to stick shut in the morning. Health teaching for caregivers of infected children includes the following:

- Use good hand sanitation practices and hygiene, including proper use and disposal of tissues.
- Do not share towels or any other item that comes in contact with the child's face.
- Disinfect any articles that may have been contaminated.
- Children diagnosed with infectious conjunctivitis should be treated with an antibiotic for at least 24 hours before returning to day care or school.

Tonsillitis
Tonsillitis is caused by many infectious agents, but the most common is Streptococcus A. The onset is sudden, and the disorder can cause intense pain within a short time, as well as fever and general malaise. The tonsils appear enlarged and inflamed and may be covered with pusules. A throat culture usually is performed to determine the causative organism. Treatment consists of bed rest, a liquid to soft diet, an analgesic throat spray, and oral antibiotics if the causative organism is a bacterium. The danger lies in the secondary problems that can occur, which include rheumatic heart disease and kidney disease if the streptococcal infection is not treated with antibiotics.

Fifth Disease
Fifth disease, also called erythema infectiosum, parvovirus infection, or slapped cheek disease, is an infection caused by parvovirus B19. Outbreaks are most common in the winter and spring. Symptoms begin with a mild fever and general malaise. After a few days, the cheeks take on a flushed appearance, making the face look as if it had been slapped. A lacy rash also may be seen on the trunk, arms, and legs, but not all those infected develop the rash.

Most children who get fifth disease are not very ill and recover without any serious consequences. However, children with sickle cell anemia, chronic anemia, or an impaired immune system may become seriously ill when infected and require medical care. If a pregnant woman becomes infected with parvovirus B19, she has an increased risk of miscarriage, and the fetus may suffer from severe anemia. The woman herself may have no symptoms or may have a mild illness with a rash and/or arthritis (joint pain).

Fifth disease is spread through direct contact or by breathing in respiratory secretions from an infected person. Patients are most contagious before the onset of the rash; once the rash appears, they are no longer considered contagious.

Hand-Foot-and-Mouth Disease
Hand-foot-and-mouth disease is caused by the coxsackievirus, which is ingested and transmitted by direct contact with nose and throat drainage, saliva, or the stool of an infected individual.
The disease is seen most often in day care settings, where children can easily come in contact with infected bodily secretions. Symptoms include a combination of fever; sore throat; painful red blisters on the tongue, mouth, palms, and soles; headache; anorexia, and irritability. Most cases of hand-foot-and-mouth disease are not serious.

The most common complication of the infection is dehydration. Young children may stop eating and drinking because sores in the mouth make swallowing painful. Because the infection is caused by a virus, antibiotic therapy is not helpful, and the disease must run its course. Supportive therapy is recommended, consisting of plenty of rest, fluids, and acetaminophen or ibuprofen for fever or discomfort. To prevent the spread of the disease, family members should be instructed to wash their hands thoroughly, especially after diaper changes, and to disinfect shared items such as toys frequently. Individuals with the disease are highly contagious during the first week; however, the virus may be spread for weeks after symptoms have cleared. Children with hand-foot-and-mouth disease should be kept out of day care or school until the fever is gone and mouth sores have healed.

**Varicella (Chickenpox)**

Chickenpox is caused by a member of the herpes virus group and is transmitted by direct or indirect droplets from the respiratory tract of an infected person. The incubation period is 14 to 21 days. The child usually runs a slight fever for up to 3 days before the skin eruptions occur and is contagious at this time. Skin lesions continue to erupt for 3 to 4 days and cause intense itching. The infection lasts approximately 1 to 2 weeks and in most cases leaves the child with lifetime immunity. The disease is so contagious in its early stages that an exposed person who is not immune to the virus has a 70% to 80% chance of contracting the disease.

The varicella virus vaccine, Varivax, is available for protection against chickenpox. The CDC now recommends that children receive two doses of the vaccine, the first between 12 and 15 months of age and the second between 4 and 6 years. Adolescents and adults who have never had chickenpox also should receive two doses of the vaccine. Varivax has proven to be safe and effective and can be administered at the same time as the measles, mumps, and rubella vaccine.

Chickenpox is not a serious disease for most children. However, newborns and individuals with an impaired immune system (e.g., those undergoing chemotherapy for cancer, those with acquired immunodeficiency syndrome [AIDS]), and those who take steroid medications (e.g., prednisone) may have a severe case or can even die. Chickenpox can be very dangerous for pregnant women, causing stillbirths or birth defects, and can be spread to their babies during childbirth. Occasionally chickenpox can cause serious, life-threatening illnesses, such as encephalitis or pneumonia, especially in adults. After infection, the virus migrates to a dermatome and may cause “shingles” or herpes zoster (see Chapter 38).

**Meningitis**

Meningitis is an inflammation of the membranes that cover the brain and spinal cord. It is caused by a bacterial, fungal, or viral infection. Viral meningitis usually is mild and clears up on its own within 10 to 14 days. Fungal meningitis can be quite serious and typically is seen in immunocompromised individuals, such as those with AIDS. Meningitis caused by a bacterial infection (sometimes called **spinal meningitis**) is one of the most serious types, sometimes leading to permanent brain damage or even death. Bacterial meningitis most often is caused by three different bacteria: *Neisseria meningitidis* (meningococcal meningitis), *Streptococcus pneumoniae*, and *Haemophilus influenzae* serotype b (*H. influenzae* meningitis). These bacteria are carried in the upper back part of the throat (nasopharynx) of an infected person and are spread either through the air (when the person coughs or sneezes) or by direct contact with secretions, such as through kissing or sharing eating or drinking utensils. However, transmission usually occurs only after very close contact with the infected person. Signs and symptoms of bacterial meningitis include a sudden onset of fever, headache, neck pain or stiffness, vomiting (often without abdominal complaints), and irritability. These signs and symptoms may quickly progress to a decreased level of consciousness (the person is difficult to rouse), convulsions, and death. For this reason, if any child displays symptoms of possible meningitis, he or she should receive medical care immediately. Bacterial meningitis is treated with immediate hospitalization and IV antibiotic therapy.

Meningitis caused by *H. influenzae* serotype b (Hib) can be prevented with the Hib vaccine, which is given as part of the routine childhood immunizations. Some cases of meningococcal meningitis also can be prevented by vaccination. However, this vaccine is not used routinely; it usually is given only during outbreaks or to high-risk children. Many states require reporting of bacterial meningitis cases to the health department, which probably will recommend preventive antibodies for potentially exposed persons.

**Hepatitis B**

Infection with the hepatitis B virus (HBV) can lead to a serious, chronic infection of the liver. The virus can be transmitted across the placenta or during the birth process if the mother is infected. HBV also can be transmitted sexually, by blood transfusion, or by direct contact. A child can carry the virus for years and only later develop liver failure or liver cancer. Many states now include immunization for HBV in the recommended immunization schedule, which usually is begun in the newborn nursery.

**Reye’s Syndrome**

The cause of Reye’s syndrome is unknown, but the disorder has been linked to the use of aspirin during a viral illness. Reye’s syndrome is an acute and sometimes fatal illness characterized by fatty invasion of the inner organs, especially the liver, and swelling of the brain. It most often is seen in children from infancy through puberty (age 16). The syndrome moves through five stages, as shown in Table 42-2.

Prevention is the best treatment, which means children should never be given aspirin. Parents should be advised to use non-nalicylate analgesics and antipyretics, such as ibuprofen and acetaminophen, for fevers or discomfort. Parents should also be
TABLE 42-2 Five Stages of Reye’s Syndrome

<table>
<thead>
<tr>
<th>STAGE</th>
<th>SIGNS AND SYMPTOMS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Restlessness, vomiting, liver malfunction</td>
</tr>
<tr>
<td>2</td>
<td>Elevated respiratory rate, hyperactive reflexes, increased liver dysfunction</td>
</tr>
<tr>
<td>3</td>
<td>Internal organ tissue changes, coma</td>
</tr>
<tr>
<td>4</td>
<td>Loss of brain function, deepening coma</td>
</tr>
<tr>
<td>5</td>
<td>Seizures, respiratory arrest, death</td>
</tr>
</tbody>
</table>

warned to read the labels of OTC medications carefully, because cold and flu remedies may contain aspirin.

CRITICAL THINKING APPLICATION 42-5
The father of a 10-year-old girl calls this morning, concerned about his daughter’s symptoms. She has a sore throat, fever, and bright red cheeks. He wants to give her aspirin for the fever. What advice should Susie give the father? What questions should she ask to determine the seriousness of the child’s problem? Should she list this call on the physician’s call back list?

AUTISM
- An estimated 3 to 6 in 1,000 children are diagnosed with autism; it occurs four times more often in boys.
- The cause of this developmental disorder is unknown, but researchers believe it is due to a combination of genetic errors and environmental factors, perhaps a problem with fetal brain development. Although many parents are concerned about a connection with vaccines, extensive studies have failed to show a link between the two.
- Children with autism have impaired social interaction, do not respond to their name, avoid eye contact, and show limited interest in their surroundings. They rarely communicate with others and display repetitive movements or mannerisms such as rocking or twirling. They may also have self-abusive behaviors, such as biting and head banging. Many children with autism have a very high pain tolerance but are extremely sensitive to noise, touch, or other sensory stimulation.
- Treatment involves coordinated educational and behavioral interventions to help the child develop social and language skills. Medications may be prescribed to treat depression, anxiety, and obsessive-compulsive behaviors.

Inherited Disorders

Cystic Fibrosis
Cystic fibrosis is an autosomal recessive genetic disorder (i.e., both parents are carriers but do not have the disease) that prevents the normal movement of sodium chloride (salt) into and out of cells. The lungs and pancreas are primarily affected, causing a buildup of abnormally thick secretions in the lungs and blockage of the pancreatic ducts, which prevents the excretion of pancreatic digestive enzymes and results in malabsorption problems. The child is prone to developing an emphysema-like lung condition because of the obstruction of the air pathways with mucus. There is also an abnormality in the sweat glands, which produce sweat that is very high in sodium chloride.

Signs and symptoms of cystic fibrosis include a salty taste to the skin, which may be noticed when parents kiss the child, steatorrhea (large, greasy, foul-smelling stools), abdominal distension, failure to thrive, chronic cough, and frequent respiratory infections.

The primary diagnostic test is the sweat test, which shows an elevated chloride level. Treatment of the disease is complicated and requires a multispecialty approach, because so many systems are involved. Treatment involves prevention of bronchial obstruction through routine chest percussion therapy; use of bronchodilators; and antibiotics for signs of infection. More recent therapies have included medications such as aerosolized dornase alfa (Pulmozyme) to make mucus thinner and easier to cough up. The child also is given pancreatic enzymes to improve digestion and absorption of nutrients. Cystic fibrosis is a chronic, progressive disease that has no cure; the life expectancy is 30 to 35 years. Genetic testing can identify carriers, and its presence can be detected through prenatal genetic testing with either chorionic villi sampling or amniocentesis. Cystic fibrosis usually occurs without any warning (parents have no idea they are carriers), so families need support and understanding to cope with the demands of caring for a child with the disease.

Duchenne’s Muscular Dystrophy
Muscular dystrophy is an X-linked genetic disease (passed from mothers to sons) that causes progressive muscle degeneration. The disease usually develops before age 5 and is marked by muscular weakness, frequent falls, a waddling gait, possible swallowing problems, and difficulty climbing stairs. The disorder is diagnosed with a blood test that shows an elevated creatine phosphokinase (CPK) level, electromyography, and a muscle biopsy. As the disease progresses and the necrotic skeletal muscles are replaced with fat and fibrous connective tissue, muscle function is gradually lost. Respiratory insufficiency and infections are common because of involvement of the diaphragm and intercostal muscles required for breathing. The disease has no cure and no specific treatment except for supportive care. Family counseling is helpful so that family members can learn to cope with the disease. Death usually occurs in the early 20s as a result of respiratory or cardiac complications.

IMMUNIZATIONS

Over the years, immunization has helped dramatically reduce potentially lethal childhood infections. Figure 42-6 summarizes the 2009 immunization recommendations from the CDC, which can be found at [www.cdc.gov/vaccines/recs/schedules/child-schedule.htm](http://www.cdc.gov/vaccines/recs/schedules/child-schedule.htm# printable).
The schedules are updated periodically as new vaccines become available and/or research indicates a better method for giving the vaccine. For example, it is now recommended that all female children be immunized against the human papilloma virus (HPV) at 11 to 12 years of age. The CDC recommends immunization against infectious diseases for all children, except those for whom a particular vaccination would pose a risk. However, each state develops its own immunization program and methods of enforcement.

The vaccines used in immunizations consist of a suspension of attenuated organisms or their toxins, which is administered to stimulate an active immune response in the child's body, resulting in the production of antibodies against the specific pathogens. Booster doses usually are equivalent to a single dose of the initial immunization; for some immunizations, such as tetanus, boosters are prescribed at designated intervals to ensure maintenance of immune levels.

Vaccine manufacturers have trade names for each product and have established protocols to ensure potency and stability. All vaccines are tested for safety and effectiveness. In every package of vaccine is an insert that fully describes the vaccine, its use, the route of administration, adverse reactions, and signs and symptoms that the parent might observe after immunization that would indicate a potential problem. Untoward responses include high fever, swelling at the site of the injection, urticaria, breathing difficulties, severe headache, and convulsions. Any of these should be reported to the physician immediately. Vaccine storage should follow the manufacturer's guidelines (e.g., some vaccines must be refrigerated; others must not be exposed to sunlight).
Some vaccines are grown in birds' eggs or in a medium made of animal organs or are weakened with chemicals. Therefore, a child who is allergic to eggs cannot receive some of the vaccines, such as those for measles, mumps, and rubella (MMR) and the vaccine for varicella. The medical assistant must know the potential allergic problems, common symptoms, and adverse reactions to immunizations and must make sure the parent is informed. Table 42-3 details guidelines for childhood immunizations.

Before a child or adult receives a vaccine, the healthcare provider is required by the National Childhood Vaccine Injury Act (NCVIA) to provide a copy of a Vaccine Information Sheet (VIS) to either the adult patient or the child's parent or legal guardian. A VIS provides information about the risks and benefits of each

<table>
<thead>
<tr>
<th>TABLE 42-3 Guidelines for Childhood Immunization</th>
<th>ROUTE OF ADMINISTRATION</th>
<th>CONTRAINDICATIONS*</th>
<th>SIDE EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DtaP (diphtheria, tetanus, pertussis) (whooping cough)</td>
<td>IM;Td (tetanus and diphtheria) boosters at 11-12 yr if at least 5 yr since last dose; subsequent booster every 10 yr</td>
<td>Moderate or severe acute illness; neurologic problem; complication after previous dose (e.g., fever, convulsion)</td>
<td>Mild fever, anorexia, irritability, drowsiness</td>
</tr>
<tr>
<td>HAV (hepatitis A)</td>
<td>IM; all children ≥ 1 yr; two doses 6 mo apart</td>
<td>Hypersensitivity to product, acute infection or fever</td>
<td>Localized injection site reaction, fever, headache</td>
</tr>
<tr>
<td>HBV (hepatitis B)</td>
<td>IM; may give with all other vaccines but at a separate site; requires three injections</td>
<td>Moderate or severe acute illness; yeast allergy; severe cardiovascular disease</td>
<td>Fever, pain at site, headache, malaise, vomiting</td>
</tr>
<tr>
<td>Hib (haemophilus influenzae serotype B meningitis)</td>
<td>IM; may give with all other vaccines but at a separate site</td>
<td>Not routinely given to children ≥ 5 yr; moderate or severe acute illness</td>
<td>Minimal</td>
</tr>
<tr>
<td>HPV (human papilloma virus (Gardasil))</td>
<td>IM; second dose 2 mo after first, third dose 6 mo after first</td>
<td>Hypersensitivity to ingredients; pregnancy</td>
<td>Relatively few; mild headache and GI upset</td>
</tr>
<tr>
<td>Influenza (trivalent inactivated vaccine for 6 months; at 2 years, use live, attenuated vaccine)</td>
<td>IM; annually each fall</td>
<td>Allergy to eggs; recent fever</td>
<td>Uncommon; fever, local irritation at injection site, general malaise</td>
</tr>
<tr>
<td>IPV (inactive poliovirus for polio)</td>
<td>SC or IM; four doses; may give with all other vaccines but at a separate site</td>
<td>Moderate or severe acute illness; egg allergy</td>
<td>Uncommon</td>
</tr>
<tr>
<td>MMR (measles, mumps, rubella)</td>
<td>SC; may give with all other vaccines but at a separate site</td>
<td>Moderate or severe acute illness; immunocompromised patients (may be given if HIV positive); pregnancy or possible pregnancy in 3 mo; egg allergy</td>
<td>Fever</td>
</tr>
<tr>
<td>Pneumococcal pneumonia</td>
<td>IM or SC; all children age 2-23 mo; administer every 6 yr for high-risk patients</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rotavirus (Rota)</td>
<td>Oral; three doses at age 6-12 wk; subsequent doses at 4-10 wk intervals</td>
<td>Hypersensitivity</td>
<td>Gastrointestinal upset and blood disorders</td>
</tr>
<tr>
<td>Varicella (Varicella (chickenpox))</td>
<td>SC; may give with all other vaccines but at a separate site; all susceptible children age ≥ 12 mo</td>
<td>Confirmed history of chickenpox; pregnancy or possible pregnancy in 1 mo; moderate or severe acute illness; immunocompromised patients; egg allergy</td>
<td>No salicylates for 6 wks afterward to prevent risk of Reye's syndrome</td>
</tr>
</tbody>
</table>

HIV, Human immunodeficiency virus; IM, intramuscular; SC, subcutaneous.

*Mild illness is not a contraindication.
vaccine. If providing the parent or guardian with the VIS is the medical assistant's responsibility, he or she should do the following (Procedure 42-1):

- Before administering the vaccine, give the parent the most current VIS available for that particular vaccine. Give the parent enough time to review the information and then answer any questions or refer the parent's concerns to the physician before administering the vaccine.
- Document in the child's medical record the date the VIS was given and the publication date of the VIS (which appears on the bottom of the form).
- To make sure the office has the most current VIS forms, either call the state health department or refer to the CDC Web site at www.cdc.gov/nip/publications/VIS/default.htm. Forms can be printed directly from the site.
- An informed consent form must be signed and attached to the child's health record before immunizations are given. Documentation of immunization administration must include the date the vaccine was administered, the manufacturer of the vaccine, the manufacturer's lot number, the type of vaccine, the exact site of administration if an injection was given, any reported or observed side effects, the name and title of the person who administered the vaccine, and the address of the medical office where the vaccine was administered.

- An official immunization booklet should be given to the parent and updated as needed to reflect the child's current immunization status. The medical assistant should not only document the required details in the patient's medical record but also complete the parent's immunization booklet each time the child receives another vaccination or booster. These patient records help schools and day care centers determine the child's immunization status. Some states are developing computerized immunization record systems.

It is very important that vaccine vials be handled and stored properly to maintain the compound's ability to fight disease. The CDC's recommendations for vaccine management practices are listed in Box 42-1.

**CRITICAL THINKING APPLICATION 42-6**

Susie will be administering pediatric immunizations during the well-baby visits scheduled for today. To prepare for this responsibility, she looked up the primary vaccinations, their routes of administration, contraindications, and possible side effects. The first child is here for her 4-month checkup. What immunizations should the child receive and how should they be administered? The baby's father asks if she will get sick from the vaccines. What should Susie tell him? What does Susie need to do to meet the requirements of the National Childhood Vaccine Injury Act?

**PROCEDURE 42-1**

**Maintain Medication and Immunization Records: Document Immunizations**

**GOAL:** To document accurately the administration of a pediatric immunization.

**SCENARIO:** Samantha Anderson, a 3-week-old infant, has just received her second dose of the hepatitis B (HBV) vaccine. Document the administration of the vaccine.

**EQUIPMENT and SUPPLIES**

- Vaccine immunization administration record (Figure 1)
- Parent's immunization booklet
- VIS form for hepatitis B
- Patient's record

**PROCEDURAL STEPS**

1. Gather the necessary forms.
2. Make sure the physician obtained informed consent from the parent, that the hepatitis B VIS form was given, and that all the parent's questions were answered.
   **PURPOSE:** To follow risk management practices.
3. After dispensing the vaccine dose and before administration, complete the information required on the Vaccine Administration Record, including the name of the vaccine, the date given, the route of administration and site, the vaccine lot number and manufacturer, the date on the VIS form, the date it was given to the parent, and your signature or initials.
   **PURPOSE:** To meet the legal requirements of the National Childhood Vaccine Injury Act.
4. Administer the vaccine intramuscularly (see Chapter 35).
5. Record the date of administration, the name and address of the physician practice, and the type of vaccine administered in the parent's immunization booklet.
   **PURPOSE:** To maintain an accurate and comprehensive parental record of childhood immunizations for school and/or day care purposes.
6. After administration of the hepatitis B vaccine, record in the child's medical record the following details:
   - Date the vaccine was administered
   - Vaccine's manufacturer, batch and lot numbers, and expiration date
   - Type of vaccine administered and dose
   - Route of administration and exact site if an injection is given
   - Any reported or observed side effects
   - Publication date of the VIS form given to the parent (on the bottom of the form)
   - Parent education about possible side effects of the vaccine
   - Name and title of the person who administered the vaccine

4/2/XX 3:25 PM Mother given VIS form for Hep B. Had no questions. Administered second dose of Hep B to O vestibularis as ordered. No problems noted after injection.  S. Kwong
CNA (AAMA)
### Vaccine Administration Record for Children and Teens

Before administering any vaccines, give the parent/guardian all appropriate copies of Vaccine Information Statements (VISs) and make sure they understand the risks and benefits of the vaccine(s). Update the patient's personal record card or provide a new one whenever you administer a vaccine.

<table>
<thead>
<tr>
<th>Vaccine</th>
<th>Type of Vaccine (generic abbreviation)</th>
<th>Date given (mo/day/yr)</th>
<th>Route</th>
<th>Site given (RA, LA, RT, LT)</th>
<th>Vaccine</th>
<th>Vaccine Information Statement</th>
<th>Signature/Initiais of vaccinator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatitis B</td>
<td>e.g., HepB, Hib-HepB, DTap-HepB-IPV</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>Date on VIS</td>
<td>Lot #</td>
</tr>
<tr>
<td>Diphtheria, Tetanus, Pertussis</td>
<td>e.g., DTap, DT, Tdap, DTap-Hib, DTap-HepB-IPV, Td</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>Date on VIS</td>
<td>Lot #</td>
</tr>
<tr>
<td>Haemophilus influenza type b</td>
<td>e.g., Hib, Hib-HepB, DTap-Hib</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>Date on VIS</td>
<td>Lot #</td>
</tr>
<tr>
<td>Polio</td>
<td>e.g., IPV, DTap-HepB-IPV</td>
<td>IM+SC</td>
<td>IM+SC</td>
<td>IM</td>
<td>IM</td>
<td>Date on VIS</td>
<td>Lot #</td>
</tr>
<tr>
<td>Pneumococcal</td>
<td>PCV (conjugate) PPV (polysaccharide)</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>Date on VIS</td>
<td>Lot #</td>
</tr>
<tr>
<td>Measles, Mumps, Rubella</td>
<td>e.g., MMR, MMRV</td>
<td>SC</td>
<td>SC</td>
<td>SC</td>
<td>SC</td>
<td>Date on VIS</td>
<td>Lot #</td>
</tr>
<tr>
<td>Varicella</td>
<td>e.g., Var, MRVR</td>
<td>SC</td>
<td>SC</td>
<td>SC</td>
<td>SC</td>
<td>Date on VIS</td>
<td>Lot #</td>
</tr>
<tr>
<td>Hepatitis A</td>
<td>HepA</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>Date on VIS</td>
<td>Lot #</td>
</tr>
<tr>
<td>Meningococcal</td>
<td>MCV4 (conjugate) MPSV4 (polysaccharide)</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>Date on VIS</td>
<td>Lot #</td>
</tr>
<tr>
<td>Influenza</td>
<td>TTV (inactivated) LAIV (live, attenuated)</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>IM</td>
<td>Date on VIS</td>
<td>Lot #</td>
</tr>
</tbody>
</table>

1. Record the generic abbreviation for the type of vaccine given (e.g., DTap-Hib, PCV), nor the trade name.
2. Record the publication date of each VIS as well as the date it is given to the patient. According to federal law, VISs must be given to patients (or parent/guardian of a minor child) before administering each dose of DTap, Td, Hib, polio, MMR, varicella, PCV, or HepB vaccine, or combinations thereof. Use of the VISs for hepatitis A, influenza, and meningococcal vaccines will become mandatory in later 2005.
3. For combination vaccines, fill in a row for each separate antigen in the combination.
4. Give MCV4 via the IM route and MPSV4 via the SC route.
5. Give TIV via the IM route and LAIV intranasally (IN).

www.immunize.org/aim/sb/12022b.pdf • Item #P2002 (10/05)

Immunization Action Coalition • 1573 Selby Ave. • St. Paul, MN 55104 • (651) 647-9009 • www.immunize.org • www.vaccineinformation.org

**FIGURE 1**
**SAFE HANDLING AND STORAGE OF VACCINES**

The Centers for Disease Control and Prevention (CDC) has devised a list of important rules and steps to ensure safekeeping of a practice's vaccine supply. This list can be used as a checklist in the office:

1. One person should be in charge of the handling and storage of vaccines at the facility, with a backup person to ensure proper management.
2. A vaccine inventory log should be maintained that includes the following:
   - Vaccine name, number of doses, and date received
   - Condition of vaccine on arrival
   - Vaccine manufacturer, lot number, and expiration date
3. A full-size refrigerator should be used for vaccine storage that has a separate freezer compartment door, or the practice should have a refrigerator and a separate freezer.
4. The vaccine refrigerator and freezer should not be used for food or drinks.
5. Vaccines should be stored in the middle of the refrigerator or freezer, not on the door.
6. New supplies should be placed behind the vials with the closest expiration date; the vials with the nearest expiration date should be used first.
7. A sign should be posted on the refrigerator door identifying which vaccines should be stored in either the refrigerator or the freezer.
8. A thermometer should be kept in the refrigerator and one in the freezer; the refrigerator temperature is maintained at 35° to 46°F (2° to 8°C) and the freezer at +5° F (-15°C) or colder.
9. Containers of water should be kept in the refrigerator and ice packs in the freezer to help maintain cold temperatures.
10. A temperature log should be kept on the refrigerator door; the refrigerator and freezer temperatures should be recorded twice a day, first thing in the morning and at the end of the day.
11. A “Do Not Unplug” sign should be posted next to the refrigerator’s electrical outlet.
12. If the refrigerator stops working, the following steps should be taken:
   - Immediately place the vaccines in another refrigerator, mark them so that they can be separated from vaccines that were not affected.
   - Record the temperature of the refrigerator or freezer and contact the vaccine manufacturer or state health department; follow their instructions regarding the use, alteration of expiration dates, or disposal of the vaccines.
13. The practice should have a copy of the health department’s general and emergency vaccine management policies.

**TABLE 42-4 Appar Scoring System**

<table>
<thead>
<tr>
<th>CLINICAL SIGN</th>
<th>0</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart rate</td>
<td>Absent</td>
<td>&lt;100</td>
<td>&gt;100</td>
</tr>
<tr>
<td>Respiratory effort</td>
<td>Absent</td>
<td>Slow and irregular</td>
<td>Good and crying</td>
</tr>
<tr>
<td>Muscle tone</td>
<td>Limp</td>
<td>Some flexion of the arms and legs</td>
<td>Active movement</td>
</tr>
<tr>
<td>Reflex irritability</td>
<td>No response</td>
<td>Grimace</td>
<td>Coughing and sneezing</td>
</tr>
<tr>
<td>Color</td>
<td>Blue and pale</td>
<td>Body pink and extremities blue</td>
<td>Pink all over</td>
</tr>
</tbody>
</table>

*Readings are taken by the pediatrician at 1 minute and 5 minutes after birth. At 1 minute, if the score is 7 or lower, some nervous system problems are suspected. If the score is below 4, resuscitation usually is necessary. At 5 minutes, if the score is at least 8, the child probably is reacting normally.*

**THE PEDIATRIC PATIENT**

An infant's first physical assessment comes at the time of delivery, when the pediatrician assesses the newborn's ability to thrive outside the uterus. The Apgar score is a system for evaluating the infant's physical condition at 1 and 5 minutes after birth (Table 42-4). Developed by pediatrician Virginia Apgar, the scoring system evaluates the following: appearance (color); pulse (heart rate); grimace (reflex; response to stimuli); activity (muscle tone); and respiration (breathing). These parameters are each rated 0, 1, or 2. The maximum total score is 10. Infants with low scores require immediate medical attention.

**Well-Child Visits**

The frequency of well-child visits varies with the physician and the community. It may follow this pattern: 2 weeks, 4 weeks, 3 weeks, 4 months, 6 months, 12 months, 18 months, 2 years, 5 years, 10 years, and 15 years. These visits focus on maintaining the child’s health through basic system examinations, immunizations, and upgrading of the child’s medical history record.

The decision on whether the child is to be seen alone or with the parent depends on the pediatrician and the child’s age. Often the child looks to the parent for approval before answering or performing a skill; for this reason, the physician may want to assess the child alone. If this is the case, explain to the parent that the physician wants to evaluate the child’s independent abilities and that as soon as testing is complete, the physician will explain the results of the tests.

The medical history is an essential guide to the pediatric examination. With an infant, the physician depends on the caregiver for the history, but as the child gets older, some history may be obtained from the child and clarified or amplified by the parent. Close observation also gives the physician considerable information.
**LEAD PAINT EXPOSURE**

Children are especially vulnerable to lead levels in their environment. High blood lead levels can result in serious brain injury, including seizures, coma, and death; lower levels can cause learning problems, stunted growth, and behavior disorders. Lead-based paint in homes and on imported toys and chronic exposure to lead-contaminated dust are the most common causes of lead exposure. The Centers for Disease Control and Prevention (CDC) recommends a screening blood lead test for all children between 1 and 2 years of age. Children with elevated levels should be followed by home and school environmental testing to determine the cause of lead exposure.

**Sick-Child Visits**

Sick-child visits occur whenever needed, usually on short notice. For this reason, most pediatric offices keep open appointments in the schedule to accommodate calls for sick-child visits. The length and frequency of this type of visit depends entirely on the child and the illness. The medical assistant frequently is the first point of contact for a sick child and his or her caregiver. Determining whether the child should be seen immediately or the problem can wait for an opening in the schedule is crucial to pediatric care. The medical assistant should follow established office policies, but when in doubt about the seriousness of the problem, he or she should ask the office manager or physician for advice. Usually the physician prefers to see the child rather than delay seeing a patient with a potentially serious condition. When the medical assistant conducts telephone screening, if the child is young (under 2 years old) and the parent reports frequent cycles of crying, lethargy, vomiting that lasts longer than 24 hours, diarrhea (more than six stools in the past 12 hours), or fever of 101°F (38.5°C) or higher, the best course is to see the child right away. He or she cannot verbalize associated pain or problems.

Table 42-5 summarizes some important questions for telephone screening of an older child who can communicate his or her symptoms. It is important to focus on the *onset* (when symptoms first started), *frequency* (are symptoms constant, or do they cycle through recurrences), and *duration* (how long the episodes last) of the problem, as well as attempted treatments and their effectiveness. As with any other patient, all telephone communication should be documented to record the reason for the call, the information gathered, and the action taken, including whether the physician was consulted, any orders given, and if and when an appointment was scheduled.

**THE MEDICAL ASSISTANT'S ROLE IN PEDIATRIC PROCEDURES**

The medical assistant is responsible for assisting the pediatrician with examinations; upgrading patient histories; performing ordered screening tests, such as vision, hearing, urinalysis, and hemoglobin checks; administering immunizations; measuring and weighing children as needed; and providing patient and caregiver support. A medical assistant must develop a relationship with the pediatric patient that encourages cooperation and compliance with tests and treatment plans. If the child becomes upset, everything that needs to be done during that visit will be done under duress, and the chance for future mistrust intensifies.

Interacting with children requires special techniques, depending on the child’s age. A calm, unhurried manner is essential to bearing cooperation. The tone of voice should be gentle but confident. Using a firm, direct approach about expected behavior is important in gaining the cooperation of older children. Offer reasonable choices when possible, such as, “Would you like your shot in your left or right leg?” not, “Are you ready for your shot now?” Offering sincere praise for the child during the examination or procedures helps ease anxiety and builds self-esteem. If the child is having an unusually difficult time, try to discover the reason. If he or she has had a bad medical experience in the past, the child may be afraid of what might happen. Each step should be explained in a language the child (and parent) can understand.
**Measurement**

Examination of the child during routine well-child care includes measurement of the circumference of the infant’s head to determine normal growth and development (Procedure 42-2). The size of the child’s head reflects the growth of the brain. Brain growth is 50% complete by 1 year of age, 75% by age 3, and 90% by age 6. Routine head measurement is recommended in children until 36 months of age and in older children whose head size is not within norms. If the circumference of the head deviates greatly from normal measurements, **hydrocephaly** or **microcephaly** may be suspected. It is important to discover any congenital problem as early as possible so that appropriate treatment can be started.

The medical assistant should record the child’s length or height, weight, and head circumference on growth charts so that the physician can compare the child’s measurement statistics with national standards (Procedure 42-3). Growth charts consist of a series of percentile curves that illustrate the distribution of selected body measurements.

The current version of the CDC’s growth records consists of 16 charts (eight for boys and eight for girls) (Figures 42-9 and 42-10). These charts represent revisions of the 14 previous charts, as well as the introduction of two BMI-for-age charts for boys and for girls ages 2 to 20 years. As mentioned previously, the BMI is the recommended method of determining whether children or adults are overweight or obese. The BMI growth charts can be used beginning at 2 years of age, when height can be measured accurately.

**Assisting with the Examination**

The pediatrician will have a designated set of procedures that the medical assistant completes before the physician sees the child (Procedure 42-4). Vital signs are measured first (Table 42-6). Depending on the child’s age and level of cooperation, the temperature may be obtained by the axillary, oral, rectal, tympanic, or temporal method. The rectal and temporal methods are considered most accurate in infants; however, the temporal method is easiest, quickest, and less invasive. It is important to remember that the younger the child, the more immature the ability to regulate body heat. Therefore the temperature of an infant may fluctuate easily and rapidly. The child’s pulse rate is affected similar to that of an adult; it can increase as a result of activity, anxiety, illness, and environmental temperature. If the child is younger than age 2, the pulse is measured apically by placing the stethoscope on the left side of the chest medial to the nipple. Always count the beats for 1 full minute for accuracy.

An alternative method of obtaining the pulse of a very young child is to use the brachial artery in the upper arm. After age 2, the child’s pulse may be taken at the radial pulse site. Anticipate a pulse rate higher than that of an adult; the younger the child, the faster the pulse. The respiratory rate is easily obtained in a child, because the chest can be readily observed. Expect the rate to be increased according to the child’s age (the younger the child, the faster the normal respiratory rate) and health. The ratio of four pulse beats to one respiration should remain constant in a healthy child.

Children younger than age 2 feel better when the parent holds them or remains very close (Figure 42-7). Preschool children enjoy playing, so making a game out of the situation is helpful (Figure 42-8). Whatever the child’s age, the medical assistant should be sensitive to his or her individual needs and should adapt the examination and procedures as much as possible to meet those needs.

The sequence of the physician’s examination varies and frequently is adapted based on the child’s cooperation. The pediatrician probably will leave procedures and tests that are likely to cause the most objections until the end of the appointment. The physician is constantly evaluating the child’s growth and development. A child’s alertness and responses tell the physician a considerable amount. With infants and young children of preschool age, the parent is closely questioned about the child’s eating, sleeping, and elimination habits. A school-aged child usually is a little more cooperative during an examination and can answer most questions without parental assistance. Adolescent patients should be given the option of not having parents present during an examination. This may permit teenagers to respond more honestly about lifestyle factors and also protects their privacy.
Maintain Growth Charts: Measure the Circumference of an Infant’s Head

**GOAL:** To obtain an accurate measurement of the circumference of an infant’s head and plot the result on the patient’s growth chart.

**EQUIPMENT and SUPPLIES**
- Flexible disposable tape measure
- Age- and gender-specific growth chart
- Pen
- Patient’s record with appropriate growth chart

**PROCEDURAL STEPS**

1. Sanitize your hands.
   - **PURPOSE:** To ensure infection control.
2. Identify the patient. If he or she is old enough, gain child’s cooperation through conversation.
   - **PURPOSE:** To alleviate anxiety and gain the child’s trust.
3. Place an infant in the supine position, or the infant may be held by the parent. An older child may sit on the examination table.
4. Hold the tape measure with the zero mark against the infant’s forehead, slightly above the eyebrows and the top of the ears. Ask the parent for assistance if necessary.
5. Bring the tape measure around the head, just above the ears, until it meets (Figure 1).
6. Read to the nearest 0.01 cm or \( \frac{1}{8} \) inch.
7. Record the measurement on the growth chart and in the patient’s medical record.
   - **PURPOSE:** A procedure is not done until it is recorded.
8. Dispose of the tape measure.
9. Sanitize your hands.
   - **PURPOSE:** To ensure infection control.

Blood pressure measurements are not included in most pediatric examinations. However, if the child has a heart or kidney anomaly, a blood pressure reading may be ordered. The cuff must be the appropriate width to obtain an accurate reading, and the bell of the stethoscope must be small enough to seal over the site. It is best to use a pediatric stethoscope with a pediatric bell when obtaining an infant’s pressure. Blood pressure readings in a young child are lower than those in an adult.

To prevent a small child or infant from rolling the head from side to side during the physician’s examination, stand at the head of the table and support the child’s head between your hands, taking care not to press on the ears or on the anterior or posterior fontanelles. An infant need not be draped, but privacy is important to an older child. Sincere respect and friendly conversation at the child’s level accomplishes a great deal. Always be patient with children. Make sure they understand what is expected. Always involve the parents or caregivers as much as possible.

Accurately judging the level of pain a young patient is experiencing can be difficult. If the child is able to communicate, the Wong-Baker Faces Pain Scale could be used, which shows simple drawings of faces that express varying levels of pain on a 1 to 10 scale (Figure 42-11 on p. 889).

---

**Obtaining a Urine Sample**

The easiest way to obtain a urine sample from a child older than age 2 who is toilet trained is to give the parent the container and instructions ahead of time. Then, when the child appears at the office for the examination, the sample is available to be tested. If the sample is needed while the child is at the office, consult with the parent for the best method to use. If the child is younger than age 2, a pediatric urine collection device can be put on him or her to collect the sample (Figure 42-12 and Procedure 42-5). This device is placed as soon as the child is checked in to increase the chance of obtaining the needed sample before the child leaves. Once the device is in place, the child can be diapered to help hold it properly. Make sure the adhesive sticks tightly so that the specimen collects in the device when the child urinates.

In some cases the child may need to be catheterized to obtain the specimen. Pediatric catheterization kits contain all the supplies needed for this procedure. When preparing the kit for the pediatrician’s use, always remember that this is a sterile procedure. The pediatrician usually asks the parent to help with the infant while the medical assistant labels and prepares the specimen for the laboratory.
**PROCEDEURE 42-3**

**Maintain Growth Charts: Measure an Infant’s Length and Weight**

**GOAL:** To measure an infant’s length and weight accurately so that growth patterns can be monitored and recorded.

**EQUIPMENT and SUPPLIES**

- Infant scale with paper cover
- Flexible measuring tape
- Examination table paper
- Pen
- Gender-specific infant growth chart
- Biohazard waste container
- Patient’s record

**PROCEDURAL STEPS**

**Measuring an Infant’s Length**

1. Sanitize your hands, assemble the necessary equipment, and explain the procedure to the infant’s caregiver.
2. Undress the infant. The diaper may be left on while the length is measured, but it must be removed before the infant is weighed.
3. Ask the caregiver to place the infant on his or her back on the examination table, which is covered with paper. If the table is a pediatric table with a headboard, ask the caregiver to hold the infant’s head gently against the headboard while you straighten the infant’s leg and mark the location of the heel on the paper. If there is no headboard, ask the caregiver to gently hold the infant’s head still while you draw a line on the paper at the back of the baby’s head and at the heel after the leg is extended (Figure 1).
4. Measure the infant’s length with the tape measure and record it.
5. Document the results in either inches or centimeters, depending on office policy, on the infant’s growth chart, in the Progress Notes, and in the caregiver’s record if requested. Complete the growth chart graph by connecting the dot from the last visit.

**Weighing an Infant**

1. Sanitize your hands, assemble the necessary equipment, and explain the procedure to the infant’s caregiver.
2. Prepare the scale by sliding weights to the left; line the scale with disposable paper to reduce the risk of pathogen transmission.
3. Completely undress the infant, including removing the diaper.
4. Place the infant gently on the center of the scale, keeping your hand directly above the infant’s trunk for safety (Figure 2).
5. Slide the weights across the scale until balance is achieved. Attempt to read the infant’s weight while he or she is still.
6. Return the weights to the far left of the scale and remove the baby. The caregiver can rediaper the baby while you discard the paper lining the scale. If the scale became contaminated during the procedure, follow OSHA guidelines for use of gloves and disposal of contaminated waste. Disinfect the equipment according to the manufacturer’s guidelines.
7. Sanitize your hands.
8. Document the results in either pounds or kilograms, depending on office policy, on the infant’s growth chart, in the Progress Notes, and in the caregiver’s record if requested. Complete the growth chart graph by connecting the dot from the last visit.

*8/24/XX  10:20 AM  Wt 17 lbs 4 oz  Length 27 in  S. Kwong, CMA (AAMA)*

**FIGURE 1**

**FIGURE 2**
Birth to 36 months: Boys
Length-for-age and Weight-for-age percentiles

Published May 30, 2000 (modified 4/22/01).
SOURCE: Developed by the National Center for Health Statistics in collaboration with
the National Center for Chronic Disease Prevention and Health Promotion (2000).
http://www.cdc.gov/growthcharts

FIGURE 42-9 Growth chart: males (birth to 36 months).
2 to 20 years: Girls
Stature-for-age and Weight-for-age percentiles

Mother's Stature

<table>
<thead>
<tr>
<th>Date</th>
<th>Age</th>
<th>Weight</th>
<th>Stature</th>
<th>BMI*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Father's Stature

<table>
<thead>
<tr>
<th>Date</th>
<th>Age</th>
<th>Weight</th>
<th>Stature</th>
<th>BMI*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*To Calculate BMI: Weight (kg) = Stature (cm) - Stature (cm) x 10,000
or Weight (lb) = Stature (in) - Stature (in) x 703

Published May 30, 2000 (modified 11/21/00).
SOURCE: Developed by the National Center for Health Statistics in collaboration with
the National Center for Chronic Disease Prevention and Health Promotion (2000),
http://www.cdc.gov/growthcharts

FIGURE 42-10 Growth chart: females (2 to 20 years).
PROCEDURE 42-4

Assist the Physician with Patient Care: Obtain Pediatric Vital Signs and Perform Vision Screening

GOAL: To accurately obtain vital signs and assess the vision of a pediatric patient.

EQUIPMENT and SUPPLIES

- Digital, tympanic, or temporal thermometer
- Pediatric blood pressure cuff
- Wristwatch with sweep second hand
- Weight scale with height bar
- Stethoscope
- Snellen E eye chart and oculator
- Pen
- Patient's record

PROCEDURAL STEPS

1. Gather the necessary equipment.
2. Sanitize your hands.
   PURPOSE: To ensure infection control.
3. Explain the procedure to the parent, and if you want the parent to help by holding the child, explain how you want him or her to do that.
   PURPOSE: Explanations ahead of time save time and improve cooperation.
4. Help the child stand in the center of the scale, then weigh the child. Ask the child to turn around, then measure the child's height. Record your findings (see Chapter 31).
5. Obtain the tympanic, temporal, or axillary temperature using the procedure explained in Chapter 31 (Figure 1).
6. Record the temperature and indicate the method used.
   PURPOSE: A procedure is not done until it is recorded in the patient's record.
7. Place the stethoscope on the child's chest at the midpoint between the sternum and the left nipple. Listen for the apical beat (Figure 2).
8. Count the apical beat for 1 full minute.
9. Record the apical pulse. Be sure to place an Ap before the rate to indicate that this is an apical pulse reading.
   PURPOSE: A procedure is not done until it is recorded in the patient's record.
10. Observe the child's chest or place your palm on the child's chest and count the respirations for 1 full minute.
11. Record the respiratory rate.
    PURPOSE: A procedure is not done until it is recorded in the patient's record.
12. Check to make sure you have the correct-sized blood pressure cuff and then take the child's blood pressure (see the procedure in Chapter 31) (Figure 3).
13. Record the blood pressure.
    PURPOSE: A procedure is not done until it is recorded in the patient's record.
14. If vision screening is to be done, familiarize the child with the E chart by asking him or her to make an E that points the same way your E is pointing. Then position the child in front of the pediatric Snellen E chart (Figure 4) and have the child match the E sign (using the fingers) with the E on the chart to which you are pointing.

15. Record the vision results.
   **PURPOSE:** A procedure is not done until it is recorded in the patient’s record.

16. Compliment the child on his or her performance, and if the parent is present, share the praise with the parent.
   **PURPOSE:** To build rapport and encourage self-confidence in the child.

17. Sanitize your hands.
   **PURPOSE:** To ensure infection control.

18. Perform appropriate disinfection and return all equipment to the proper storage area.

---

**TABLE 42-6 Reference Ranges for Pediatric Vital Signs**

<table>
<thead>
<tr>
<th>VITAL SIGN</th>
<th>REFERENCE RANGE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature</strong></td>
<td></td>
</tr>
<tr>
<td>Oral</td>
<td>98.6° F (37° C)</td>
</tr>
<tr>
<td>Aural</td>
<td>100.4° F (38° C)</td>
</tr>
<tr>
<td>Axillary</td>
<td>97.6° F (36.4° C)</td>
</tr>
<tr>
<td><strong>Pulse</strong></td>
<td></td>
</tr>
<tr>
<td>Newborn</td>
<td>100-180 beats per minute</td>
</tr>
<tr>
<td>3 mo–2 yr</td>
<td>80-150 beats per minute</td>
</tr>
<tr>
<td>2–10 yr</td>
<td>65-130 beats per minute</td>
</tr>
<tr>
<td>&gt;9 yr</td>
<td>60-100 beats per minute</td>
</tr>
<tr>
<td><strong>Respirations</strong></td>
<td></td>
</tr>
<tr>
<td>Newborn</td>
<td>30-35 breaths per minute</td>
</tr>
<tr>
<td>1–2 yr</td>
<td>25-30 breaths per minute</td>
</tr>
<tr>
<td>4–6 yr</td>
<td>23-25 breaths per minute</td>
</tr>
<tr>
<td>&gt;7 yr</td>
<td>16-20 breaths per minute</td>
</tr>
<tr>
<td><strong>Blood Pressure</strong></td>
<td></td>
</tr>
<tr>
<td>Newborn</td>
<td>Systolic &lt; 90 mm Hg; diastolic &lt; 70 mm Hg</td>
</tr>
<tr>
<td>1–5 yr</td>
<td>Systolic &lt; 100 mm Hg; diastolic &lt; 70 mm Hg</td>
</tr>
<tr>
<td>&gt;9 yr</td>
<td>Systolic &lt; 120 mm Hg; diastolic &lt; 84 mm Hg</td>
</tr>
<tr>
<td>&gt;13 yr</td>
<td>Systolic, 100 mm Hg + age; diastolic, 30-40 mm Hg less</td>
</tr>
</tbody>
</table>

---

**CRITICAL THINKING APPLICATION 42-7**

The office manager asked Susie if she would check the entire office for potential child safety problems. After inspecting the facility, Susie is concerned about some safety issues, so she decides to create a checklist for future use. What precautions or safety features should she include?

---

**THE ADOLESCENT PATIENT**

The adolescent patient may present the greatest challenge to health education and disease management. Adolescence begins with the onset of puberty, a time when the child’s reproductive system matures, and is marked by rapid changes in the endocrine and musculoskeletal systems. The adolescent undergoes rapid growth spurts and the development of secondary sexual characteristics.

Health examinations for patients in this age group should include screening for height and weight; gathering details about

diet and exercise routines; screening for sexually transmitted diseases (STDs) and for sexually active female adolescents, a Pap test, especially to screen for infection with HPV; reviewing the vaccination history and administration of boosters as indicated; and assessing for high-risk behaviors, such as substance abuse and sexual behavior.

Some health problems most frequently seen in adolescent patients include eating disorders (anorexia nervosa and bulimia nervosa), obesity, and injury-related problems. Accidents are the leading cause of death and injury in adolescence, and suicide is the third leading cause of death. All healthcare personnel should be on the alert for indicators of suicide, including:

- Signs of depression, such as headaches, abdominal discomfort, anorexia, fatigue, aggressiveness, drug or alcohol abuse, and sexual promiscuity
- Verbal statements that hint at the adolescent’s intention to commit suicide; talking about dying
PROCEDURE 42-5

Assist the Physician with Patient Care: Apply a Urinary Collection Device

GOAL: To apply a pediatric urinary collection device properly.

EQUIPMENT and SUPPLIES
- Pediatric urine collection bag
- Labeled laboratory urinary container
- Laboratory test request form
- Antiseptic wipes
- Biohazard waste container
- Disposable examination gloves
- Patient's record

PROCEDURAL STEPS

1. Assemble all needed supplies.
   PURPOSE: To manage time efficiently.
2. Sanitize your hands and put on gloves.
   PURPOSE: To ensure infection control.
3. Ask the parent to remove the child's diaper or place the child in a supine position on the examination table and remove the diaper.
4. Cleanse the genitalia with antiseptic wipes.
   Male: Cleanse the urinary meatus in a circular motion, starting directly on the meatus and working in an outward pattern. Repeat with a clean wipe. If the child has not been circumcised, gently retract the foreskin to expose the meatus; when you have completed the cleansing, return the foreskin to its natural position.
   Female: Hold the labia open with your nondominant hand; with your dominant hand, cleanse the inner labia, from the clitoris to the vaginal meatus, in a superior to inferior pattern. Discard the first wipe and repeat with a clean wipe, cleaning both sides of the inner labia.

PURPOSE: To prevent contamination of the urine specimen with surface pathogens.
5. Make sure the area is dry. Unfold the collection device, remove the paper from the upper portion, place this portion over the mons pubis, and press it securely into place. Continue by removing the lower portion of the paper and securing this portion against the perineum. Make sure the device is attached smoothly and that you have not taped it to part of the infant's thigh.
6. Rediaper the infant or, if the parent is helping, have the parent rediaper the infant at this time. The diaper will help hold the bag in place.
7. Suggest that the parent give the child liquids, if allowed; check the bag for urine at frequent intervals.
   PURPOSE: Increasing intake helps increase output.
8. When a noticeable amount of urine has collected in the bag, put on gloves, remove the device, cleanse the skin area where the device was attached, and rediaper the child.
9. Pour the urine carefully into the laboratory urine container and handle the sample in a routine manner.
10. Dispose of all used equipment in a biohazard waste container.
11. Remove your gloves, dispose of them in a biohazard container, and sanitize your hands.
12. Record the procedure in the patient's record.
   PURPOSE: A procedure is not done until it is recorded.

8/24/XX 10:45 AM Urine specimen collected for culture as ordered. Proceed for pick up by North Hills Laboratory. S. Kwong, CMA (AAPM)

- Actions such as giving away prized objects, withdrawing from social groups, sudden changes in normal behavior patterns, or writing a suicide note

CHILD ABUSE

The federal Child Abuse Prevention and Treatment Act states that all threats to a child's physical and/or mental welfare must be reported. This means that every teacher, healthcare worker, and social worker—in fact, every citizen—who suspects that a child is being neglected or abused must report this to the proper authority. The agency must record the report, and after three similar reports, the agency must investigate.

When suspected abuse is reported, the individual must provide his or her name; however, this is considered confidential information and is not given to the child's parent or guardian, nor is it given to the investigating officer. The individual making the report also is protected under the law from any liability for reporting suspicions of child abuse.

If the medical assistant suspects that a child is a victim of abuse, he or she should consult with the pediatrician immediately. In most states, the medical assistant and the physician can make separate reports to the authorities. However, state laws vary, so state and local reporting protocols should be outlined in the office procedures manual.

SIGNS OF CHILD ABUSE

Obvious Signs
- Previously filed reports of physical or sexual abuse of the child
- Documented abuse of other family members
- Different stories between parents and child on how an accident happened
- Stories of incidents and injuries that are suspicious
- Injuries blamed on other family members
- Repeated visits to the emergency department for injuries
Examination Findings
- Trauma to the nervous system
- Internal abdominal pain
- Discolorations/bruising on the buttocks, back, and abdomen
- Elbow, wrist, and shoulder dislocations

Changes in Behavior
- Too eager to please the parent
- Overly passive and too compliant
- Aggressive and demanding
- Parenting the parent (role reversal)
- Delays in the normal growth and development patterns
- Erratic school attendance

Physical Indicators
- Poor hygiene
- Malnutrition
- Obvious dental neglect
- Neglected well-baby procedures (e.g., immunizations)

CLOSING COMMENTS

Patient Education
In a pediatric practice, the child usually is joined by one or both parents during visits to the physician. Parents need reinforcement, praise, and understanding in dealing with the health and welfare of their child. Provide parents with information to help them understand their children’s behavior and improve their parenting skills. Understanding the normal behavioral characteristics of a particular developmental stage may increase the parents’ confidence and reinforce expectations for the child.

The waiting room is an ideal place for parent education. Use the space and resources available to provide up-to-date information on child health issues, as well as local resources for support and assistance. If the pediatrician has pamphlets available, discuss them with the parents. Answer questions when possible, or alert the physician so that questions can be answered during the office visit. Every opportunity should be taken to teach parents about sound healthcare. Because so many ambulatory care visits involve infectious disorders, educating children and parents on the following infection control measures may help reduce the spread of disease.

- Children should cover their mouth with a disposable tissue when they cough and should blow the nose with disposable tissues.
- A tissue should be used only once and then immediately thrown away.
- Children should not be allowed to share toys they have put in their mouth.
- After a child has discarded a toy that was in the mouth, it should be placed in a bin for dirty toys that is out of reach of others. Wash and disinfect these toys before allowing children to play with them again.
- Make sure all children and adults follow good hand-washing practices.

Legal and Ethical Issues
In the United States, children are considered persons who are growing and developing physically, emotionally, and mentally. Our laws view children as a distinct group, and laws and customs have been established that deal with the protection of children’s rights. Occasionally in the pediatric office, legal and ethical issues arise, and the entire office staff may be faced with an ethical situation. If this type of situation occurs, the first option is to talk it over with the pediatrician. It may be necessary to have an office staff meeting to identify the conflict, note pertinent laws and facts, consider possible options and the consequences of each, and decide on a course of action. Facing ethical issues confidently may reduce the risk of liability. If the pediatrician’s feelings are different from yours, this might be a totally separate dilemma with which you will have to deal. Always remember that as your employer, the physician makes the final decision, and as long as you work in that office, you are required to do things according to that decision.

If something happens that you cannot ethically support, seek the help of your local medical assistant organization. You may find that others have been in similar situations and that they can suggest possible methods of solving the problem.

SUMMARY OF SCENARIO

After working with the telephone screening staff, Susie realizes the importance of becoming familiar with childhood diseases and disorders, as well as the management policy of her physician employers. Many times Susie has had to refer to the office disease manual to make sure she is asking the right questions and gathering all the information needed for the physician who will make the daily response calls. From working in the clinical area, Susie also has realized that pediatric practice actually has two groups of patients: the child and the caregivers. She must be sensitive to the needs of both groups and develop communication skills that build trust with the child as well as his or her parents.

Susie is working on developing a comprehensive education site in the office for interested parents and is creating a community resource guide for interested caregivers. She recognizes the need to stay up-to-date on the CDC’s recommendations for childhood immunizations and routinely refers to the CDC Web site to make sure the office has the most recently published VIS forms. Susie regularly attends her local American Association of Medical Assistants (AAMA) chapter meetings to maintain her certification and to continue to learn about the pediatric practice specialty.
SUMMARY OF LEARNING OBJECTIVES

1. Define, spell, and pronounce the terms listed in the vocabulary. Spelling and pronouncing medical terms correctly bolster the medical assistant’s credibility. Knowing the definitions of these terms promotes confidence in communication with patients and coworkers.

2. Apply critical thinking skills in performing the patient assessment and patient care. Completing the Critical Thinking Application exercises throughout the chapter can help the student medical assistant become more adept at critical analysis of real-life situations.

3. Describe childhood growth patterns. By 6 months of age, the child’s birth weight has doubled; at 1 year it has tripled, and the child’s length has increased by 50%. By age 2 the child has reached approximately 50% of adult height. This same growth rate continues through the school-aged period, 6 to 12 years, which leads into a growth spurt that indicates impending puberty. In adolescence, ages 12 to 18 years, the adolescent gains almost half of his or her adult weight and the skeleton and organs double in size.

4. Summarize the important features of the Denver II Developmental Screening Test. The Denver II Developmental Screening Test is a standardized tool given to children between 1 month and 6 years of age to screen healthy infants for developmental delays, to validate concerns about an infant’s development, or to monitor high-risk children for potential problems.

5. Identify four different growth and development theories. Table 42-1 summarizes Freud’s psychosexual, Piaget’s cognitive, Erikson’s psychosocial, and Kohlberg’s moral reasoning theories.

6. Explain common pediatric gastrointestinal disorders and their signs, symptoms, and treatment. Pediatric gastrointestinal disorders include infant colic; diarrhea, which can be caused by a variety of different microorganisms and is treated medically when it continues for longer than 2 days; failure to thrive caused by a physiologic factor (e.g., malabsorption disease or cleft palate) or a nonorganic cause that is associated with the parent-child relationship; and obesity if the child’s BMI is equal to or greater than the 95th percentile.

7. Classify disorders of the respiratory system in children. The common cold may lead to secondary bacterial infections, including strep throat or otitis media; croup, a viral disorder that affects the larynx; bronchiolitis, a viral infection of the bronchioles that causes acute onset of wheezing and dyspnea; asthma, which causes bronchospasms and inflammation of the bronchioles; and influenza, an acute, highly contagious viral infection of the respiratory tract.

8. Distinguish among pediatric infectious diseases. Pediatric infectious diseases include conjunctivitis, caused by a bacterial or viral infection; tonsillitis, typically caused by beta-hemolytic streptococci; fifth disease, also called erythema infectiousum, a mild infection caused by parvovirus B19; hand-foot-and-mouth disease, caused by the coxsackievirus, which causes multiple symptoms, including painful blisters on the tongue, mouth, palms of the hands, and soles of the feet; chickenpox, caused by a member of the herpes virus group; meningitis, an inflammation of the membranes that cover the brain and spinal cord, caused by bacteria or viruses (bacterial meningitis is the more dangerous); HBV, which can lead to serious and chronic infection of the liver and can be transmitted across the placenta; and Reye’s syndrome, which is linked with the use of aspirin during a viral illness.

9. Recognize the etiologic factors and signs and symptoms of the two primary pediatric inherited disorders. Pediatric inherited disorders include cystic fibrosis, an autosomal recessive genetic disorder that causes exocrine glands to produce abnormally thick secretions and primarily affects the lungs and pancreas; and Duchenne’s muscular dystrophy, an X-linked genetic disease that causes progressive muscle degeneration and subsequent replacement of muscle fibers with fat and fibrous connective tissue.

10. Summarize the immunizations recommended for children by the Centers for Disease Control and Prevention (CDC). The CDC’s recommendations for childhood immunization are summarized in Table 42-3.

11. Demonstrate how to document immunizations and maintain accurate immunization records. Procedure 42-1 summarizes how to document immunizations in both the official vaccination record and the parent’s immunization booklet. Documentation of immunization administration on the VIS form must include the date the vaccine was administered, the vaccine’s manufacturer, the manufacturer’s lot number, the type of vaccine, the route of administration and exact site if an injection is given, any reported or observed side effects, the name and title of the person administering the vaccine, the address of the medical office where the vaccine was administered, and the date.

12. Compare and contrast a well-child and a sick-child examination. Well-child visits are typically scheduled from age 2 weeks through 15 years to focus on maintaining the child’s health with physical examinations, immunizations, and upgrading of the child’s medical history record. Sick-child visits occur whenever the child needs to be seen because of illness or injury. Table 42-5 summarizes important questions for telephone screening of pediatric problems.

13. Outline the medical assistant’s role in a pediatric examination. The medical assistant assists the pediatrician with examinations; maintains patient histories; performs ordered screening tests, such as vision, hearing, urinalysis, and hemoglobin checks; administers immunizations; measures and weights children as needed; documents accurately; and provides support to patients and caregivers.

14. Measure the circumference of an infant’s head. Procedure 42-2 outlines the steps for measuring an infant’s head.

15. Obtain accurate length and weight measurements and plot pediatric growth patterns. Procedure 42-3 outlines the steps for measuring an infant’s length and weight.

16. Accurately measure pediatric vital signs and perform vision screening. Procedure 42-4 summarizes the steps for obtaining accurate pediatric vital signs and performing vision screening on a child. Tympa
thermometers are the easiest and quickest method for measuring temperature; the apical pulse should be taken for a full minute, respirations observed and recorded, and blood pressures taken with the appropriate-sized cuff when indicated. After patient education, the Snellen E chart is used to perform vision screening and to record results accurately.

17. Correctly apply a pediatric urine collection device.
   Procedure 42-5 summarizes the steps for applying a urinary collection device.


The medical assistant should be involved in parent education regarding injury prevention for children. Childhood injuries are linked to the child's growth and development level and therefore are often predictable and many times preventable.

19. Describe the characteristics and needs of the adolescent patient. Adolescents are going through extreme physical and emotional changes, and an extra measure of patience and understanding is required to establish therapeutic interactions. Ensuring their privacy, giving them the option of being seen without the parents, and providing pertinent education materials all are important factors in patient-centered adolescent care.

**CONNECTIONS**

- **Study Guide Connection**: Go to the Chapter 42 Study Guide. Read and complete the activities.
- **Evolve Connection**: Go to the Chapter 42 link at evolve.elsevier.com/review to complete the Chapter Review and Chapter Quiz. Peruse other resources listed for this chapter to increase your knowledge of Assisting in Pediatrics.