

BARBARA FADEM

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Behavioral Science

FOURTH EDITION

High-Yield™ Behavioral Science is designed to:

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- Help equip you for the behavioral science questions on the USMLE
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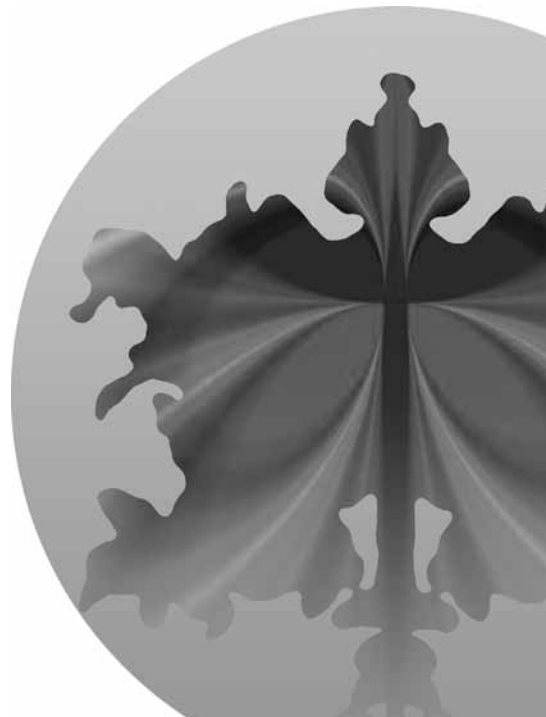
Behavioral Science

FOURTH EDITION

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Dedication

I dedicate this book to my son Daniel Fadem, the best father a mother can have, who has given me my greatest treasures.

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Preface

High-Yield Behavioral Science, fourth edition, is designed to provide medical students with a concise, clear presentation of a subject that encompasses developmental psychology, learning theory, psychopathology, sleep, substance-related disorders, human sexuality, social behavior, physician–patient relationships, health care delivery, medical ethics, epidemiology, and statistics. All of these topics commonly are tested on the USMLE Step 1. Because students are required to answer questions based on clinical descriptions, this book incorporates the “**Patient Snapshot**” feature. Designated by the icon , this feature is designed to provide memorable scenarios and pose specific questions about relevant topics and disorders. Annotated answers to and explanations of the snapshots appear at the end of each chapter.

Because of the limited time available to medical students, the information contained in these 24 chapters is presented in an outline format and includes many quick-access tables. Each chapter, patient snapshot, and table provides a pertinent piece of information to help students master the first major challenge in their medical education, Step 1 of the USMLE.

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Child Development

I Infancy: Birth to 15 Months



Patient Snapshot 1-1. A 10-month-old child, who was born full term and had an Apgar score of 5 one minute after birth, can lift his head while lying prone but does not roll over or sit alone. When approached by an unfamiliar person, he is friendly and smiles.

Are this child's motor skills and social behavior consistent with typical development?*(See Table 1-1.)

A. ATTACHMENT

1. **Formation of an intimate attachment** to the mother or primary caregiver is the principal psychological task of infancy.
2. **Separation from the mother or primary caregiver** results in initial protests, which may be followed by **signs of depression**, in which the infant becomes withdrawn and unresponsive.
3. **Children without proper mothering or attachment may** exhibit **reactive attachment disorder**, which includes
 - a. Developmental retardation
 - b. Poor health and growth
 - c. High death rates, despite adequate physical care
 - d. Indiscriminate attachments to strangers (in the disinhibited subtype of reactive attachment disorder)

B. PHYSICAL AND SOCIAL DEVELOPMENT

1. **Physical development**
 - a. Physical development proceeds in a **cephalocaudal and proximodistal order**. For example, children can control their heads before they can control their feet and can control their forearms before they can control their fingers (see Table 1-1).
 - b. **Reflexes** that are present at birth disappear during the first year of life. These reflexes include the **Moro** (extension of limbs when startled), **rooting** (nipple seeking), **palmar grasp** (grasping objects placed in the palm), and **Babinski** (dorsiflexion of the large toe when the plantar surface of the foot is stroked).
2. **Social development** proceeds from an internal to an external focus (Table 1-1).

C. INFANT MORBIDITY AND MORTALITY IN THE UNITED STATES

1. **Premature birth** is usually defined as less than 34-week gestation or birth weight less than 2,500 g. Prematurity places the child at risk for **delayed physical and**

*Answers to patient snapshots are found at the end of each chapter.

TABLE 1-1**MOTOR, SOCIAL, AND COGNITIVE CHARACTERISTICS OF THE INFANT**

Age (Months)	Motor Characteristics	Social and Cognitive Characteristics
0–2	<ul style="list-style-type: none"> Follows objects with the eyes 	<ul style="list-style-type: none"> Is comforted by hearing a voice or being picked up
2–3	<ul style="list-style-type: none"> Lifts head when lying prone and later also lifts shoulders 	<ul style="list-style-type: none"> Smiles (social smile) and vocalizes (coos) in response to human attention
4–6	<ul style="list-style-type: none"> Rolls over (5 mo) Can hold a sitting position unassisted (6 mo) Uses a no-thumb “raking” grasp 	<ul style="list-style-type: none"> Recognizes familiar people Forms attachment to the primary caregiver Repeats single sounds over and over (babbling)
7–11	<ul style="list-style-type: none"> Crawls Pulls himself up to stand Uses a thumb and forefinger grasp (pincer grasp) Transfers objects from hand to hand 	<ul style="list-style-type: none"> Shows discomfort and withdraws from unfamiliar people (stranger anxiety) Responds to simple instructions Uses gestures (e.g., waves good-bye)
12–15	<ul style="list-style-type: none"> Walks unassisted 	<ul style="list-style-type: none"> Maintains the mental image of an object without seeing it (object permanence) Is fearful when separated from primary figure of attachment (separation anxiety) Says first words

social development, emotional and behavioral problems, learning disabilities, and child abuse (see Chapter 19).

- a. Prematurity occurs in **about twice as many births to African American women as to white American women**.
 - b. Prematurity is associated with low socioeconomic status, teenage pregnancy, and poor maternal nutrition.
 - c. Premature birth is also associated with increased infant mortality.
- 2. Infant mortality** rate varies by ethnicity and averages **6.9 per 1,000 live births** (Table 1-2).
- a. The overall rate is improving but is still high compared with rates in other developed countries.
 - b. **The Apgar** (A[appearance] P[pulse] G[grimace] A[activity] R[respiration]) **score**, developed by Dr. Virginia Apgar, is useful for evaluating physical functioning in newborns (Table 1-3).

TABLE 1-2**INFANT MORTALITY IN THE UNITED STATES (2005)**

Ethnic Group	Infant Deaths per 1,000 Live Births
African American	13.9
White	5.8
Mexican American	5.6
Asian American	4.9
Overall	6.9

TABLE 1-3

THE APGAR SCORING SYSTEM

Measure	Score		
	0	1	2
Heartbeat	Absent	Slow (<100/min)	Rapid (>100/min)
Respiration	Absent	Irregular, slow	Good, crying
Muscle tone	Flaccid, limp	Weak, inactive	Strong, active
Color of body and extremities	Both body and extremities pale or blue	Pink body, blue extremities	Pink body, pink extremities
Reflexes, e.g., heel prick or nasal tickle	No response	Facial grimace	Foot withdrawal, cry, sneeze, cough

The infant is evaluated 1 minute and 5 (or 10) minutes after birth. Each of the five measures can have a score of 0, 1, or 2 (highest score = 10). Score >7 = no imminent survival threat; score <4 = imminent survival threat.

D. DEVELOPMENTAL THEORISTS

1. **Sigmund Freud** described development in terms of the parts of the body from which the most pleasure is derived at each age during development.
2. **Erik Erikson** described development in terms of “critical periods” for the achievement of social goals; if a specific goal is not achieved at a specific age, the individual will never achieve that goal.
3. **Jean Piaget** described development in terms of learning capabilities of the child at each age during development.
4. **Margaret Mahler** described early development as a sequential process of separation of the child from the mother or primary caregiver.
5. **Chess and Thomas** described endogenous differences among infants in **temperament**, including activity level, cyclic behavior patterns (e.g., sleeping), approaching or withdrawing from new stimuli, reactivity to stimuli, adaptability, responsiveness, mood, distractibility, and attention span. These differences in temperament remain stable throughout life.

II The Toddler Years: 16 Months–2½ Years



Patient Snapshot 1-2. An 18-month-old boy makes a tower using 3 blocks, climbs stairs using 1 foot at a time, and can say *mama*, *dada*, *cookie*, *bye-bye*, and a few other words. When told to copy a circle, he only makes a mark on the paper. His mother relates that he plays well with the babysitter as long as she (the mother) remains in the room. When the mother tries to leave, the child cries and refuses to stay with the babysitter.

Are this child’s motor skills and social behavior consistent with typical development? (See Table 1-4.)

A. ATTACHMENT

1. The major task of the second year of life is the **separation of the child from the mother** or primary caregiver.
2. Because of the close attachment between child and mother at this age, **hospitalized toddlers fear separation** from parents more than they fear bodily harm or pain.

B. PHYSICAL AND SOCIAL DEVELOPMENT

1. At approximately 2 years of age, a child is **half of his or her adult height**.
2. The **motor, social, and cognitive characteristics** of a toddler are listed in Table 1-4.

TABLE 1-4

MOTOR, SOCIAL, AND COGNITIVE CHARACTERISTICS OF THE CHILD 1½–3 YEARS OF AGE

Age (Years)	Motor Characteristics	Social and Cognitive Characteristics
1½	<ul style="list-style-type: none"> • Stacks 3 blocks • Throws a ball • Scribbles on paper • Climbs stairs one foot at a time 	<ul style="list-style-type: none"> • Moves away from and then toward the mother (rapprochement) • Uses about 10 words • Says own name
2	<ul style="list-style-type: none"> • Stacks 6 blocks • Kicks a ball • Undresses himself • Uses a spoon 	<ul style="list-style-type: none"> • Plays alongside other children (parallel play) • Uses about 250 words and 2-word sentences • Names body parts and uses pronouns • Favorite word is <i>No</i>
3	<ul style="list-style-type: none"> • Stacks 9 blocks • Rides a tricycle • Copies a circle • Can partially dress himself • Climbs stairs using alternate feet 	<ul style="list-style-type: none"> • Has sense of self as male or female (core gender identity) • Achieves toilet training • Can comfortably spend part of the day away from mother • Uses about 900 words and speaks in complete sentences • Identifies some colors

III The Preschooler: 3–6 Years



Patient Snapshot 1-3. A 4-year-old boy cannot undress or dress himself without help. He enjoys going to nursery school 2 days per week, where he plays next to but not cooperatively with his peers. He uses about 200 words in speech, usually in 1- or 2-word sentences. Are this child’s motor skills and behavior consistent with typical development? (See Table 1-5.)

A. ATTACHMENT

- 1. Separation.** At about 3 years of age, children are able to spend a portion of the day with adults other than their parents (e.g., in preschool).
- There is no evidence that daily separation from working parents in a good day care setting has long-term negative consequences for children.

TABLE 1-5

MOTOR, SOCIAL, AND COGNITIVE CHARACTERISTICS OF THE CHILD 4–6 YEARS OF AGE

Age (Years)	Motor Characteristics	Social and Cognitive Characteristics
4	<ul style="list-style-type: none"> • Creates simple drawing of a person • Buttons garments • Grooms self (e.g., brushes teeth) • Hops on one foot • Throws a ball • Copies a cross 	<ul style="list-style-type: none"> • Overconcern about illness and injury • Curiosity about sex (e.g., plays “doctor”) • Has nightmares and phobias • Has imaginary companions • Plays cooperatively with other children • Has good verbal self-expression
5	<ul style="list-style-type: none"> • Draws a person in detail • Skips using alternate feet • Copies a square 	<ul style="list-style-type: none"> • Rivalry with the same-sex parent for the affection of the opposite-sex parent (Oedipal conflict)
6	<ul style="list-style-type: none"> • Ties shoelaces • Rides a bicycle • Copies a triangle • Prints letters 	<ul style="list-style-type: none"> • Begins to develop moral values • Begins to understand the finality of death • Begins to read

3. **Death.** The child may not completely understand the meaning of death and may expect a friend, relative, or pet who has died to come back to life.

B. PHYSICAL AND SOCIAL CHARACTERISTICS of the preschooler are listed in Table 1-5.

IV School Age: 7–11 Years



Patient Snapshot 1-4. A 9-year-old boy tells his teacher that he wants to be just like his father when he grows up. He does well in school and enjoys collecting baseball cards and postage stamps. He plays goalie on a soccer team and is vigilant about observing the rules. All of his friends are boys, and he shows little interest in spending time with girls.

Are this child's motor skills and social behavior consistent with typical development? (See IV A and B.)

A. ATTACHMENT

1. **Involvement with people other than the parents**, including teachers, group leaders, and friends (especially same-sex friends), increases.
2. The **child identifies with the parent of the same sex**; psychosexual issues are dormant (Freud's latency stage).
3. Because school-age children cope with separation from parents and tolerate hospitalization relatively well, this is the **best age group for elective surgery**.
4. Children with ill or dying parents or siblings may respond by acting badly at school or at home (i.e., use of the defense mechanism of acting out; see Chapter 4).

B. PHYSICAL AND SOCIAL DEVELOPMENT

1. The child develops the ability to perform **complex motor tasks** (e.g., playing ball, riding a bike, skipping rope).
2. **Developmental theories of the social and cognitive characteristics** of the school-age child are listed in Table 1-6.

TABLE 1-6

DEVELOPMENTAL THEORIES OF THE SOCIAL AND COGNITIVE CHARACTERISTICS OF SCHOOL-AGE CHILDREN

Developmental Theorist	Theory	Social and Cognitive Characteristics
Erikson	Stage of industry vs inferiority	The child is either industrious, organized, and accomplished or feels incompetent in his or her interactions with the world
Freud	Development of the superego	The child develops a moral sense of right and wrong and learns to follow rules
Piaget	Stage of concrete operations	The child develops the capacity for logical thought; child can determine that objects have more than one property (e.g., an object can be red and metal)
	Concept of conservation	The child understands that the quantity of a substance remains the same regardless of the size of the container it is in (e.g., the amount of water is the same whether it is in a tall, thin tube or a short, wide bowl)

Answers to Patient Snapshot Questions

1-1. This child's motor skills and behavior are not consistent with typical development. At 10 months of age, most typical infants can sit unassisted and crawl on hands and knees. In contrast to this child who does not seem to distinguish between familiar and unfamiliar people, they are also likely to show "stranger anxiety" when approached by an unfamiliar person. It is of interest that this child also showed a relatively low Apgar score at birth.

1-2. This child's motor skills and behavior are consistent with typical development. At 18 months of age, children can stack 3 blocks, climb stairs using 1 foot at a time, and say a few single words. They cannot yet copy shapes. They also show separation anxiety when left by the primary caregiver.

1-3. This child's motor skills and behavior are not consistent with typical development. At 4 years of age, children can dress and undress by themselves. They can play cooperatively with other children and use at least 900 words in speech using complete sentences.

1-4. This child's motor skills and behavior are consistent with typical development. At 9 years of age, children identify with the parent of the same sex and want to be like that parent. They enjoy having collections of objects, have developed a sense of morality, and are very conscious of following the rules.

Adolescence and Adulthood

I Adolescence: 11–20 Years



Patient Snapshot 2-1. A 16-year-old boy, who has a long-standing and good relationship with his family physician, tells the physician that he occasionally smokes cigarettes and drinks beer on weekends with his friends. He also says that he masturbates almost every day. He is doing well in school and is the captain of the school baseball team.

Is this teenager's behavior consistent with typical adolescent development? Should the physician intervene? And if so, how? (See I A and B.)

A. EARLY ADOLESCENCE (11–14 YEARS)

1. Puberty is marked by
 - a. **Onset of menstruation** (menarche) in girls, which on average begins at 11–14 years of age
 - b. **First ejaculation** in boys, which on average occurs at 12–15 years of age
 - c. **Cognitive growth and formation of the personality**
 - d. **Sex drives**, which are released through **masturbation** and **physical activity**; daily masturbation is normal.
2. **Alterations in expected patterns of development** (e.g., acne, obesity, late breast development) may lead to psychological problems.

B. MIDDLE ADOLESCENCE (14–17 YEARS)

1. There is a preoccupation with **gender roles, body image, and popularity**.
2. Love for unattainable people (“crushes”) and **preference for spending time with friends** rather than family are common.
3. **Homosexual experiences** may occur. Although parents may become alarmed, these experiences are part of **typical development**.
4. **Risk-taking behavior** (e.g., smoking, drug use) may occur. The physician should provide education about short-term consequences (e.g., “Smoking will discolor your teeth.”) rather than threats of long-term consequences (e.g., “You will develop lung cancer.”) to more effectively alter this behavior.
5. Adolescents resist being different from their peers, which can also lead to non-adherence to medical advice and management.

C. LATE ADOLESCENCE (17–20 YEARS)

1. Development.
 - a. **Adolescents show further development of morals**, ethics, self-control, and concerns about humanitarian issues and world problems.
 - b. Some adolescents, but not all, develop the ability for abstract reasoning (**Piaget's stage of formal operations**).

2. Questions about one's identity (i.e., an "**identity crisis**") commonly develop.
 - a. If the identity crisis is not handled effectively, adolescents may show **role confusion** in which they do not know where they belong in the world.
 - b. With role confusion, adolescents may display behavioral abnormalities with **criminality** or an interest in **cults**.

D. TEENAGE SEXUALITY AND PREGNANCY

1. Sexuality

- a. In the United States, **first sexual intercourse** on average occurs at 16 years of age; by 19 years of age, most men and women have had sexual intercourse. Fewer than half of sexually active teenagers regularly use contraceptive measures.
- b. Physicians may counsel minors, provide them with contraceptives, and treat them for sexually transmitted diseases problems of pregnancy, and substance abuse **without parental knowledge or consent** (see also Chapter 22).

2. Pregnancy

- a. American teenagers give birth to approximately half a million infants and have approximately half a million abortions annually.
- b. **Predisposing factors** to teenage pregnancy include depression, low academic achievement and goals, poor planning for the future, and having divorced parents.
- c. **Abortion** is legal in the United States, but parental notification or consent is required in most states.
- d. **Pregnant teenagers** are at high risk for **obstetric complications** because they are less likely to get prenatal care and because they are physically immature.

II Early Adulthood: 20–40 Years



Patient Snapshot 2-2. A 27-year-old married woman develops a sad and tearful mood the day after a normal delivery of a healthy girl. She tells the doctor that she feels intermittently sad and tearful for no apparent reason, but she appears well groomed and relates that she enjoys visits from friends and relatives. Five days later, the tearfulness has disappeared, she is happily caring for her baby, and she feels "like her old self again."

What has this woman experienced and is her emotional response within normal limits? (See II B 2 c.)

A. CHARACTERISTICS

1. The adult's **role in society is defined**, physical development peaks, and the adult develops independence.
2. At approximately **30 years of age**, there is a **period of reappraisal** of one's life.

B. STARTING A NEW FAMILY

1. Marriage

- a. Marriage or another type of intimate (e.g., close, sexual) relationship occurs (Erikson's **stage of intimacy versus isolation**).
- b. By 30 years of age, most Americans are married and have children.

2. Having children

- a. **Normal (vaginal) birth.** Women who are educated about what to expect in childbirth have shorter labors and better initial relationships with their infants.
- b. **Cesarean births** have recently increased and now make up about 32% of all births in the United States.

Reaction	Incidence (%)	Characteristics	Physician Intervention
Postpartum “blues”	33–50	<ul style="list-style-type: none"> • Feelings of sadness and tearfulness • Symptoms last up to 2 wk after delivery • Grooming is normal 	<ul style="list-style-type: none"> • Support • Practical advice about child care
Major depression (with postpartum onset)	5–10	<ul style="list-style-type: none"> • Feelings of hopelessness and helplessness • Lack of pleasure or interest in usual activities • Lack of grooming • Symptoms usually begin within 4 wk after delivery 	<ul style="list-style-type: none"> • Antidepressant medication • Frequent scheduled visits • Antipsychotic medication and hospitalization if delusions are present (“mood disorder with psychotic features”)
Brief psychotic disorder (with postpartum onset)	0.1–0.2	<ul style="list-style-type: none"> • Hallucinations and/or delusions without depression • Symptoms usually begin within 4 wk after delivery 	<ul style="list-style-type: none"> • Antipsychotic medication • Hospitalization

- c. **Postpartum reactions.** Many women have negative emotional reactions after childbirth. These reactions include postpartum “blues,” or “baby blues” (considered within the normal range of emotions) as well as major depression and psychosis (both considered abnormal) (Table 2-1).
- d. **Adoption.** An adoptive parent is one who voluntarily becomes the legal parent of a child who is not his or her genetic offspring. Children should be told that they are adopted as soon as they understand language and at the **earliest age possible**.

III Middle Adulthood: 40–65 Years



Patient Snapshot 2-3. A successful 50-year-old engineer tells her internist that she just bought an expensive sports car. In explaining her purchase she says, “I realized that I better get the things I’ve always wanted now, because I’m not getting any younger.”

Is this woman’s emotional response commonly seen in people of her age group? (See III B 1.)

A. CHARACTERISTICS

1. The midlife adult possesses more **power** and **authority** than at other life stages.
2. The individual either maintains a continued sense of productivity or develops a sense of emptiness (Erikson’s stage of **generativity vs stagnation**).

B. RELATIONSHIPS

1. Many men and some women in their middle forties or early fifties exhibit a “**midlife crisis**,” which may include
 - a. A change in profession or lifestyle
 - b. Infidelity, separation, or divorce
 - c. Increased use of alcohol or drugs
 - d. Depression
2. The midlife crisis is associated with an **awareness of one’s own aging and mortality** and severe or unexpected lifestyle changes (e.g., death of a spouse, loss of job, serious illness).

- C. THE CLIMACTERIUM** is the **diminution in physiological function that occurs during midlife.**
1. In men, bioavailable testosterone levels decrease and decrease in muscle strength, endurance, and sexual performance occurs. Unless testosterone levels are well below normal, however, treatment with testosterone is rarely helpful in restoring lost sexual function.
 2. In **women, menopause** occurs.
 - a. The ovaries stop functioning, and menstruation stops at about age 50.
 - b. Most women experience menopause with relatively few physical or psychological problems.
 - c. Vasomotor instability, **or hot flashes (or flushes)**, is a common physical problem seen in women in all cultures and countries.
 - d. Use of contraceptive measures should continue for 1 year after the last menstrual period.

Answers to Patient Snapshot Questions

2-1. This teenager's behavior is consistent with that of a typical 16-year-old. Teenagers of this age often experiment with smoking and drinking alcohol. Daily masturbation is normal. It is unlikely that this teenager has a problem with substance abuse, because he is doing well in school and in extracurricular activities. Although the parents do not have to be informed about his behavior (see Chapter 22), the physician should see this teenager on a regular basis to follow him and counsel him about risk-taking behavior.

2-2. This woman is experiencing the postpartum "blues," or the "baby blues," a normal reaction following delivery. The baby blues include sad feelings and crying; it lasts a few days to 2 weeks after delivery and usually resolves without medical intervention.

2-3. The emotional response, or "midlife crisis," seen in this patient is commonly seen in people of her age group. She is aware of her own aging and mortality and is seeking to realize her desires while she is still able to do so.

Aging, Death, and Bereavement

I Aging



Patient Snapshot 3-1. An 81-year-old woman appears alert and well groomed. She tells her physician that she needs some help with food shopping and house cleaning, but cooks for herself and feels that she functions well living on her own. The woman notes that she has three acquaintances with whom she plays cards weekly and, although she always remembers family members' birthdays, she occasionally forgets the birthdays of the other card players.

Is this woman's level of functioning and behavior consistent with typical aging? (See I C.)

A. DEMOGRAPHICS

1. More than **15% of the US** population will be **older than 65** years by the year 2020.
2. The **fastest growing age group** in the population is those **older than age 85**.
3. The **average life expectancy** in the United States is about 77 years.
 - a. Life expectancies vary by race and gender (Table 3-1).
 - b. Because men and African Americans are living longer, the differences in life expectancy between gender and ethnic groups are decreasing.

B. PHYSICAL CHANGES

1. **Physical changes** associated with aging include
 - a. Impaired vision, hearing, bladder control, and immune responses
 - b. Decreased renal, pulmonary, and gastrointestinal function; decreased muscle mass and strength
 - c. Increased fat deposits
 - d. Osteoporosis
2. **Brain changes** include decreased cerebral blood flow and brain weight, enlarged ventricles and sulci, and increased presence of amyloid plaques and neurofibrillary tangles (even in the normally aging brain).

C. PSYCHOLOGICAL CHANGES

1. Although learning speed may decrease and some memory lapses may occur, in the absence of a dementing illness, **intelligence remains approximately the same throughout life**.
2. The mild memory problems of typical aging do not interfere with social functioning or self-care.
3. The elderly experience Erikson's stage of **ego-integrity versus despair**. Individuals are either satisfied and proud of their accomplishments or they experience a sense of worthlessness. Most people achieve ego-integrity in their old age.

TABLE 3-1

LIFE EXPECTANCY (IN YEARS) AT BIRTH IN THE UNITED STATES BY SEX AND ETHNICITY (2005–2006)

	African American	White	All
Men	69.5	75.7	75.2
Women	76.5	80.8	80.4

D. PSYCHOPATHOLOGY IN THE ELDERLY

1. **Depression** is the **most common psychiatric disorder** in the elderly.
 - a. Factors associated with depression in the elderly include biological factors such as decline of vision and hearing as well as social factors such as **loss of spouse, family members, and friends and loss of prestige**.
 - b. Depression **may mimic (and thus be misdiagnosed as) Alzheimer disease (pseudodementia)**, because depression in the elderly is associated with memory loss and cognitive problems.
 - c. Depression can be treated successfully with psychotherapy, pharmacotherapy, and electroconvulsive therapy.
2. **Sleep patterns change**, resulting in loss of sleep, poor sleep quality, or both (see Chapter 7).
3. **Anxiety** may be associated with insecurity and anxiety-inducing situations such as physical illness.
4. **Alcohol-related disorders** are present in 10%–15% of the elderly population but are often not identified.
5. **Psychoactive drugs** may produce different effects in the elderly than in younger patients.

E. LONGEVITY has been associated with many factors, including

1. Family history of longevity
2. Continuation of occupational and physical activity
3. Higher education
4. Social support systems, including marriage



Dying, Death, and Bereavement



Patient Snapshot 3-2. A 78-year-old man whose wife died 6 months ago presents to his physician for an annual physical examination. He is unshaven, and his clothes are dirty. He tells his physician that he cries many times during the day when he thinks about his wife and feels that it is “all his fault” that she did not get to the hospital in time for her life to be saved. The patient has little interest in food or social activities. Physical examination is unremarkable except for a 25-lb weight loss.

Is this man’s emotional response to the loss of his wife within the normal range? Should the physician intervene? And if so, how? (See Table 3-2.)

- A. **STAGES OF DYING.** According to **Elizabeth Kubler-Ross**, the process of dying involves **5 stages** that usually occur in the following order. However, they may also occur simultaneously or in another order.
 1. **Denial.** The patient refuses to believe that she is dying (“The lab test was wrong”).
 2. **Anger.** The patient’s anger may become displaced onto the physician and/or hospital staff (“You should have made me come in more often”).

TABLE 3-2**CHARACTERISTICS OF BEREAVEMENT (NORMAL GRIEF) AND DEPRESSION (ABNORMAL GRIEF OR COMPLICATED BEREAVEMENT)**

Bereavement	Depression
Minor sleep disturbances	Significant sleep disturbances
Mild guilty feelings	Intense feelings of guilt and worthlessness
Illusions	Hallucinations or delusions
Crying and expressions of sadness	Suicidal ideas or attempts
Minor weight loss (<5 lb)	Significant weight loss (>5% of body weight)
Good grooming and hygiene	Poor grooming
Attempts to return to normal routine	Few attempts to return to normal routine
Severe symptoms subside in <2 mo	Severe symptoms continue for >2 mo
Moderate symptoms subside in <1 y	Moderate symptoms persist for >1 y
Management includes increased contact with the physician, support groups, and counseling; short-acting sedatives for sleep if needed	Management includes antidepressants, increased contact with the physician, support groups, and antipsychotics, or electroconvulsive therapy

3. **Bargaining.** The patient may try to strike a bargain with God or other higher being (“I promise to go to church every day if I can get rid of this disease”).
4. **Depression.** The patient becomes preoccupied with death and may become emotionally detached (“I feel so hopeless and helpless”).
5. **Acceptance.** The patient is calm and accepts his or her fate (“I have made my peace and am ready to die”).

B. BEREAVEMENT (NORMAL GRIEF) VERSUS DEPRESSION (ABNORMAL GRIEF).

After the loss of a loved one, loss of a body part, abortion, or miscarriage, or diagnosis of a terminal illness, there is a normal grief reaction that must be distinguished from depression, which is pathological (Table 3-2).

Answers to Patient Snapshot Questions

3-1. This 81-year-old woman’s ability to care for herself is consistent with typical aging. Memory lapses, such as she describes, commonly occur in aging people but do not interfere with social functioning or self-care.

3-2. This 78-year-old man demonstrates depression, an abnormal grief response. He is showing poor self-care, little interest in food leading to significant weight loss, intense guilt, and no interest in social activities. Even though some sadness is normal 6 months after the loss of a spouse, this man should be showing some attempts to get back to his former lifestyle but is not. The man should be seen by the physician on an ongoing basis, treated with antidepressants, and assessed regularly for the presence of suicidal ideas or plans.

Psychodynamic Theory and Defense Mechanisms



Patient Snapshot 4-1. A female patient who has unacknowledged anger toward her physician because he was late for her last appointment compliments him effusively on the decor of his office.

What defense mechanism is this patient using to deal with her unconscious angry feelings toward her physician? (See Table 4-2.)

I Freud's Theories of the Mind

Psychoanalytic theory is based on Sigmund Freud's concept that forces motivating behavior derive from dynamic (active) but unconscious mental processes. Psychoanalysis and related therapies are treatment techniques based on this concept. Freud's major theories of the mind follow.

A. TOPOGRAPHIC THEORY OF THE MIND

1. The **unconscious mind** contains **repressed thoughts and feelings**, which are unavailable to the conscious mind.
 - a. **Primary process** is a type of thinking that is associated with **primitive drives, wish fulfillment, and pleasure** and does not involve logic or time.
 - b. **Dreams** represent gratification of unconscious instinctual impulses and wish fulfillment.
2. The **preconscious mind** contains memories that, although not readily available, can be accessed by the conscious mind.
3. The **conscious mind** contains thoughts that a person is currently aware of, but it does not have access to the unconscious mind.

B. STRUCTURAL THEORY OF THE MIND. The three parts of the mind—the **id**, **ego**, and **superego**—operate primarily on an unconscious level (Table 4-1).

II Psychoanalysis and Related Therapies

A. OVERVIEW

1. Psychoanalysis and related therapies (e.g., brief dynamic psychotherapy) are **treatment techniques based on Freud's theories** of the unconscious mind and defense mechanisms.
2. The main strategy of these therapies is to **uncover and then integrate repressed unconscious memories** into the individual's current life.

TABLE 4-1

THE THREE PARTS OF THE MIND

Structural Component	Age at Which It Develops	Characteristics
Id	Is present at birth	<ul style="list-style-type: none"> • Represents instinctive sexual and aggressive drives • Wants pleasure immediately • Is not influenced by external reality
Ego	Begins to develop at birth	<ul style="list-style-type: none"> • Controls the id in order to adapt to the outside world • Sustains satisfying interpersonal relationships • Uses reality testing to maintain a sense of the body and outside world
Superego	Begins to develop at about age 6 y	<ul style="list-style-type: none"> • Controls the id • Is associated with moral values, conscience and empathy













3. Psychoanalysis is most appropriate for those who are younger than 40 years, intelligent, and not psychotic, and who have good relationships with others, stable life situations, and the time and money for this treatment. A typical regimen of psychoanalysis involves 1-hour sessions conducted 4–5 times a week for 3–4 years.
 4. In **brief or short-term dynamic psychotherapy**, the patient is helped to deal with his or her defense mechanisms and transference reactions during 12–40 weekly sessions.
- B. TECHNIQUES.** These therapies include **free association** (in which the patient says whatever comes to mind), **dream interpretation**, and **analysis of transference reactions**.
1. **Transference reactions** occur when the patient's unconscious feelings from the past about his or her parents (or other important persons) are experienced in the present relationship with the therapist. In psychoanalysis, these reactions are identified and analyzed.
 2. **Countertransference reactions** occur when the therapist unconsciously reexperiences feelings about his or her parents (or other important persons) with the patient. These reactions must be identified because they can alter the therapist's judgment.

III Defense Mechanisms





- A. DEFINITION.** Defense mechanisms are **unconscious mental techniques** used by the ego to keep conflicts out of consciousness, thus decreasing anxiety and maintaining the individual's sense of safety, equilibrium, and self-esteem.
- B. CLASSIFICATION** (Table 4-2)
1. **Less mature defense mechanisms** (e.g., acting out, regression, splitting) are manifestations of childlike or disturbed behavior and often are associated with negative social consequences.
 2. **Mature defense mechanisms** (e.g., altruism, humor, sublimation, and suppression) are manifestations that are adaptive to a typical, healthy adult life and are unlikely to have negative social consequences.

TABLE 4-2

DEFENSE MECHANISMS (IN ALPHABETICAL ORDER)

Defense Mechanism	Explanation	Patient Snapshots
Acting out	Avoiding personally unacceptable feelings by behaving in an attention-getting, often socially inappropriate, manner	 A teenager with a terminally ill younger sibling begins to do poorly at school and to argue with her parents at home
Altruism	Unselfishly assisting others to avoid negative personal feelings	 A woman with a poor self-image works in a homeless shelter on her day off from her regular job
Denial	Not believing personally intolerable facts about reality	 Despite the fact that he has just had a myocardial infarction, a 54-year-old man does pushups on the floor of the intensive care unit
Displacement	Transfer of emotions from a personally unacceptable situation to one that is personally tolerable	 A resident who is unconsciously angry at his ill mother is impatient with his elderly female patients
Dissociation	Mentally separating out a part of one's personality	 A woman who was sexually abused as a child "zones out" when she is under stress
Humor	Expression of feeling without causing discomfort	 A man who is extremely overweight makes jokes about obese people
Identification	Unconsciously patterning one's behavior after that of someone who is more powerful	 A man who was physically abused as a child abuses his own children
Intellectualization	Using the mind's higher functions to avoid experiencing uncomfortable emotions	 A physician who has received a diagnosis of malignant melanoma excessively discusses the statistics of the illness with her colleagues and family
Projection	Attributing one's own personally unacceptable feelings to others	 A man who has sexual feelings for his brother's wife begins to believe that his own wife is cheating on him
Rationalization	Seemingly reasonable explanations are given for unacceptable or irrational feelings	 A student who fails a final exam says it was not an important course anyway
Reaction formation	Unacceptable feelings are denied, and opposite attitudes and behavior are adopted; unconscious hypocrisy	 A woman who unconsciously is resentful of the responsibilities of child care often buys her children expensive toys and gifts
Regression	Childlike patterns of behavior appear under stress	 A hospitalized 48-year-old patient insists that he will only eat French fries and ice cream

(Continued)

TABLE 4-2		DEFENSE MECHANISMS (IN ALPHABETICAL ORDER) (Continued)
Defense Mechanism	Explanation	Patient Snapshots
Splitting	Believing people or events are either all bad or all good because of intolerance of ambiguity	 A woman who believed her physician was godlike begins to think he is a terrible person after he is late for an appointment with her
Sublimation	An unconscious, unacceptable impulse is rerouted in a socially acceptable way	 A man who is angry at his boss plays a hard game of racquetball
Suppression	Unwanted feelings are consciously put aside but not repressed	 A breast cancer patient decides that she will worry about her illness for only 10 min per d
Undoing	Believing that one can magically reverse negative past events caused by "incorrect" behavior by now adopting "correct" behavior or by atonement or confession	 A woman who is terminally ill with lung cancer caused by smoking stops smoking and starts a healthful diet and exercise program

Answer to Patient Snapshot Question

4-1. This woman is using the defense mechanism of reaction formation. She does not accept nor is she consciously aware of her anger toward her doctor. Instead she is more complimentary to him than might be expected.

Learning Theory and Behavioral Medicine

I Overview

- A. **LEARNING** is the **acquisition** of new behavior **patterns**.
- B. **METHODS** of learning include **habituation** and **sensitization** as well as **classical conditioning** and **operant conditioning**. These methods form the basis of several behavioral management techniques.

II Habituation and Sensitization



Patient Snapshot 5-1. A medical student working in the office of a pediatrician notices that 2 children respond quite differently to repeated needle sticks. A 3-month-old girl who receives daily heel sticks to monitor her blood disorder stops withdrawing her foot after she has had her heel stuck 10 times. In contrast, a 3-year-old boy who receives weekly allergy injections cries more and more with each injection.

What aspects of learning are responsible for the behavior of these two children? (See II A and B.)

- A. **HABITUATION** results when repeated stimulation results in a decreased response.
- B. **SENSITIZATION** results when repeated stimulation results in an increased response.

III Classical Conditioning



Patient Snapshot 5-2. A 2-year-old child is brought to the physician's office for a measles immunization. He cries when he receives the injection from the nurse. The following month the child cries when he sees the same nurse in the physician's office, even though he does not receive an injection. After five subsequent visits with no injections, the child no longer cries when he sees the nurse.

What aspects of learning are responsible for this child's behavior? (See III A–C.)

- A. **PRINCIPLES.** In classical conditioning, a **natural**, or **reflexive**, **response** (e.g., crying) is elicited by a **learned stimulus** (e.g., the sight of the nurse).
- B. **ELEMENTS**
 1. An **unconditioned stimulus** is a stimulus that automatically produces a response (e.g., the injection).
 2. An **unconditioned response** is a natural, reflexive behavior that does not have to be learned (e.g., crying in response to the injection).

3. A **conditioned stimulus** is a neutral stimulus that produces a response following learning (e.g., the sight of the nurse the following month).
4. A **conditioned response** is a behavior that is learned by an association made between a neutral stimulus and an unconditioned stimulus (e.g., crying when seeing the nurse the following month).

C. RESPONSE ACQUISITION AND EXTINCTION

1. In **acquisition**, the conditioned response (e.g., crying in response to the sight of the nurse) is learned.
2. In **extinction**, the conditioned response decreases if the conditioned stimulus (e.g., the sight of the nurse) is not paired with the unconditioned stimulus (e.g., the injection).
3. In **stimulus generalization**, a new stimulus (e.g., the sight of anyone in white clothing) that resembles the conditioned stimulus (e.g., the sight of the nurse) results in the conditioned response (e.g., crying).

D. RELATED CONCEPTS

1. **Aversive conditioning.** An unwanted behavior (e.g., drinking alcohol) is paired with a painful or aversive stimulus (e.g., medication that causes nausea). Ideally, this pairing creates an association between the unwanted behavior and the aversive stimulus and alcohol drinking ceases.



Patient Snapshot 5-3. A 66-year-old man in the ICU who has had a stroke learns that he cannot communicate his discomfort to his caregivers when he receives painful or uncomfortable treatment. The man then becomes depressed and shows no reaction when faced with any new aversive stimulus.

What is the nature of this type of learning?

2. Learned helplessness

- a. Through classical conditioning, an individual learns that he or she **cannot escape** a painful or difficult stimulus or situation. The individual then **becomes** hopeless and apathetic when faced with any new aversive stimulus or situation. This is learned helplessness.
- b. Learned helplessness has been used as a model system for the development of **depression**.

IV

Operant Conditioning



Patient Snapshot 5-4. A mother wants her 10-year-old daughter to get better grades in school.

How can the mother achieve this goal using the elements of operant conditioning—that is, positive reinforcement, negative reinforcement, punishment, or extinction? (See Table 5-1.)

A. PRINCIPLES

1. **Behavior is determined by its consequences** for the individual. The consequence occurs immediately following a behavior.
2. In operant conditioning, **a behavior that is not part of the individual's natural repertoire can be learned** through **reward** or **punishment**.

B. ELEMENTS (Table 5-1)

1. The likelihood that a behavior will occur is increased by reward (**i.e., reinforcement**) and decreased by **punishment or extinction**.

TABLE 5-1

ELEMENTS OF OPERANT CONDITIONING

Element	Effect on Behavior	Example	Comment
Positive reinforcement	Behavior is increased by reward	Child increases her studying behavior to get money by earning good grades in school	Reward or reinforcement (money) increases the desired behavior (studying); a reward can be attention as well as a tangible reward such as money
Negative reinforcement	Behavior is increased by avoidance or escape from aversion	Child increases her studying behavior to avoid being scolded	Active avoidance of an aversive stimulus (being scolded) increases desired behavior (studying)
Punishment	Behavior is decreased by aversion	Child decreases her "fooling around" behavior (when she should be studying) after her mother scolds her	Delivery of an unpleasant stimulus (scolding) decreases unwanted behavior (fooling around)
Extinction	Behavior is eliminated by nonreinforcement	Child stops her "fooling around" behavior when the behavior is ignored by her mother	Although there may be an initial increase in "fooling around" behavior before it disappears, extinction is more effective than punishment for long-term reduction in unwanted behavior

- a. **Types of reinforcement**
 - i. **Positive reinforcement** (reward) is the introduction of a positive (i.e., desired) stimulus that increases the rate of behavior.
 - ii. **Negative reinforcement** (escape) is the removal of an aversive (i.e., unpleasant) stimulus that increases the rate of behavior.
 - b. **Punishment** is the introduction of an aversive stimulus **aimed at reducing the rate of an unwanted behavior**.
 - c. **Extinction** in operant conditioning is the gradual disappearance of a learned behavior when reinforcement is reduced.
2. The **pattern, or schedule, of reinforcement** affects how quickly a behavior is learned and how long a behavior lasts even though it is not rewarded (resistance to extinction). For example, rewarding children every time they pick up their toys (continuous reinforcement) leads to fast learning. However, children stop picking up their toys as soon as the rewards cease (the new neatness behavior is not resistant to extinction) (Table 5-2).

C. RELATED CONCEPTS

1. **Shaping** involves rewarding closer and closer approximations of the wanted behavior until the correct behavior is achieved. For example, a child who is told to pick up his or her toys is rewarded initially for picking up only one toy, and eventually learns to pick up all of them.
2. **Modeling** is a type of observational learning. For example, a medical student learns to conduct a physical in a manner similar to that of a resident whom she admires.

TABLE 5-2

SCHEDULE OF REINFORCEMENT

Schedule	Reinforcement Presented	Example	Comments
Continuous	After every response	Receiving candy from a vending machine	Least resistant to extinction; response is quickly learned but disappears rapidly without reinforcement
Fixed ratio	After a designated number of responses	Getting paid for sewing 10 shirts	Fast response rate (e.g., many shirts are sewn quickly)
Fixed interval	After a designated amount of time	Studying for regularly scheduled, weekly quizzes	Response rate increases toward the end of the interval
Variable ratio	After a random and unpredictable number of responses	Getting a payoff on a slot machine	Highly resistant to extinction; response persists with little or no reinforcement
Variable interval	After a random and unpredictable amount of time	Catching fish in a lake by keeping the lure in the water	Highly resistant to extinction; response persists with little or no reinforcement

V Application of Behavioral Techniques to Medicine



Patient Snapshot 5-5. A 40-year-old man who is afraid of flying is put into a relaxed state and then is shown a photograph of an airplane. The next day while relaxed, he is shown a scale model of an airplane. One week later, he can sit calmly in the cabin of an airplane and 2 weeks later he takes an airplane ride without fear.

What behavioral technique has been used here to treat this man's fear of flying? (See V A.)

A. SYSTEMATIC DESENSITIZATION

1. **Principles.** Systematic desensitization is a behavioral technique based on classical conditioning. It is used to **eliminate phobias** (irrational fears).
2. **Method**
 - a. An individual is exposed to the frightening stimulus in increasing doses in conjunction with relaxation procedures.
 - b. Because relaxation is incompatible with fear, the relaxed patient is less likely to be anxious when the frightening stimulus is presented.

B. TOKEN ECONOMY

1. A **desired behavior is "paid for"** with a token reward (i.e., a positive reinforcer).
2. Used in **mental hospitals** and in working with the **mentally retarded**, tokens are later exchanged for desired objects (e.g., candy, movies).

C. COGNITIVE-BEHAVIORAL THERAPY

1. **Definition.** Cognitive therapy is a method of short-term psychotherapy (up to 25 weeks) that uses behavioral techniques and deals with depression and anxiety. It is also useful in eating and substance use disorders.
2. **Method.** A patient's distorted, negative way of thinking is reorganized and substituted with self-enhancing thoughts.

D. BIOFEEDBACK

1. **Principles.** Biofeedback involves learning to gain control over measurable physiological parameters; it is based on the principles of operant conditioning and requires a high degree of **motivation** and **practice**.
2. **Therapeutic uses.** Biofeedback is used to treat hypertension, peptic ulcer disease, asthma, migraine and tension headaches, Raynaud disease, fecal incontinence, and temporomandibular joint pain. It is also used to treat attention deficit/hyperactivity and generalized anxiety disorders.

Answers to Patient Snapshot Questions

5-1. The 3-month-old girl who stops withdrawing her foot after repeated needle sticks is showing habituation, while the 3-year-old boy who cries more and more with each injection is showing sensitization.

5-2. This child cries even when he does not get an injection because he has learned through classical conditioning to associate the nurse (the conditioned stimulus) with the injection needle and pain (the unconditioned stimulus). However, after 5 weeks of seeing the nurse and not receiving a painful injection, extinction has occurred, and the conditioned response (i.e., crying when he sees the nurse) has disappeared.

5-3. This patient shows the phenomenon of learned helplessness. As he cannot communicate or escape painful situations, the patient has become hopeless and apathetic (i.e., depressed) when faced with any new aversive treatment.

5-4. This snapshot is explained in the text of Table 5-1.

5-5. The behavioral technique used to treat this man's fear of flying is systematic desensitization. He is exposed to flying while relaxed. Because relaxation is incompatible with fear, he then is less anxious when exposed to airplanes and flying.

Substance-Related Disorders

I Overview of Substance-Related Disorders



Patient Snapshot 6-1. A 23-year-old man is brought to the emergency room by the police after causing a disturbance in a shopping mall. The patient tells the physician that he is “on top of the world” and is communicating mentally with the president of the United States. One hour later, the patient is very quiet, shows little response to the physician’s presence, and seems depressed.

If this patient’s behavior is due to use of a substance, which substance is most likely to be involved? (See Table 6-2.)

- A. **DEMOGRAPHICS.** Caffeine, nicotine, alcohol, marijuana, cocaine, and heroin are the most commonly used substances in the United States (Table 6-1). Barbiturates as well as over-the-counter stimulants and sedative or opioid prescription medications are also commonly used and abused (see below).
- B. **SUBSTANCE USE DISORDERS: SUBSTANCE DEPENDENCE AND SUBSTANCE ABUSE**
 - 1. **Substance dependence** is a maladaptive pattern of substance use leading to **impairment** of social, physical, or occupational functioning that results in **tolerance, dependence, or both**.
 - a. **Tolerance** is the need for increased amounts of a substance to gain the desired effect; **Cross-tolerance** occurs when tolerance develops to one substance as the result of use of another substance.
 - b. **Dependence** is a pattern of compulsive use of a substance plus tolerance and withdrawal symptoms. The effects of use and withdrawal of substances are listed in Table 6-2.
 - 2. **Substance abuse** is a recurrent and persistent maladaptive pattern of substance use leading to impairment of social, physical, or occupational functioning.
In contrast to substance dependence, substance abuse
 - a. Does not include tolerance, dependence, or withdrawal symptoms
 - b. Does not include a pattern of compulsive use
 - c. Is not diagnosed if the patient meets the criteria for substance dependence

II Neurotransmitter Associations

- A. **STIMULANTS** work primarily by increasing the availability of **dopamine** and **glutamate**.
 - 1. Amphetamine use causes the release of dopamine. Cocaine blocks the reuptake of dopamine. Nicotine promotes glutamate release.

TABLE 6-1

DEMOGRAPHICS AND CHARACTERISTICS OF COMMONLY USED SUBSTANCES IN THE UNITED STATES

Substance (Lifetime Prevalence, Nonclinical Use)	Comments
Alcohol (85%)	<ul style="list-style-type: none"> • 10%–13% lifetime prevalence of abuse or dependence • Increased use among Native Americans • 2:1 male-to-female ratio of abuse • Associated with automobile accidents, homicide, suicide, rape, child physical and sexual abuse, partner and elder abuse, childhood ADHD, and conduct disorder • Physical effects include fetal alcohol syndrome, liver dysfunction, gastrointestinal problems (e.g., ulcers), and thiamine deficiency leading to Wernicke and Korsakoff syndromes
Caffeine (80%)	<ul style="list-style-type: none"> • Found in coffee (125 mg/cup), tea (65 mg/cup), cola (40 mg/cup), nonprescription stimulants, and over-the-counter diet agents
Nicotine (55%) (Cigarette smoking)	<ul style="list-style-type: none"> • Smoking increasing among teenagers, African Americans, and women • Associated with cancer of the lung, pharynx, and bladder • Associated with cardiovascular diseases • Decreases life expectancy more than any other substance
Marijuana (33%)	<ul style="list-style-type: none"> • Most commonly used illegal psychoactive substance • Current increased use in 12–25 year olds • Primary active compound is tetrahydrocannabinol
Cocaine (12%)	<ul style="list-style-type: none"> • “Crack” and “freebase” are cheap, smokable forms • In pure form, it is sniffed into the nose (“snorted”) • Hyperactivity and growth retardation are seen in newborns of users
Amphetamines (7%)	<ul style="list-style-type: none"> • Used clinically in the management of ADHD, narcolepsy (see Chapter 7), depression, and obesity; clinical formulations include dextroamphetamine (Dexedrine), methamphetamine (Desoxyn), and methylphenidate (Ritalin) • “Speed,” “ice” (methamphetamine), and “ecstasy” (MDMA) are street names for amphetamine compounds
Heroin (7%)	<ul style="list-style-type: none"> • Is more potent, crosses the blood–brain barrier faster, and has a faster onset of action and more euphoric effect than medically used opioids (e.g., morphine) • Higher rate of use in large cities; use is increasing among teenagers • Intravenous use is associated with transmission of HIV
Benzodiazepines and barbiturates (4%)	<ul style="list-style-type: none"> • Used clinically as anti-anxiety agents, sedatives, muscle relaxants, anticonvulsants, and anesthetics; long-acting agents are used to treat alcohol withdrawal
Hallucinogens (3%)	<ul style="list-style-type: none"> • LSD is ingested • PCP is typically smoked in a marijuana or other cigarette

ADHD, attention deficit hyperactivity disorder; LSD, lysergic acid diethylamide; MDMA, methylene dioxymethamphetamine; PCP, phencyclidine.

2. Increased availability of dopamine and glutamate in the synapse is apparently involved in the “**reward system**” of the brain and the euphoric effects of stimulants and opioids. As in schizophrenia (see Chapter 11), altered dopamine and glutamate availability may also result in **psychotic symptoms**.

B. SEDATIVE AGENTS work primarily by increasing the activity of the inhibitory neurotransmitter γ -aminobutyric acid (GABA).

TABLE 6-2

EFFECTS OF USE AND WITHDRAWAL OF PSYCHOACTIVE SUBSTANCES

Category	Effects of Use	Effects of Withdrawal
Sedatives <ul style="list-style-type: none"> Alcohol Benzodiazepines Barbiturates 	<ul style="list-style-type: none"> Mood elevation, decreased anxiety, sedation, behavioral disinhibition, respiratory depression Barbiturates have a low safety margin; benzodiazepines have a high safety margin 	<ul style="list-style-type: none"> Mood depression, increased anxiety, tremor, insomnia, seizures, cardiovascular collapse, and psychotic symptoms such as formication [i.e., tactile hallucinations of bugs crawling on the skin are seen in delirium tremens (the “DTs”)] Hospitalization is necessary for withdrawal in heavy or long-term users
Opioids <ul style="list-style-type: none"> Heroin Opioids used medically (e.g., morphine, methadone) 	<ul style="list-style-type: none"> Mood elevation, sedation, analgesia, respiratory depression, constipation, pupil constriction 	<ul style="list-style-type: none"> Mood depression, anxiety, sweating, fever, rhinorrhea, piloerection, muscle aches, yawning, diarrhea, pupil dilation Death from withdrawal is rare
Stimulants Major stimulants <ul style="list-style-type: none"> Amphetamines Cocaine Minor stimulants <ul style="list-style-type: none"> Caffeine Nicotine 	<ul style="list-style-type: none"> Mood elevation, insomnia, increased cardiovascular, neurological, and gastrointestinal activity, pupil dilation Psychotic symptoms, including tactile hallucinations, e.g., formication (i.e., “cocaine bugs”), with use of major stimulants 	<ul style="list-style-type: none"> Mood depression, lethargy, increased appetite, fatigue, headache The change from mood elevation to mood depression is particularly rapid (<1 h) with the use of cocaine
Hallucinogens and related agents <ul style="list-style-type: none"> Marijuana Hashish LSD PCP Psilocybin Mescaline 	<ul style="list-style-type: none"> Mood elevation, altered perception, hallucinations, bad trips, “flashbacks,” cardiovascular symptoms, sweating, tremor Nystagmus (abnormal eye movements) and episodes of violent behavior and seizures with PCP 	<ul style="list-style-type: none"> Few if any withdrawal symptoms

III Identifying Substance Use Disorders



Patient Snapshot 6-2. A 45-year-old man goes to his physician for a physical examination to obtain a life insurance policy. Although he is a smoker, when filling out his patient information form he checks the box marked “Never smoked.” He is denied the policy when the insurance company analyzes his urine sample and finds evidence that he is a smoker.

What evidence has the laboratory found? (See Table 6-3.)

- A. LABORATORY FINDINGS** can often confirm substance use (Table 6-3).
- B. POSITIVE RESPONSES TO THE CAGE QUESTIONS** can help identify people who have a problem with alcohol. The CAGE questions are “Do you ever . . .
- . . . try to **Cut** down on your drinking?”
 - . . . get **Angry** when someone comments on your drinking?”
 - . . . feel **Guilty** about your drinking?”
 - . . . take a drink as an **Eye-opener** in the morning?”

TABLE 6-3**LABORATORY FINDINGS FOR SELECTED DRUGS OF ABUSE**

Class of Substance	Elevated Levels in Body Fluids (e.g., Urine, Blood)	Substance Detection (Length of Time after Use)
Sedatives	• Alcohol: Legal intoxication is 0.08%–0.15% blood alcohol concentration (BAC), depending on state laws	7–12 h
	• Coma occurs at BAC of 0.40%–0.50% in nonalcoholics	
	• γ -Glutamyltransferase	7–12 h
Opioids	• Specific barbiturate or benzodiazepine or its metabolite	1–3 d
	• Heroin	1–3 d
Stimulants	• Methadone	2–3 d
	• Cotine (nicotine metabolite)	1–2 d
	• Amphetamine	1–2 d
Hallucinogens	• Benzoylcegonine (cocaine metabolite)	1–3 d in occasional users; 7–12 d in heavy users
	• Cannabinoid metabolites	3–28 d
	• PCP: Serum glutamic-oxaloacetic transaminase and creatininephosphokinase	7–14 d in heavy users

TABLE 6-4**MANAGEMENT OF SUBSTANCE USE DISORDERS^a**

Substance	Management
Alcohol	<ul style="list-style-type: none"> • Alcoholics Anonymous (AA) or other peer support group (12-step program), which are the most effective ways to manage alcoholism in the long term • Disulfiram (Antabuse), which causes a toxic reaction when alcohol is ingested; effective to prevent use • Naltrexone (ReVia), acamprosate (Campral), or topiramate (Topamax), which block the positive effects of alcohol; effective to prevent use • Thiamine (vitamin B₁), which is used for emergency room treatment of neurological symptoms caused by intoxication • Benzodiazepines (e.g., chlordiazepoxide, diazepam), which are used to decrease withdrawal symptoms and control seizures
Heroin	<ul style="list-style-type: none"> • Methadone and buprenorphine maintenance programs: All can cause physical dependence and tolerance but suppress heroin withdrawal symptoms, have a longer duration of action, are less sedating, have fewer euphoric effects than heroin, and can be taken orally • Naltrexone (NT), which blocks opioid receptors, or buprenorphine plus NT (Suboxone), can be used to maintain abstinence • Clonidine, which stabilizes the autonomic nervous system, is useful for withdrawal symptoms
Nicotine (cigarette smoking)	<ul style="list-style-type: none"> • Membership in a peer support group such as “Smokenders” • Nicotine-containing gum, patch, nasal spray • Antidepressants, particularly bupropion (Zyban), are effective when used as part of a smoking cessation program

^aListed in order of highest to lowest utility by substance.

IV Management of Substance Use Disorders

- A. **MANAGEMENT OF SUBSTANCE DEPENDENCE AND ABUSE RANGES FROM ABSTINENCE AND DRUGS THAT BLOCK WITHDRAWAL SYMPTOMS TO PEER SUPPORT GROUPS (TABLE 6-4).**
- B. **DUAL DIAGNOSIS**—or mentally ill, chemically addicted—patients require treatment for both substance use and comorbid psychiatric illness (e.g., major depression). They are often treated on a special unit in the hospital.

Answers to Patient Snapshot Questions

6-1. The substance most likely to be responsible for this man's elevated mood and psychotic thinking (e.g., the delusion that he communicates mentally with the president) is cocaine. Cocaine works quickly to elevate mood. However, withdrawal is associated in a short time period with mood depression.

6-2. Cotinine, a metabolite of nicotine, is the evidence that the laboratory has found in the urine of this patient who has been smoking cigarettes.

Sleep

I The Awake State and the Normal Sleep State



Patient Snapshot 7-1. A 38-year-old man, who for the past 6 months has felt tired all the time, is evaluated in a sleep laboratory. In the interview with the physician, the patient notes that during those months he has had frequent thoughts of suicide, lack of appetite resulting in a 25-lb weight loss, and little interest in activities such as fishing that he formerly enjoyed (see Chapter 12).

What characteristics of sleep state and architecture are likely to be seen in this patient? (See Table 7-2.)




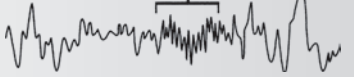


- A. AWAKE STATE.** Beta and alpha waves characterize the EEG of an awake individual (Table 7-1).
- B. SLEEP STATE.** Normal sleep consists of stages 1, 2, 3, and 4 as well as rapid eye movement (REM) sleep. Each stage of sleep is associated with particular brain wave patterns (see Table 7-1).
- C. SLEEP ARCHITECTURE.** The changes in sleep stages that occur throughout the night produce a structure known as sleep architecture (Fig. 7-1).
 - 1. Measures of sleep architecture
 - a. **Sleep latency:** Time from going to bed to falling asleep
 - b. **REM latency:** Time from falling asleep to the first REM period
 - c. **Sleep efficiency:** Percentage of time spent sleeping per amount of time spent in bed
 - 2. Sleep architecture and percentage of time spent in each sleep stage change with age and in depression (Table 7-2).
 - 3. Use of **alcohol**, **benzodiazepines**, and **barbiturates** is associated with decreased REM and delta sleep.
- D. NEUROTRANSMITTERS** are associated with the production of sleep (Table 7-3).

II Sleep Disorders

- A. CLASSIFICATION OF SLEEP DISORDERS.** According to the *Diagnostic and Statistical Manual of Mental Disorders*, (4th edition, text revision [**DSM-IV-TR**]) there are two major categories of sleep disorders:

TABLE 7-1

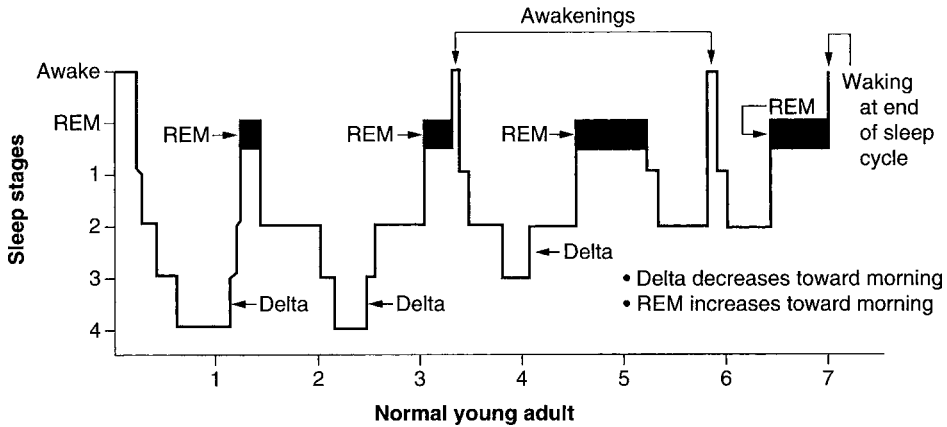
CHARACTERISTICS OF THE AWAKE STATE AND OF SLEEP STAGES

Sleep Stage	Associated EEG Pattern	Percentage of Sleep Time in Young Adults	Characteristics
Awake	Beta  Alpha 	—	Active mental concentration
Stage 1	Theta 	5%	Lightest stage of sleep characterized by peacefulness, slowed pulse and respiration, decreased blood pressure, and episodic body movements
Stage 2	Sleep spindle and K-complex 	45%	Largest percentage of sleep time, bruxism (tooth grinding)
Stages 3 and 4	Delta (slow-wave sleep) 	25% (decreases with age)	Deepest, most relaxed stage of sleep; sleep disorders, such as night terrors, sleepwalking (somnambulism), and bed-wetting (enuresis) may occur
REM	"Sawtooth," beta, alpha, and theta 	25% (decreases with age); increases in depression	Periods occur every 90 min; dreaming; penile and clitoral erection; increased cardiovascular activity; absence of skeletal muscle movement; REM deprivation leads to REM "rebound" and transient psychiatric symptoms such as anxiety or psychosis

Adapted from Fadem B. *BRS Behavioral Science*. 5th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009:92.

1. **Dyssomnias** are characterized by problems in the timing, quality, or amount of sleep. These disorders include insomnia, narcolepsy, breathing-related sleep disorder (sleep apnea) (Table 7-4), as well as circadian rhythm sleep disorder (sleeping at inappropriate times) and hypersomnia (oversleeping).
2. **Parasomnias** are characterized by abnormalities in physiology or in behavior associated with sleep. They include sleep terror (see Table 7-4), sleepwalking (both occurring in delta sleep), and nightmare disorder (repeated episodes of frightening dreams occurring in REM sleep).

B. MANAGEMENT OF SLEEP DISORDERS. Management options for insomnia, narcolepsy, sleep apnea, and sleep terror disorder are described in Table 7-4.






● **Figure 7.1** Sleep architecture in a normal young adult. (Adapted from Wedding D. *Behavior and Medicine*. St. Louis, MO: Mosby Year Book; 1995:416.)

TABLE 7-2		CHARACTERISTICS OF SLEEP IN DEPRESSION AND AGING		
Sleep Measure	Normal Young Adult	Depressed Young Adult	Normal Elderly Adult	
Sleep latency	About 10 min	>10 min	>10 min	
REM latency	About 90 min	About 45 min	About 90 min	
Sleep efficiency	About 100%	<100%	<100%	
Percentage delta	About 25%	<25%	<25%	
Percentage REM	About 25%	>25%	<25%	

TABLE 7-3		NEUROTRANSMITTERS AND SLEEP	
Action	Neurotransmitter	Specific Effect	
Promote sleep	Serotonin	<ul style="list-style-type: none"> Increases total sleep time and slow-wave sleep; damage to the dorsal raphe nucleus decreases both of these measures Depression is associated with low serotonin, and reduced sleep quality and slow-wave sleep; antidepressants increase serotonin and improve sleep quality 	
	Acetylcholine	<ul style="list-style-type: none"> Activity in the reticular formation increases total sleep time and REM sleep Anticholinergics (e.g., atropine) decrease REM sleep; cholinomimetics (e.g., physostigmine) increase REM sleep 	
Promote wakefulness	Norepinephrine	<ul style="list-style-type: none"> Decreases both total sleep time and REM sleep Anxious patients have trouble falling asleep 	
	Dopamine	<ul style="list-style-type: none"> Mania and other psychotic illnesses are associated with wakefulness Management with antipsychotics, which block DA receptors, improves sleep 	


TABLE 7-4

**SLEEP DISORDERS AND THEIR MANAGEMENT
(IN ORDER OF HIGHEST TO LOWEST UTILITY)**

Disorder	Patient Snapshot	Characteristics	Management
Insomnia	 <p>A 25-year-old medical student complains that for most nights during the past year he lies awake in bed for 2 h before falling asleep at night; during the day, he is tired and frequently makes errors in his chart work and on exams</p>	<ul style="list-style-type: none"> • Difficulty falling asleep or staying asleep that occurs for at least 1 month and leads to sleepiness during the day or results in problems fulfilling social or occupational obligations • Occurs in up to 30% of the US population • Associated with the use of caffeine, withdrawal from alcohol, anxiety disorders, and mood disorders 	<ul style="list-style-type: none"> • Avoidance of caffeine • Development of a sleep ritual • Improvement of sleep hygiene, e.g., establish a fixed sleep and wake schedule • Relaxation techniques • Nonbenzodiazepine sleep agent, e.g., zolpidem (Ambien), zaleplon (Sonata), eszopiclone (Lunesta), ramelteon (Rozerem)
Narcolepsy	 <p>A 30-year-old woman reports strange perceptual experiences as she is falling asleep (hypnagogic hallucinations). She also reports that she is unable to move for about a minute after she wakes up (sleep paralysis) and had a few car accidents when she fell asleep while driving</p>	<ul style="list-style-type: none"> • Sleep “attacks” in which the individual falls asleep suddenly during the day • Short REM latency • Hypnagogic hallucinations (occur on falling asleep) • Hypnopompic hallucinations (occur on waking up) • Cataplexy (loss of all muscle tone with a strong emotional stimulus) • Sleep paralysis (inability to move for a few seconds on waking) 	<ul style="list-style-type: none"> • Stimulant drugs, such as modafinil (Provigil); if cataplexy is present, an antidepressant or sodium oxybate (Xyrem) is added • Timed daytime naps
Breathing-related sleep disorder (sleep apnea)	 <p>A 45-year-old overweight man is tired every day. His wife reports that he snores and seems to stop breathing at times during the night.</p>	<ul style="list-style-type: none"> • Breathing cessation for many brief periods during sleep • It may be central, (no respiratory effort) or obstructive (airway obstruction) which is more common • Cannot sleep deeply because anoxia causes awakenings during the night, leading to chronic tiredness • More common in men, in middle age, and in the obese • Related to headaches, pulmonary hypertension, respiratory acidosis, depression, and sudden death (particularly in the elderly and in infants) 	<ul style="list-style-type: none"> • Weight loss (if overweight) • A mask with a device providing continuous positive airway pressure (CPAP) • Respiratory stimulant, e.g., medroxyprogesterone acetate (Provera), fluoxetine (Prozac), protriptylene (Vivactil) • Surgery (e.g. tracheostomy or less invasive procedure)

(Continued)

TABLE 7-4**SLEEP DISORDERS AND THEIR MANAGEMENT
(IN ORDER OF HIGHEST TO LOWEST UTILITY) (Continued)**

Disorder	Patient Snapshot	Characteristics	Management
Sleep terror disorder	 <p>A 4-year-old girl's parents report that she often screams in her sleep during the night. When they try to waken her, she sits up in bed and opens her eyes but does not respond to them and has no memory of the incident the next day</p>	<ul style="list-style-type: none"> • Recurrent nighttime periods of extreme fright and screaming • Most common in children • In contrast to night-mares, which occur during REM sleep, this occurs during slow-wave sleep • No memory of the arousal or dreaming • Usually normal but may be an early sign of temporal lobe epilepsy if it starts in adolescence 	<ul style="list-style-type: none"> • Reassure parents that occasional night terrors are normal in young children • Rarely, use of a benzodiazepine in small doses at bedtime

Answer to Patient Snapshot Question

7-1. The sleep architecture of this depressed patient reveals a short REM latency, reduced delta sleep, increased REM sleep, and many nighttime awakenings leading to poor sleep efficiency and daytime sleepiness.

The patient snapshots in Table 7-4 are explained in the text of that table.

The Genetics of Behavior

I Genetic Studies

- A. FAMILY RISK STUDIES** compare how frequently a disease occurs in the relatives of the affected individual (**proband**) with how frequently it occurs in the general population.
- B. TWIN STUDIES**
1. **Adoption studies** using **monozygotic twins** (who are derived from a single fertilized ovum) or **dizygotic twins** (who are derived from 2 fertilized ova), reared together or apart, are used to distinguish the effects of genetic factors from environmental factors in disease.
 2. If both twins have a given trait, they are **concordant** for that trait.
 3. If genetic in origin, a disorder may be expected to have a higher concordance rate in monozygotic twins than in dizygotic twins.

II Genetic Origins of Psychiatric Disorders



Patient Snapshot 8-1. A 19-year-old woman reports that she just learned that her father—whom she believed had died when she was an infant—has been institutionalized for the last 18 years with a diagnosis of schizophrenia.

What are the chances that this woman will develop schizophrenia over the course of her life? (See Table 8-1.)

- A. SCHIZOPHRENIA** (see Chapter 11)
1. **Prevalence.** The prevalence of schizophrenia is about 1% in the general population. The prevalence is approximately **equal in men and women**, with no ethnic differences in its occurrence.
 2. Persons with a **close genetic relationship** to an individual with schizophrenia are more likely than those with a more distant relationship to be concordant for, and to develop, the disorder (Table 8-1).
 3. Schizophrenia has been associated with markers on chromosomes 1, 6, 7, 8, 13, 21, and 22. Chromosomes 13 and 21 are linked to disturbed glutamate transmission, and chromosome 22 is associated with velocardiofacial syndrome, which is associated with schizophrenia.
- B. AFFECTIVE (MOOD) DISORDERS** (see Chapter 12)
1. **Prevalence**
 - a. The lifetime prevalence of major depressive disorder is about 10% in men and 15%–20% in **women**.
 - b. The **lifetime prevalence** of bipolar disorder is about 1%, with no gender differences in its occurrence.

TABLE 8-1**RISK OF DEVELOPING SCHIZOPHRENIA AND BIPOLAR DISORDER
IN RELATIVES OF PATIENTS**

Relationship	Risk for Schizophrenia (%)	Risk for Bipolar Disorder (%)
No specific relationship (general population)	1	1
First-degree relative (sibling, dizygotic twin, child) of a patient with the disorder	10	20
Child who has 2 parents with the disorder	40	60
Monozygotic twin of a person with the disorder	50	75

- The genetic **component is stronger in bipolar disorder** than in major depressive disorder or schizophrenia (see Table 8-1).
- Recently, **chromosome 3**, specifically 3p21.1 was identified as a locus for increased risk for both major depressive disorder and bipolar disorder.

C. PERSONALITY CHARACTERISTICS AND DISORDERS (see Chapter 14)

- Personality characteristics, such as shyness and attention-seeking, have a higher concordance rate in monozygotic twins than in dizygotic twins.
- Genetic factors** also play a role in personality disorders. Relatives of patients with specific personality disorders have demonstrated characteristic psychiatric problems (Table 8-2).

**Genetic Origins of Neuropsychiatric Disorders**

Patient Snapshot 8-2. Physical examination of a 48-year-old woman who has started to show evidence of memory loss reveals that she has midface depression, extra skin at the corners of her eyes, and an enlarged tongue.

Which chromosome is most likely to be involved in the etiology of this patient's memory problem?

- NEUROPSYCHIATRIC DISORDERS** such as dementia of the Alzheimer type (Alzheimer disease) have genetic components (Table 8-3).

TABLE 8-2**PSYCHIATRIC CONDITIONS OBSERVED IN RELATIVES
OF PATIENTS WITH PERSONALITY DISORDERS^a**

Personality Disorder of Patient	Psychiatric Condition Seen in Relatives
Antisocial	Alcoholism, ADHD
Avoidant	Anxiety disorders
Borderline	Major depressive disorder, substance abuse
Histrionic	Somatization disorder
Schizotypal	Schizophrenia

^aSee Chapters 11, 12, and 14.

ADHD, attention deficit hyperactivity disorder.

TABLE 8-3

CHROMOSOMAL DISORDERS WITH BEHAVIORAL MANIFESTATIONS

Chromosome	Disorder	Behavioral and Related Manifestations
1	• Alzheimer disease	• Depression, anxiety, dementia (early onset)
4	• Huntington disease	• Erratic behavior, psychiatric symptoms (e.g., depression, psychosis), dementia
5	• Sotos syndrome	• Intellectual impairment, phobias, hyperphagia
7	• Williams syndrome	• Hypersociality, mental retardation, behavioral problems, hypotonia
8	• Cohen syndrome	• Autistic behavior, mental retardation, microcephaly
9	• Dystonia musculorum deformans (DYT1)	• Depression, learning problems
	• Tuberous sclerosis	• Seizures, cognitive defects, autistic behavior
11	• Acute intermittent porphyria	• Manic behavior, psychosis
12	• Phenylketonuria	• Attention deficit/hyperactivity disorder (ADHD), mental retardation
13	• Wilson disease	• Depression, personality changes, psychotic symptoms
14	• Alzheimer disease	• Depression, anxiety, dementia (early onset)
15	• Chromosome 15 inversion-duplication syndrome	• Seizures, autistic behavior, hypotonia
	• Prader–Willi/Angelman syndrome	• Mental retardation, rage, stubbornness, rigid thinking, and self-injury
16	• Tuberous sclerosis	• Seizures, cognitive impairment autism
17	• Neurofibromatosis-1	• Cognitive impairment
	• Charcot–Marie–Tooth	• Peripheral neuropathy
	• Smith–Magenis syndrome	• Mental retardation, impaired expressive language, stereotyped behavior, clinging and dependency, seizures
18	• Tourette disorder	• Dyscontrol of language and movement
19	• Alzheimer disease (site of the APO E ₄ gene)	• Depression, anxiety, dementia
21	• Progressive myoclonic epilepsy	• Cognitive regression, aphasia, mental retardation
	• Alzheimer disease (associated with Down syndrome)	• Depression, anxiety, dementia (early onset)
22	• Metachromatic leukodystrophy	• Personality changes, psychosis, dementia
	• Neurofibromatosis-2	• Hearing impairment
	• DiGeorge/velocardiofacial syndrome	• Schizophrenia, bipolar disorder, psychomotor retardation, language delay, ADHD, seizures
X	• Fragile X syndrome	• Autistic behavior
	• Kallmann syndrome	• No sense of smell, lack of sex drive, depression, anxiety, fatigue, insomnia
	• Lesch–Nyhan syndrome	• Self-mutilation and other bizarre behavior, mental retardation
	• Rett disorder	• Autistic behavior, hand-wringing, breathing abnormalities

Adapted with permission from Fadem B, Monaco E. *High-Yield Brain & Behavior*. Baltimore, MD: Lippincott Williams & Wilkins; 2007:27.

- B. FORMS OF MENTAL RETARDATION** with genetic components include Down, Fragile X, Williams, Cohen, Prader–Willi/Angelman, and Smith–Magenis syndromes. These and other chromosomal disorders with behavioral symptoms also can be found in Table 8-3.

IV Alcoholism

- A. PREVALENCE.** Alcoholism is **4 times more prevalent** in the biological children of people who abuse alcohol than in children of people who do not abuse alcohol, even if the children are raised by adoptive parents.
- B. CONCORDANCE RATES** for alcoholism are twice as high in monozygotic twins than in dizygotic twins.
- C. FAMILY HISTORY.** **Sons of people who abuse alcohol** are at **greater risk than daughters** of people who abuse alcohol. The genetic influence is strongest in males who abuse alcohol before 20 years of age.

Answers to Patient Snapshot Questions

8-1. The chance that this woman, whose father has schizophrenia, will develop the illness is approximately 10%.

8-2. The physical description of this patient indicates that she has Down syndrome. Chromosome 21 is involved in the etiology of both Down syndrome and Alzheimer disease, and this woman's memory loss may be a sign of the latter.

Behavioral Neuroanatomy and Neurochemistry

I Neuroanatomy



Patient Snapshot 9-1. A 68-year-old woman who has had a stroke shows personality changes including outbursts of anger, lack of self-control, and increased emotionality.

What area of her brain is most likely to have been affected by the stroke? (See Table 9-1.)

- A. THE CENTRAL NERVOUS SYSTEM (CNS)** contains the brain and spinal cord.
1. The cerebral hemispheres of the brain are connected by the corpus callosum, anterior commissure, hippocampal commissure, posterior commissure, and habenular commissure.
 2. The **functions** of the hemispheres are **lateralized**.
 - a. The **right**, or **nondominant, hemisphere** is associated primarily with **perception**; it is also associated with **spatial relations** and musical and artistic ability.
 - b. The **left**, or **dominant, hemisphere** is associated with **language function** in about 96% of right-handed persons and 70% of left-handed persons.
- B. BRAIN LESIONS** caused by accident, disease, or surgery are associated with particular neuropsychiatric deficits (Table 9-1).
- C. THE PERIPHERAL NERVOUS SYSTEM (PNS)** contains all sensory, motor, and autonomic fibers outside of the CNS, including the spinal nerves, cranial nerves, and peripheral ganglia.
1. The PNS carries sensory information to the CNS and motor information away from the CNS.
 2. The **autonomic nervous system**, which consists of sympathetic and parasympathetic divisions, innervates the internal organs.
 - a. This system coordinates emotional experiences with visceral responses (e.g., changes in heart rate or blood pressure).
 - b. Visceral responses occurring as a result of psychological stress are involved in the exacerbation of some physical illnesses (see Chapter 20).

II Neurotransmission

A. SYNAPSES AND NEUROTRANSMITTERS

1. When the presynaptic neuron is stimulated, a **neurotransmitter** is released, travels across the synaptic cleft, and acts on receptors on the postsynaptic neuron.

TABLE 9-1

NEUROPSYCHIATRIC EFFECTS OF BRAIN LESIONS

Location of Lesion	Effects
Frontal lobes	<ul style="list-style-type: none"> • Emotional symptoms (e.g., depression, especially with dominant lesions) • Problems with attention, motivation, concentration, orientation, and problem solving (dorsolateral convexity lesions) • Problems with judgment, inhibitions, emotions, and personality (orbitofrontal cortex lesions)
Parietal lobes	<ul style="list-style-type: none"> • Impaired processing of visual-spatial (right-sided lesions) information and verbal (left-sided lesions) information
Temporal lobes	<ul style="list-style-type: none"> • Impaired memory • Hallucinations • Personality changes
Limbic lobes (hippocampus)	<ul style="list-style-type: none"> • Poor new learning
Limbic lobes (amygdale)	<ul style="list-style-type: none"> • Decreased aggressive behavior, increased sexual behavior, and hyperorality (Klüver–Bucy syndrome) • Decreased learned fear response • Inability to recognize facial and vocal expressions of anger in others
Hypothalamus	<ul style="list-style-type: none"> • Increased appetite leading to obesity (ventromedial nucleus [satiety center] damage) • Loss of appetite leading to weight loss (lateral nucleus damage) • Effects on sexual activity and body temperature regulation
Reticular system	<ul style="list-style-type: none"> • Changes in sleep–wake mechanisms (e.g., decreased production of REM sleep via decreased ACh production) • Loss of consciousness
Basal ganglia	<ul style="list-style-type: none"> • Disorders of movement, such as Parkinson disease (substantia nigra), Huntington disease (caudate and putamen), and Tourette disorder (caudate)

2. Neurotransmitters are **excitatory** if they increase the chances that a neuron will fire and **inhibitory** if they decrease these chances.

B. PRESYNAPTIC AND POSTSYNAPTIC RECEPTORS are proteins present in the membrane of the neuron that can recognize specific neurotransmitters.

1. The **changeability** of number or affinity of receptors for specific neurotransmitters (**neuronal plasticity**) can regulate the responsiveness of neurons.
2. **Second messengers.** When stimulated by neurotransmitters, postsynaptic receptors may alter the metabolism of the neuron by the use of second messengers, which include **cyclic adenosine monophosphate**, **lipids** (e.g., diacylglycerol), Ca^{2+} , and nitric oxide.

C. REGULATION OF NEUROTRANSMITTER ACTIVITY

1. The concentration of neurotransmitters in the synaptic cleft is closely related to mood and behavior. Several mechanisms affect this concentration.
 - a. After release by the presynaptic neuron, neurotransmitters are removed from the synaptic cleft by **reuptake** by the presynaptic neuron.
 - b. Neurotransmitters may also be **degraded by enzymes** such as **monoamine oxidase**.
2. **Availability** of specific neurotransmitters is associated with the etiology of many psychiatric conditions (Table 9-2).
3. Normalization of neurotransmitter levels by pharmacological agents using the mechanisms noted above can temporarily reduce the symptoms of these disorders.

TABLE 9-2

PSYCHIATRIC CONDITIONS AND ASSOCIATED NEUROTRANSMITTER ACTIVITY

Psychiatric Condition	Neurotransmitter Activity Increased (↑) or Decreased (↓)
Schizophrenia	Dopamine (↑), serotonin (↑), glutamate (↑↓)
Mania	Dopamine (↑), GABA (↓)
Depression	Norepinephrine (↓), serotonin (↓), dopamine (↓)
Anxiety	GABA (↓), serotonin (↓), norepinephrine (↑)
Alzheimer disease	ACh (↓), glutamate (↑)

D. CLASSIFICATION. The three major classes of neurotransmitters are **biogenic amines** (monoamines), **amino acids**, and **peptides**.

III Biogenic Amines



Patient Snapshot 9-2. A 30-year-old man is brought to the emergency department with a serious knife wound to the chest. The wound is a result of a fight that the patient started when another man refused to give up a parking space.

The body fluids of this assaultive, impulsive patient are most likely to show decreased levels of the major metabolite of which neurotransmitter? (See Table 9-3.)

A. OVERVIEW

1. The **biogenic amines, or monoamines**, include catecholamines, indolamines, ethyl-amines, and quaternary amines.
2. The **monoamine theory of mood disorder** hypothesizes that **lowered noradrenergic or serotonergic activity results in depression**.
3. **Metabolites** of the monoamines are measured in psychiatric research and diagnosis because they are present in body fluids at higher levels than the actual monoamines (Table 9-3).

TABLE 9-3

METABOLITES OF MONOAMINES AND ASSOCIATED PSYCHOPATHOLOGY

Neurotransmitter	Concentration of Metabolite ^a	Associated Psychopathology
Dopamine	Increased HVA	<ul style="list-style-type: none"> • Schizophrenia • Other conditions involving psychosis
	Decreased HVA	<ul style="list-style-type: none"> • Parkinson disease • Depression
Norepinephrine	Decreased MHPG	<ul style="list-style-type: none"> • Depression
	Increased VMA	<ul style="list-style-type: none"> • Adrenal medulla tumor (pheochromocytoma)
Serotonin	Decreased 5-HIAA	<ul style="list-style-type: none"> • Depression • Violent behavior • Impulsive behavior • Fire setting • Touretted • Alcohol abuse • Bulimia

^aIn blood plasma, cerebrospinal fluid, or urine.

5-HIAA, 5-hydroxyindoleacetic acid; HVA, homovanillic acid; MHPG, 3-methoxy-4-hydroxyphenylglycol; VMA, vanillylmandelic acid.

B. DOPAMINE

1. Dopamine, a catecholamine, is involved in the pathophysiology of **schizophrenia and mood disorders as well as Parkinson disease, the conditioned fear response and the rewarding nature of drugs of abuse**.
 - a. **Hyperactivity** of the mesolimbic dopaminergic tract is associated with the **positive symptoms (e.g., hallucinations)** and **hypoactivity** of the mesocortical dopaminergic tract with the **negative symptoms (e.g., apathy)** of schizophrenia (see Chapter 11).
 - b. At least 5 dopamine receptor subtypes (D₁–D₅) have been identified. The major site of action for antipsychotic medications is the **D₂ receptor**. The D₁ and D₄ subtypes are also implicated in the action of the atypical antipsychotics (see Chapter 11).
2. **Synthesis**. The amino acid tyrosine is converted to the precursor for dopamine by the action of **tyrosine hydroxylase**.

C. NOREPINEPHRINE, a catecholamine, plays a role in **mood, anxiety, arousal, and learning and memory**.

1. **Synthesis**
 - a. Like dopaminergic neurons, noradrenergic neurons synthesize dopamine.
 - b. **β-Hydroxylase**, present in noradrenergic neurons, converts dopamine to norepinephrine.
2. **Localization**. Most noradrenergic neurons (approximately 10,000 per hemisphere in the brain) are located in the **locus ceruleus**.

D. SEROTONIN, an indolamine, plays a role in **mood, sexuality, sleep, and impulse control**; high levels of serotonin are associated with **improved mood and sleep** but **decreased sexual functioning** (see Chapter 18). Decreased serotonin is associated with depression, poor impulse control, anxiety, and poor sleep.

1. **Synthesis**. The amino acid tryptophan is converted to serotonin, also known as **5-hydroxytryptamine (5-HT)**, by the enzyme tryptophan hydroxylase as well as by an amino acid decarboxylase.
2. **Localization**. Most serotonergic cell bodies in the brain are contained in the **dorsal raphe nucleus**.
3. **Antidepressant agents** (see Chapter 10) ultimately increase the presence of serotonin (and sometimes also of norepinephrine) in the synaptic cleft; the selective serotonin reuptake inhibitors, such as **fluoxetine (Prozac)**, work specifically by **blocking the reuptake** of serotonin into the presynaptic neuron.

E. HISTAMINE

1. Histamine, an **ethylamine**, is affected by psychoactive agents.
2. **Histamine receptor blockade** by agents such as antipsychotics and tricyclic antidepressants is associated with common side effects, such as sedation and increased appetite (leading to weight gain).

F. ACETYLCHOLINE (ACH), a quaternary amine, is the transmitter used by **nerve–skeleton–muscle junctions**.

1. **Degeneration of cholinergic neurons** is associated with Alzheimer disease, Down syndrome, and movement and sleep disorders (e.g., decreased rapid eye movement [REM] sleep).
2. **Synthesis and breakdown of ACh**
 - a. **Cholinergic neurons** synthesize ACh from acetyl coenzyme A and choline using **choline acetyltransferase**.

- b. **Acetylcholinesterase** (AChE) breaks ACh down into choline and acetate; blocking the action of AChE with drugs such as donepezil (Aricept) can delay the progression of Alzheimer disease but cannot reverse lost function.

IV Amino Acid Neurotransmitters Are Involved in Most Synapses in the Brain



Patient Snapshot 9-3. In a clinical experiment, a 50-year-old man with chronic back pain caused by a degenerating disc is given naloxone. Shortly thereafter he is given an inert substance that he believes is an opioid pain reliever.

Even though he has responded in the past to placebos, what is likely to happen to this man's pain on this occasion after he receives the placebo? (See D2 below.)

These neurotransmitters include γ -aminobutyric acid (GABA), glycine, and glutamate as well as endogenous opioids.

- A. **GABA** is the principal inhibitory neurotransmitter in the CNS and is involved in the antianxiety activity of the benzodiazepines and barbiturates.
- B. **GLYCINE** is an inhibitory neurotransmitter that acts independently and also as a regulator of glutamate activity.
- C. **GLUTAMATE** is an excitatory neurotransmitter and may be associated with **epilepsy, schizophrenia, neurodegenerative illnesses** such as Alzheimer disease, and mechanisms of **cell death**. Classes of glutamate receptors include **N-methyl-D-aspartate (NMDA), kainate, and metabotropic glutamate** receptors.
- D. **ENDOGENOUS OPIOIDS**
 1. **Enkephalins** and **endorphins** are endogenous opioids that affect pain, thermoregulation, seizure activity, anxiety, and mood.
 2. **Placebo effects** may be mediated by the endogenous opioid system and may be blocked by treatment with an opioid receptor blocker such as naloxone.

Answers to Patient Snapshot Questions

9-1. The brain area most closely involved in the disinhibition and increased emotion seen in this patient is the orbitofrontal portion of the frontal lobes.

9-2. Decreased levels of brain serotonin are most closely involved in impulsive, aggressive, assaultive behavior. The major metabolite of serotonin, 5-hydroxyindoleacetic acid, would therefore be decreased in this man.

9-3. Despite the fact that placebos often temporarily relieve pain even when it is caused by pathology, this patient's pain is likely to be unchanged because his secretion of endogenous opioids has been blocked by prior treatment with naloxone.

Psychopharmacology

I Agents Used to Treat Psychosis



Patient Snapshot 10-1. A 32-year-old man with chronic schizophrenia has been taking an antipsychotic that not only is effective against his auditory hallucinations but is also helping him to be more interactive with other people. After 6 months on the drug, he comes to the emergency department with a severe throat infection. Blood testing reveals a granulocyte count of just 100 cells/ μ L (microliter).

What antipsychotic agent is this patient most likely to have been taking, and what action should the physician take at this time? (See Table 10-1.)

A. TYPICAL (TRADITIONAL) ANTIPSYCHOTIC AGENTS

1. Traditional antipsychotics are used to treat **schizophrenia** and psychosis associated with other psychiatric and physical disorders (see Chapter 11). They are also used medically to treat intense agitation and Tourette disorder.
2. Their primary mechanism of action is as **D₂ receptor antagonists** and they are classified according to potency.
 - a. **Low-potency agents** (e.g., thioridazine) are associated primarily with anticholinergic, endocrine, hematological, dermatological, ophthalmological, and antihistaminergic side effects.
 - b. **High-potency agents** (e.g., haloperidol) are associated primarily with neurological side effects (Table 10-2).

B. ATYPICAL ANTIPSYCHOTIC AGENTS are newer drugs that work by a different mechanism of action (e.g., as 5-HT₂ D₁ and D₄ as well as D₂ receptor antagonists).

1. These agents have more advantages than disadvantages compared with high- and low-potency traditional agents (Table 10-1).
2. **Atypical agents** are currently the first line of treatment in patients with chronic psychotic illnesses such as schizophrenia.

II Agents Used to Treat Mood Disorders



Patient Snapshot 10-2. A 45-year-old woman is brought to the emergency department with a severe headache, vomiting, and sweating. Clinical examination reveals greatly elevated blood pressure and fever. The woman's husband notes that they had just finished eating dinner (which included cheese and red wine) in a French restaurant when her symptoms started.

What class of psychoactive agents is most likely to be responsible for this woman's symptoms? (See II A 3.)

TABLE 10-1

TRADITIONAL AND ATYPICAL ANTIPSYCHOTIC AGENTS

Type of Agent and Specific Agents	Advantages	Disadvantages
<p>Traditional high-potency agents</p> <ul style="list-style-type: none"> • Haloperidol (Haldol) • Perphenazine (Trilafon) • Trifluoperazine (Stelazine) • Fluphenazine (Prolixin) • Thiothixene (Navane) • Pimozide (Orap) 	<ul style="list-style-type: none"> • Positive symptoms improve in about 70% of patients 	<ul style="list-style-type: none"> • More neurological adverse effects than low-potency agents • Less effective against negative symptoms than atypical agents
<p>Traditional low-potency agents</p> <ul style="list-style-type: none"> • Thioridazine (Mellaril) • Chlorpromazine (Thorazine) 	<ul style="list-style-type: none"> • Fewer neurological adverse effects than high-potency agents 	<ul style="list-style-type: none"> • More nonneurological adverse effects (i.e., anticholinergic effects) than high-potency agents
<p>Atypical agents</p> <ul style="list-style-type: none"> • Clozapine (Clozaril) • Risperidone (Risperdal) • Olanzapine (Zyprexa) • Quetiapine (Seroquel) • Ziprasidone (Geodon) • Aripiprazole (Abilify) • Paliperidone (Invega) • Iloperidone (Fanapt) • Asenapine (Saphris) • Lurasidone (Latuda) 	<ul style="list-style-type: none"> • More effective than traditional agents against negative symptoms • Fewer neurological adverse effects than traditional agents 	<ul style="list-style-type: none"> • More hematological problems (e.g., agranulocytosis), anticholinergic effects, seizures, weight gain, and diabetes than traditional agents

TABLE 10-2

NEUROLOGICAL ADVERSE EFFECTS OF ANTIPSYCHOTICS AND THEIR MANAGEMENT

Effects	Characteristics
Extrapyramidal effects	<ul style="list-style-type: none"> • Acute dystonia (prolonged muscular spasms); more common in men younger than age 40 • Pseudoparkinsonism (muscle rigidity, shuffling gait, resting tremor, masklike facial expression) • Akathisia (subjective feeling of motor restlessness) • Treat with an anticholinergic (e.g., benztropine) or antihistaminergic (e.g., diphenhydramine) agent
Tardive dyskinesia	<ul style="list-style-type: none"> • Abnormal writhing movements of the tongue, face, and body • More common in women and after at least 6 mo of treatment • Manage by substituting an atypical antipsychotic agent • Rarely reversible
Other effects	<ul style="list-style-type: none"> • Neuroleptic malignant syndrome (high fever, sweating, increased pulse and blood pressure, muscular rigidity); more common in men and early in treatment; mortality rate about 20%; treat by discontinuing agent and providing medical support • Decreased seizure threshold

A. ANTIDEPRESSANTS

1. Classification

- a. Heterocyclic antidepressants (tricyclic and tetracyclic), monoamine oxidase inhibitors (**MAOIs**), and selective serotonin reuptake inhibitors (**SSRIs**), selective serotonin and norepinephrine reuptake inhibitors (**SNRIs**), and other antidepressants are used to treat depression (see Chapter 12) as well as other psychiatric disorders (Table 10-3).
 - i. All antidepressants take **3–6 weeks for the therapeutic effect** to begin and **all have equal efficacy**.
 - ii. Antidepressants do not elevate mood in nondepressed people and **have no abuse potential**.
- b. **Stimulants**, such as methylphenidate or dextroamphetamine, may also be useful in treating depression, particularly in the elderly or terminally ill. Disadvantages include their potential for dependence and abuse.

TABLE 10-3
ANTIDEPRESSANT AGENTS

Agent (Current or Former Brand Name)	Effects	Clinical Uses in Special Populations and in Addition to Depression
Tricyclic and tetracyclic agents (TCAs)		
Desipramine (Norpramin, Pertofrane)	<ul style="list-style-type: none"> • Least sedating of the TCAs • Least anticholinergic of the TCAs • Most potent norepinephrine reuptake inhibitor of the TCAs • Stimulates appetite 	<ul style="list-style-type: none"> • Depression in the elderly • Eating disorders
Nortriptyline (Aventyl, Pamelor)	<ul style="list-style-type: none"> • Unlikely to cause orthostatic hypotension • Anticholinergic 	<ul style="list-style-type: none"> • Depression in the elderly • Depression in patients with cardiac disease • Pruritus (itching)
Amitriptyline (Elavil)	<ul style="list-style-type: none"> • Most sedating and anticholinergic of TCAs 	<ul style="list-style-type: none"> • Depression with insomnia • Chronic pain • Migraine prophylaxis • Enuresis
Clomipramine (Anafranil)	<ul style="list-style-type: none"> • Most serotonin-specific of the TCAs 	<ul style="list-style-type: none"> • OCD • Panic disorder
Doxepin (Adapin, Sinequan, Silenor [for sleep maintenance])	<ul style="list-style-type: none"> • Sedating • Antihistaminergic • Anticholinergic 	<ul style="list-style-type: none"> • GAD • Peptic ulcer disease • Pruritus • Sleep maintenance
Imipramine (Tofranil)	<ul style="list-style-type: none"> • Likely to cause orthostatic hypotension 	<ul style="list-style-type: none"> • Panic disorder with agoraphobia • Enuresis • Eating disorders
Maprotiline (Ludiomil)	<ul style="list-style-type: none"> • Low cardiotoxicity • May cause seizures 	<ul style="list-style-type: none"> • Anxiety with depressive features
Protriptyline (Vivactil, Odyssey)	<ul style="list-style-type: none"> • 2⁰ tricyclic 	<ul style="list-style-type: none"> • ADHD, narcolepsy

TABLE 10-3

ANTIDEPRESSANT AGENTS (Continued)

Agent (Current or Former Brand Name)	Effects	Clinical Uses in Special Populations and in Addition to Depression
Selective serotonin receptor inhibitors (SSRIs)		
Citalopram (Celexa)	<ul style="list-style-type: none"> • May be more dangerous in overdose than other SSRIs (cardiac conduction problems) • Sexual dysfunction 	<ul style="list-style-type: none"> • OCD
Escitalopram (Lexapro)	<ul style="list-style-type: none"> • Isomer of citalopram • Most serotonin-specific of the SSRIs • Sexual dysfunction • Fewer side effects than citalopram 	<ul style="list-style-type: none"> • OCD • Panic disorder • GAD • Paraphilias
Fluoxetine (Prozac, Sarafem, Prozac Weekly)	<ul style="list-style-type: none"> • Initial agitation and insomnia • Sexual dysfunction 	<ul style="list-style-type: none"> • OCD • Panic disorder • Premenstrual dysphoric disorder (Sarafem) • Premature ejaculation • Bulimia • Hypochondriasis • Geriatric depression • Depression in children • Paraphilias
Paroxetine (Paxil, Paxil CR [long-acting form])	<ul style="list-style-type: none"> • Most sedating and anticholinergic SSRI • Potent serotonin reuptake inhibition • Sexual dysfunction 	<ul style="list-style-type: none"> • OCD • Panic disorder • Social phobia • Chronic pain • Paraphilias
Sertraline (Zoloft)	<ul style="list-style-type: none"> • Most likely of the SSRIs to cause GI disturbances (e.g., diarrhea) • Sexual dysfunction 	<ul style="list-style-type: none"> • OCD • Panic disorder • PTSD • Premenstrual dysphoric disorder • Depression in children • Paraphilias
Fluvoxamine (Luvox)	<ul style="list-style-type: none"> • Sedation Sexual dysfunction 	<ul style="list-style-type: none"> • OCD (only indication)
Selective serotonin and norepinephrine reuptake inhibitors (SNRIs)		
Duloxetine (Cymbalta)	<ul style="list-style-type: none"> • Rapid symptom relief (1–3 wk) • Few sexual side effects 	<ul style="list-style-type: none"> • Major depression • Urinary stress incontinence • GAD • Diabetic peripheral neuropathic pain • Fibromyalgia • Chronic musculoskeletal pain
Venlafaxine (Effexor, Effexor XR [extended-release form])	<ul style="list-style-type: none"> • Rapid symptom relief • Few sexual side effects • Low cytochrome P450 effects • Increased diastolic blood pressure at higher doses • High remission rate 	<ul style="list-style-type: none"> • Major depression • GAD • Social phobia • Panic disorder

(Continued)

TABLE 10-3

ANTIDEPRESSANT AGENTS (Continued)

Agent (Current or Former Brand Name)	Effects	Clinical Uses in Special Populations and in Addition to Depression
Monoamine Oxidase Inhibitors (MAOIs)		
Isocarboxacid (Marplan)	<ul style="list-style-type: none"> • Hyperadrenergic crisis precipitated by ingestion of pressor amines in foods or sympathomimetic drugs • Orthostatic hypotension • Sexual dysfunction • Insomnia 	<ul style="list-style-type: none"> • Atypical depression • Panic disorder • Eating disorders • Pain disorders • Social phobia • Geriatric depression
Phenelzine (Nardil)		
Selegiline (Emsam skin patch)		
Tranylcypromine (Parnate)		
Other Antidepressants		
Amoxapine (Asendin)	<ul style="list-style-type: none"> • Antidopaminergic effects such as Parkinsonian symptoms, galactorrhea, and sexual dysfunction • Most dangerous in overdose 	<ul style="list-style-type: none"> • Depression with psychotic features • Refractory depression (inadequate clinical response to other agents)
Bupropion (Wellbutrin, Wellbutrin SR [sustained-release form], Wellbutrin XL [extended-release form], Zyban, Contrave [with naltrexone])	<ul style="list-style-type: none"> • Norepinephrine and dopamine reuptake inhibition • No effect on serotonin • Insomnia • Seizures: Avoid in eating disorder patients who purge • Sweating • Decreased appetite • Fewer adverse sexual effects 	<ul style="list-style-type: none"> • Smoking cessation (Zyban) • Seasonal affective disorder • Adult ADHD • SSRI-induced sexual dysfunction • Dysfunction • Obesity (Contrave)
Mirtazapine (Remeron)	<ul style="list-style-type: none"> • Stimulates release of serotonin and norepinephrine • Fewer adverse sexual effects • More sedation • Increased appetite 	<ul style="list-style-type: none"> • Refractory depression • Insomnia
Trazodone (Desyrel, Oleptro [extended release])	<ul style="list-style-type: none"> • Sedation • Priapism • Hypotension 	<ul style="list-style-type: none"> • Insomnia
Vilazodone (Viibryd)	<ul style="list-style-type: none"> • SSRI and serotonin 1A (5-HT_{1A}) receptor partial agonist • Fewer adverse sexual effects 	<ul style="list-style-type: none"> • Only indicated for major depressive disorder in adults

GAD, Generalized anxiety disorder; PTSD, posttraumatic stress disorder; OCD, obsessive-compulsive disorder; ADHD, attention deficit hyperactivity disorder.

2. Heterocyclics

- Heterocyclic agents **block the reuptake of norepinephrine and serotonin** at the synapse, increasing the availability of these neurotransmitters and improving mood.
- These agents also block muscarinic acetylcholine and histamine receptors, causing **anticholinergic effects, sedation, and weight gain**. An **overdose may be fatal**.

3. MAO inhibitors

- MAO inhibitors irreversibly limit the action of MAO-A, **increasing the availability of norepinephrine and serotonin** in the synaptic cleft and improving mood.

- b. MAO inhibitors may be particularly useful in treating **atypical depression** (see Chapter 12) and treatment resistance to other agents.
- c. Because **MAO metabolizes tyramine**, a pressor, in the gastrointestinal (GI) tract, the ingestion of tyramine-rich foods (e.g., aged cheese, beer, wine, broad beans, chicken or beef liver, orange pulp, smoked or pickled meats or fish) or sympathomimetic agents (e.g., pseudoephedrine [Sudafed];) can lead to a **hypertensive crisis, which may result in stroke or death**. Serotonergic agents such as TCAs, SSRIs, meperidine (Demerol), and tramadol (Ultram) also must be avoided.
- d. MAO inhibitors are as safe as heterocyclics if **the above precautions** are followed. Adverse effects are similar to those of the heterocyclics.

4. SSRIs and SNRIs

- a. SSRIs and SNRIs selectively **block the reuptake, respectively, of serotonin only and of both norepinephrine and serotonin**, but have little effect on dopamine, histamine, or acetylcholine systems.
- b. Compared with heterocyclic antidepressants, SSRIs are equivalent in efficacy, have **minimal anticholinergic and cardiovascular adverse effects, do not cause sedation, are safer in overdose, and may cause some weight loss**.
- c. SSRIs are now used as **first-line agents for depression**. Compared with other antidepressants, the SSRIs are safer for the elderly.
- d. The SSRIs are also useful in the treatment of **OCD, panic disorder, and premenstrual syndrome**.
- e. Because they cause sexual dysfunction, including delayed orgasm and ejaculation, they are being used to **manage premature ejaculation**.
- f. SNRIs may work more quickly (2–3 weeks) and cause fewer sexual side effects than SSRIs.

B. MOOD STABILIZERS: AGENTS USED TO TREAT MANIA

1. **Lithium carbonate and lithium citrate** are used primarily to treat the mania of bipolar disorder. They also have antidepressant activity.
 - a. Adverse effects include renal dysfunction, cardiac conduction abnormalities, GI distress, tremor, mild cognitive impairment, hypothyroidism, and, rarely, **first-trimester congenital abnormalities**, especially of the cardiovascular system (e.g., Ebstein's anomaly of the tricuspid valve).
 - b. Lithium **takes 2–3 weeks for the therapeutic effect** to begin. An antipsychotic such as **haloperidol**, which works within hours, is therefore the initial treatment for psychotic symptoms in an acute manic episode.
2. **Anticonvulsants, such as carbamazepine (Tegretol) and valproic acid (Depakene, Depakote)**, are also used to treat bipolar disorder, particularly rapid cycling bipolar disorder, which is characterized by more than 4 episodes annually.
3. **Atypical antipsychotics** (Table 10-1) are also used to treat bipolar disorder.

C. ELECTROCONVULSIVE THERAPY

1. Electroconvulsive therapy (ECT) involves inducing a generalized seizure by passing an electric current across the brain of an anesthetized patient.
2. ECT is a safe, effective treatment for **major depressive disorder refractive to other treatment**, the most common indication.
3. ECT is also effective for treatment of depression with psychotic features, acute mania, and schizophrenia with acute, catatonic, or affective symptoms and in depressed elderly or pregnant patients.
4. The maximum response to ECT usually occurs after **5–10 treatments given over a period of 2–3 weeks**.

III Agents Used to Treat Anxiety



Patient Snapshot 10-3. A physician needs to choose an antianxiety agent for a 45-year-old woman with a history of generalized anxiety disorder and substance abuse.

Which agent would best relieve the patient's anxiety but have a low risk of abuse?

(See III B 1.)

A. BENZODIAZEPINES AND BARBITURATES

1. Benzodiazepines relieve the symptoms of anxiety and can be **short-, intermediate-, or long-acting**. These agents also are used in the management of seizures, for muscle relaxation, and in the treatment of alcohol withdrawal (Table 10-4).
2. **Tolerance and dependence** occur with chronic use of these agents. Barbiturates have a **greater potential for abuse and a lower therapeutic index** (i.e., the ratio of minimum toxic dose to therapeutic or effective dose) than benzodiazepines.
3. Flumazenil (Mazicon) is a benzodiazepine receptor antagonist that can reverse the effects of these agents in cases of overdose.

B. NONBENZODIAZEPINES

1. **Buspirone (BuSpar)**, an azaspirodecanedione, is unrelated to the benzodiazepines and is **nonsedating**. In contrast to the benzodiazepines, it is **not associated with dependence, abuse, or withdrawal**. It takes up to 2 weeks for the therapeutic effect to begin.
2. **Zolpidem (Ambien)**, **zaleplon (Sonata)**, **eszopiclone (Lunesta)**, and **ramelteon (Rozerem)** are short-acting non-benzodiazepines that are used to **treat insomnia**.
3. **Propranolol (Inderal)** blocks the action of epinephrine on both β_1 - and β_2 -adrenergic receptors. It is used to treat hypertension but is also useful for treating the **somatic symptoms of anxiety (e.g., tachycardia)** in patients with anxiety disorders such as social phobia (e.g., fear of public speaking).
4. Antidepressants (e.g. SSRIs and SNRIs) are also useful in anxiety disorders.

TABLE 10-4

BENZODIAZEPINES (IN ORDER OF DURATION OF ACTION)

Agent (Brand Name)	Onset of Action	Duration of Action	Clinical Uses in Addition to Treating Anxiety
Alprazolam (Xanax)	Short	Short	Depression, panic disorder, social phobia
Oxazepam (Serax)	Intermediate	Short	Alcohol withdrawal
Triazolam (Halcion)	Intermediate	Short	Insomnia
Clorazepate (Tranxene)	Short	Intermediate	Management of partial seizures
Lorazepam (Ativan)	Intermediate	Intermediate	Psychotic agitation, alcohol withdrawal, acute seizure control
Temazepam (Restoril)	Intermediate	Intermediate	Insomnia
Chlordiazepoxide (Librium)	Short	Long	First-line agent for alcohol withdrawal
Clonazepam (Klonopin)	Short	Long	Seizures, mania, social phobia, panic disorder, OCD
Diazepam (Valium)	Short	Long	Muscle relaxation, analgesia, seizures associated with alcohol withdrawal
Flurazepam (Dalmane)	Short	Long	Insomnia

IV Psychoactive Medications in Pregnancy



Patient Snapshot 10-4. A physician identifies signs of major depression in a 35-year-old woman who is in her 12th week of pregnancy. Although she does not remember which one she took, the patient notes that she responded well to an SSRI that she took for a depressive episode she experienced during her early 20s.

Which SSRI should the doctor avoid in this patient? (See Table 10-5.)

The safety of the fetus is an important issue when women of child-bearing age require psychoactive medication. Since serious psychiatric illness can be life-threatening and the risk to the fetus of most agents is relatively small, psychoactive medication often is started or continued during

TABLE 10-5
FDA PREGNANCY CATEGORIES AND ASSOCIATED PSYCHOACTIVE AGENTS

Pregnancy Category	Antipsychotics	Antidepressants	Mood Stabilizers	Antianxiety Agents
A	None	None	None	None
B	Clozapine	Maprotiline Bupropion	None	Buspirone Zolpidem
C	Aripiprazole Chlorpromazine Fluphenazine Haloperidol Loxapine Olanzapine Perphenazine Pimozide Quetiapine Risperidone Thioridazine Thiothixene Trifluoperazine Ziprasidone	Amitriptyline Amoxapine Clomipramine Desipramine Doxepin Imipramine Nortriptyline Protriptyline Citalopram Escitalopram Fluoxetine Fluvoxamine Sertraline Duloxetine Mitazapine Trazadone Venlafaxine	Lamotrigine	Eszopiclone Zaleplon
D	None	Paroxetine	Carbamazepine Lithium Valproic acid	Alprazolam Chlordiazepoxide Clonazepam Clorazepate Diazepam Lorazepam Oxazepam
X	None	None	None	Flurazepam Temazepam Triazolam

Category A. No risk to the fetus in animal or human studies.

Category B. No or slight risk to the fetus in animal studies, no risk seen in human studies.

Category C. Risk to the fetus in animals; no adequate studies in humans. Potential benefit may warrant use in pregnancy.

Category D. Risk to the fetus in humans. Potential benefit may warrant use in pregnancy.

Category X. Human fetal risk outweighs potential benefits.

pregnancy. Table 10-5 summarizes the Food and Drug Administration (FDA) categorization of the fetal safety of a number of these agents.

Answers to Patient Snapshot Questions

10-1. While this patient is showing improvement in negative symptoms (he is now more outgoing), he is also showing signs of agranulocytosis. These two changes indicate that he has probably been taking clozapine, an atypical antipsychotic agent. The treatment of agranulocytosis, a life-threatening side effect of clozapine, is to stop the medication, hospitalize the patient, and give antibiotic therapy to control the throat infection. When the patient recovers, another antipsychotic can be substituted.

10-2. This patient has probably been taking an MAO inhibitor. She is experiencing a life-threatening hypertensive crisis caused by ingestion of tyramine, which is present in red wine and aged cheese.

10-3. Because this patient has a history of substance abuse, the best antianxiety agent to use is buspirone. In contrast to the benzodiazepines, buspirone is nonaddicting and has a very low risk for abuse. Other good choices are the SNRIs such as venlafaxine or duloxetine.

10-4. Paroxetine is the only SSRI that is in FDA Category D and so should be avoided in this pregnant patient.

Schizophrenia and Other Psychotic Disorders

I Psychiatric Disorders: *The Diagnostic and Statistical Manual of Mental Disorders* (4th Edition, Text Revision [DSM-IV-TR]) and 5th Edition (DSM-5)

- A. In the United States, diagnostic criteria for mental disorders are based on a consensus of opinions of the American Psychiatric Association, which are gathered in book form as the **DSM-IV-TR**. The next revision, **DSM-5**, will be published within a few years.
- B. The *DSM-IV-TR* includes **15 major diagnostic groupings**. These, along with selected proposed *DSM-5* changes, can be found in Table 11-1. One of the first diagnostic groupings is schizophrenia and the psychotic disorders which are the subject of this Chapter.

TABLE 11-1

DSM-IV-TR CATEGORIES AND SELECTED DSM-5 PROPOSED CHANGES

Category	DSM-IV-TR Examples	Selected DSM-5 Proposed Changes
Disorders usually first diagnosed in infancy, childhood, or adolescence	Attention deficit/hyperactivity disorder Autistic disorders	Increase age of symptom appearance from <7 y to <12 y Subsume Asperger syndrome under autism spectrum disorders
Delirium, dementia, and amnesic and other cognitive disorders	Alzheimer dementia	Remove term "dementia" and replace with "major neurocognitive disorders"
Substance-related disorders	Alcohol-related disorders, sedative-related disorders	Combine substance abuse and substance dependence into "addiction and related disorders"
Schizophrenia and other psychotic disorders	Schizophrenia	Remove subtypes of schizophrenia
Mood disorders	Major depressive disorder, bipolar I and II disorders	Add premenstrual dysphoric disorder
Anxiety disorders	Panic disorder, specific phobia Obsessive-compulsive disorder (OCD)	Add hoarding disorder Reclassify OCD
Somatoform disorders	Conversion disorder, hypochondriasis Body dysmorphic disorder	Add complex and simple somatic symptom disorders Reclassify body dysmorphic disorder

(Continued)

TABLE 11-1 DSM-IV-TR CATEGORIES AND SELECTED DSM-5 PROPOSED CHANGES (Continued)

Category	DSM-IV-TR Examples	Selected DSM-5 Proposed Changes
Factitious disorders	Factitious disorder, factitious disorder by proxy	Change factitious disorder by proxy to factitious disorder imposed on another
Dissociative disorders	Dissociative amnesia, dissociative fugue	Reclassify dissociative fugue
Sexual and gender identity disorders	Secondary erectile dysfunction, gender identity disorders	Add hypersexual disorder, remove sexual aversion disorder
Eating disorders	Anorexia nervosa, bulimia nervosa	Add “binge-eating disorder”
Sleep disorders	Primary sleep disorders, sleep disorders related to another mental disorder	Add REM behavior disorder and Kleine–Levin syndrome
Impulse-control disorders not elsewhere classified	Intermittent explosive disorder, pathological gambling	Move pathological gambling to substance-related disorders
Adjustment disorders	Adjustment disorder with depressed mood or anxiety	Subsume into a new group called “trauma and stress-related disorders”
PDs	Paranoid PD, antisocial PD	Subsume all PDs into a few PD “types” based on their core components
Other conditions that may be a focus of clinical attention	Problems relating to abuse or neglect, malingering	Consider gender and ethnicity in diagnosis



Patient Snapshot 11-1. When a 21-year-old male college student refuses to leave the closet in his dormitory room for 2 days, the campus police are called. The student’s roommate reports that, over the past 3 months, the student’s behavior has become increasingly bizarre. A month ago he reported hearing a voice repeatedly saying “you are an evil seed,” and a few weeks ago he accused the roommate of trying to read his mind. The roommate notes that to his knowledge, the student is not taking psychoactive drugs. The student is admitted to the hospital, where medical examination, toxicology screening, and laboratory test results are unremarkable.

What is the most appropriate diagnosis for this patient at this time and what is his prognosis? (See Table 11-2.)

II Overview of Schizophrenia and the Psychotic Disorders (Table 11-2)

- A. SCHIZOPHRENIA** is a chronic mental disorder that is present in about 1% of the population in all countries and ethnic groups studied. The disorder is characterized by the following:
- 1. Periods of psychosis** (active phases) in which loss of touch with reality characterized by delusions and hallucinations (see Table 11-3) occurs.
 - 2. Periods between psychotic episodes** (residual phases), in which the person is in touch with reality but shows disturbances in behavior, appearance, speech and affect and has peculiar thinking.
- B. THE OCCURRENCE OF SCHIZOPHRENIA** shows no sex difference, but there are sex differences in its presentation.
- 1. Schizophrenia often develops at a younger age in males (15–25 years) than in females (25–35 years).**
 - 2. Men are less responsive to antipsychotic medication** and show more deficits in social and cognitive function than women.

TABLE 11-2





DIFFERENTIAL DIAGNOSES OF SCHIZOPHRENIA

Disorder	Characteristics
Schizophrenia	Psychotic and residual symptoms lasting ≥ 6 mo
Brief psychotic disorder	Psychotic symptoms lasting >1 d but <1 mo There are often precipitating stressful psychosocial factors
Schizophreniform disorder	Psychotic and residual symptoms lasting 1–6 mo
Schizoaffective disorder	Symptoms of a mood disorder as well as schizophrenia Psychotic symptoms sometimes occur without previous mood symptoms
Manic phase of bipolar disorder	Psychotic symptoms, elevated mood, hyperactivity, rapid speech, increased sociability Little or no impairment in social or occupational functioning between episodes
Delusional disorder	Fixed, pervasive, nonbizarre delusional system in a patient or his close relative (shared delusional disorder) Few if any other thought disorders Relatively normal social and occupational functioning
Schizoid PD	Social withdrawal without psychosis
Schizotypal PD	Peculiar behavior and odd thought patterns, such as magical thinking (i.e., believing that something one wishes can alter the course of events in the world) No frank psychosis
Borderline PD	Extreme mood changes with uncontrollable anger and episodic suicidal thoughts Transient paranoia or dissociation
Substance-induced psychotic disorder	Prominent hallucinations (often visual or tactile) or delusions directly related to the use of stimulants or hallucinogens or withdrawal from sedatives
Psychotic disorder due to a general medical condition	Clouding of consciousness Hallucinations are visual and changeable rather than auditory and recurrent Occurs in the context of an acute medical illness but is not due to delirium or dementia

Adapted with permission from Fadem B, Simring S. *High-Yield Psychiatry* (2nd ed.). Baltimore, MD: Lippincott Williams & Wilkins; 2003:63.

TABLE 11-3

ILLUSIONS, HALLUCINATIONS, DELUSIONS, AND IDEAS OF REFERENCE

Symptom	Definition	Patient Snapshot
Illusion	Misperception of real external stimuli	 A man who is alone in a room in the dark thinks that his jacket on the chair is a man
Hallucination	False sensory perception	 A woman who is alone in a room hears a voice outside her head telling her to jump from the window
Delusion	False belief not shared by others	 A homeless woman tells the physician that she is being followed by government agents
Idea of reference	False belief of being referred to by others	 A man states that a television host is talking about him every morning

III Etiology

A. NEUROLOGICAL FACTORS

1. Hyperactivity of the **dopaminergic, serotonergic, and noradrenergic systems**.
2. Enlargement of the **lateral and third ventricles**.
3. Decreased glucose use in the **prefrontal cortex**.
4. Decreased volume of the **hippocampus and amygdala**.
5. Neuropsychological deficits such as **psychomotor and attentional difficulties**.

B. SOCIAL FACTORS

1. Social factors do not cause schizophrenia although it is diagnosed more often in populations of **low socioeconomic status**.
2. This increased incidence is likely because of **downward drift** into lower socioeconomic groups, which occurs because individuals with schizophrenia show decreased social and occupational functioning.

IV Clinical Signs and Symptoms

A. PEOPLE WITH SCHIZOPHRENIA show evidence of **disordered thinking** as well as psychotic symptoms such as **hallucinations**, most commonly auditory, and **delusions** (Table 11-3). **Flat, blunted, or inappropriate affect** may also be present.

1. Symptoms must be present for **6 months** or more, with **impairment of occupational or social functioning**.
2. The patient is usually alert, **oriented to person, place, and time**, and has a **good memory**; if not, a cognitive disorder should be suspected (see Chapter 13).

B. CLASSIFICATION OF SYMPTOMS. Symptoms of schizophrenia can be classified as positive or negative. This classification can be useful in predicting the effects of antipsychotic medication.

1. Positive symptoms

- a. Are characteristics **additional** to expected behavior including delusions, hallucinations, agitation, and talkativeness.
- b. Are related to **hyperactivity of the mesolimbic dopaminergic tract**.
- c. Respond well to **traditional and atypical antipsychotic medication**.

2. Negative symptoms

- a. Are characteristics **missing** from expected behavior including flattening of affect, deficiencies in speech content, poor grooming, lack of motivation, and social withdrawal.
- b. Are related to **hypoactivity of the mesocortical dopaminergic tract**.
- c. Respond better to **atypical agents** than to traditional antipsychotics.

C. THOUGHT DISORDERS

1. **Disorders of thought content** include **delusions and ideas of reference**. A distinction is made between these disorders and perceptual disturbances such as hallucinations and illusions (Table 11-3).
2. **Disorders of thought form** include loose associations (i.e., loss of logical meaning between thoughts), word salad (i.e., using unrelated combination of words), neologisms (i.e., using newly invented words), and echolalia (i.e., repeating words).

3. **Disorders of thought processes** include flight of ideas (i.e., rapid succession of thoughts), short attention span, loss of abstraction abilities, and clang associations (i.e., speaking in rhyming words).

D. SUBTYPES AND DIFFERENTIAL DIAGNOSIS

1. **Subtypes.** The *DSM-IV-TR* lists 5 subtypes of schizophrenia: disorganized, catatonic, paranoid, undifferentiated, and residual (Table 11-4).



Patient Snapshot 11-2. A 22-year-old medical student with no history of psychiatric illness or drug abuse tells her friend that she believes that the dean of the medical school is poisoning the food in the cafeteria. She is alert and oriented but seems anxious and frightened. Her symptoms started 2 weeks ago, when she found out that she had failed the first anatomy exam.

What is the most appropriate diagnosis for this student at this time and what is her prognosis? (See IV D 2 b and Table 11-2.)

2. **Other disorders characterized by psychotic symptoms and bizarre behavior**
- All psychotic disorders are characterized at some point in their course by a **loss of touch with reality** (e.g., delusions and/or hallucinations). However, other psychotic disorders do not include all of the criteria required for the diagnosis of schizophrenia.
 - Differential diagnoses** of schizophrenia include other psychotic disorders such as brief psychotic disorder, schizophreniform disorder, schizoaffective disorder, and delusional disorder (see Table 11-2).
 - The differential diagnosis also includes the **manic phase of bipolar disorder** (Chapter 12), schizoid and schizotypal **personality disorders** (PDs; Chapter 14), and **delirium** (Chapter 13).

V

Prognosis and Management

A. PROGNOSIS

- Schizophrenia usually involves repeated psychotic episodes and a **chronic downhill course** over years.
- A **good prognosis** is associated with presence of mood symptoms, female gender, good social and work relationships, positive symptoms, older age at onset, and absence of neurological symptoms.

TABLE 11-4

DSM-IV SUBTYPES OF SCHIZOPHRENIA

Subtype	Characteristics
Disorganized	Disinhibited, disorganized, disheveled personal appearance, inappropriate emotional responses; onset before age 25
Catatonic	Stupor or agitation, lack of coherent speech, bizarre posturing (waxy flexibility)
Paranoid	Delusions of persecution; better social functioning and older age at onset than other subtypes
Undifferentiated	Characteristics of more than 1 subtype
Residual	At least 1 psychotic episode; subsequent flat affect, illogical thinking, odd behavior, and social withdrawal, but no severe psychotic symptoms

- 3. Suicide** is common in patients with schizophrenia. More than 50% attempt suicide, and at least 10% of those die in the attempt. **Risk factors** for suicide in patients with schizophrenia include male sex, college education, youth, many relapses, depressed mood, high ambitions, and living alone.

B. MANAGEMENT

- 1. Antipsychotic agents**, particularly the atypicals, are used in the long-term management of patients with schizophrenia (see Table 10-1). Long-acting, injectable “depot” forms (e.g., haloperidol or fluphenazine decanoate) can improve functioning in patients whose symptoms may lead to non-adherence.
- 2. Psychosocial interventions**, such as behavioral, family, group, and individual therapy, provide long-term social support and foster compliance with the drug regimen.

Answers to Patient Snapshot Questions

11-1. The most appropriate diagnosis for this patient at this time is schizophreniform disorder. His symptoms, for example, auditory hallucinations and delusions (e.g., the roommate trying to read his mind) have been present for more than 1 month but less than 6 months and there is no evidence of medical illness or drug abuse. Schizophreniform disorder may or may not resolve. If the patient's symptoms have not resolved after 6 months, he may be diagnosed with schizophrenia that typically lasts throughout life.

11-2. The most appropriate diagnosis for this patient at this time is brief psychotic disorder. This disorder is characterized by psychotic symptoms (e.g., the delusion that someone is trying to harm her) with no evidence of medical illness or drug abuse. The symptoms last up to 1 month, commonly occur following a stressful life event (e.g., failing an important examination), and typically resolve completely.

Mood Disorders

I Definition, Categories, and Epidemiology



Patient Snapshot 12-1. A 35-year-old man comes to his physician complaining of tiredness and mild headaches, which have been present for the past 8 months. The patient relates that he is not interested in playing basketball, a game he formerly enjoyed, nor does he have much interest in sex or food. The patient denies that he is depressed but tells the physician, “Maybe I am more trouble to my family than I am worth.” Physical examination and laboratory testing are unremarkable except that the patient, who has maintained a normal weight for years, has lost 25 lb since his last visit 1 year ago.

What is wrong with this patient? (See III A 1 and Table 12-1.)

- A. DEFINITION.** In mood disorders, emotions that the individual cannot control cause **serious distress** and **occupational problems, social problems,** or both.
- B. MAJOR CATEGORIES**
- 1. Major depressive disorder.** Patients with this disorder have recurrent episodes of depressed mood (see III A 1 and Table 12-1), each episode lasting at least 2 weeks.
 - 2. Bipolar disorder**
 - a. Bipolar I disorder.** Patients have episodes of both mania (i.e., greatly elevated mood) and depression. Identification of one manic episode is adequate for this diagnosis.
 - b. Bipolar II disorder.** Patients have episodes of both hypomania (i.e., mildly elevated mood) and depression.
 - 3. Dysthymic disorder.** Patients with this disorder are mildly depressed (dysthymia) most of the time for at least 2 years, with no discrete episodes of illness.
 - 4. Cyclothymic disorder.** Patients have alternating periods of dysthymia and hypomania lasting at least 2 years with no discreet episodes of illness.
- C. EPIDEMIOLOGY**
- 1. Lifetime prevalence**
 - a.** The lifetime prevalence of major depressive disorder is about **2 times higher in women than in men**; lifetime prevalence, respectively, is 10%–20% for women, 5%–12% for men.
 - b.** The lifetime prevalence of bipolar disorder (1%) is about **equal in men and women.**
 - 2. No ethnic differences** are found in the occurrence of mood disorders. Because of limited access to health care, bipolar disorder in poor patients may progress to a point at which the condition is misdiagnosed as schizophrenia.

TABLE 12-1

SYMPTOMS OF DEPRESSION AND MANIA

Symptom	Likelihood of Occurrence
Depression	
Feelings of sadness, hopelessness, helplessness, and low self-esteem	+++
Reduced interest or pleasure in most activities (anhedonia)	+++
Feelings of guilt and anxiety	+++
Reduced energy and motivation	+++
Sleep problems (e.g., waking frequently at night and too early in the morning)	+++
Difficulty with memory and concentration	++
Physically slowed down (particularly in the elderly) or agitated	++
Decreased appetite for sex and food (with weight loss)	++
Depressive feelings are worse in the morning than in the evening	++
Suicidal thoughts	++
Makes suicide attempt or commits suicide	+
False beliefs (delusions) often of destruction and fatal illness	+
Mania	
Strong feelings of mental and physical well-being	+++
Feelings of self-importance	+++
Irritability and impulsivity	+++
Uncharacteristic lack of modesty in dress or behavior	+++
Inability to control aggressive impulses	+++
Inability to concentrate on relevant stimuli	+++
Compelled to speak quickly (pressured speech)	+++
Thoughts move rapidly from one to the other (flight of ideas)	+++
Impaired judgment	+++
Delusions, often of power and influence	++

+++, seen in most patients; ++, seen in many patients; +, seen in some patients.

II

Etiology

A. BIOLOGICAL FACTORS

1. **Neurotransmitter activity** is altered in patients with mood disorders (see Chapter 9).
2. **Abnormalities of the limbic–hypothalamic–pituitary–adrenal axis** are seen (see Chapter 16).
3. **Sleep patterns** (see Chapter 7) often are altered in patients with mood disorders.

B. PSYCHOSOCIAL FACTORS

1. The **loss of a parent in the first decade of life** and the **loss of a spouse** or child in adulthood correlate with major depressive disorder.
2. **“Learned helplessness”** (i.e., when attempts to escape a bad situation prove futile; see Chapter 5), **low self-esteem**, and **loss of hope** may be related to the development of depression.
3. Psychosocial factors are **not involved in the etiology of mania or hypomania**.

III Clinical Signs and Symptoms

A. DEPRESSION (Table 12-1)

1. The patient “**SAGS**” with depression.
 - a. **S: Sadness** (unhappiness).
 - b. **A: Anhedonia** (inability to feel pleasure in things one formerly enjoyed).
 - c. **G: Guilt** (unwarranted feelings of fault).
 - d. **S: Suicidality** (has serious thoughts of or tries killing oneself).
2. Some patients seem unaware of or deny depression (i.e., **masked depression**), even though symptoms are present (see Patient Snapshot 12-1).
3. Patients who experience delusions or hallucinations while depressed have **depression with psychotic features**.
4. **Depression with atypical features** is characterized by oversleeping, overeating, and feeling that one’s arms and legs are as heavy as lead (“leaden paralysis”).
5. **Seasonal affective disorder** is a specifier used for major depressive disorder associated with short day length; management involves increasing light exposure using artificial lighting.

B. MANIA (see Table 12-1). In contrast to depressed patients, manic patients are quickly identified because **judgment is impaired**, and the patient often violates the law.

IV Differential Diagnosis, Prognosis, and Management

A. DIFFERENTIAL DIAGNOSIS. Certain medical diseases, neurological disorders, psychiatric disorders, and use of prescription drugs are associated with mood symptoms (Table 12-2).

B. PROGNOSIS

1. **Depression is a self-limiting disorder**, with untreated episodes lasting about 6–12 months each.
2. A **manic episode is also self-limiting**, each untreated episode lasts approximately 3 months.
3. Patients with major depressive disorder and bipolar disorder usually are mentally healthy between episodes.

TABLE 12-2

OTHER CAUSES OF MOOD SYMPTOMS

Category	Examples
Endocrine	Thyroid, adrenal, or parathyroid dysfunction, diabetes
Infectious	Pneumonia, mononucleosis, AIDS
Inflammatory	Systemic lupus erythematosus, rheumatoid arthritis
Medical	Pancreatic and other cancers; renal and cardiopulmonary disease
Neurological	Parkinson disease, epilepsy, multiple sclerosis, stroke, brain trauma or tumor, dementia
Nutritional	Nutritional deficiency
Prescription drugs	Reserpine, propranolol, steroids, methyldopa, oral contraceptives
Psychiatric	Anxiety disorders, schizophrenia, eating disorders, somatoform disorders, adjustment disorders, bereavement
Substance abuse	Use of or withdrawal from sedatives, withdrawal from stimulants or opioids

- C. MANAGEMENT.** Depression is successfully treated in most patients. However, **because of the social stigma associated with mental illness**, only approximately 25% of patients with major depression seek and receive treatment.
- 1. Pharmacological management**
 - a. The effects of antidepressant agents (see Chapter 10) are usually seen in **3–6 weeks**.
 - b. Compared with cyclic antidepressants and monoamine oxidase inhibitors (MAOIs), **selective serotonin reuptake inhibitors** are often used as first-line agents because they have fewer adverse effects.
 - c. Patients with atypical depression are more likely to respond to MAOIs than to other agents.
 - d. **Lithium** is the drug of choice for maintenance in patients with **bipolar disorder**. Anticonvulsants are also effective (see Chapter 10). Antipsychotics are used to treat acute manic episodes because they resolve symptoms quickly.
 - 2. Electroconvulsive therapy** is also used to treat mood disorders (see Chapter 10).
 - 3. Psychological management**
 - a. Psychological treatment of mood disorders includes interpersonal, family, behavioral, cognitive, and psychoanalytic therapy (see Chapter 4).
 - b. **Psychological treatment in conjunction with pharmacological management is more effective** than either form of treatment alone for depression and dysthymia.
 - c. **Pharmacological management** is the most effective treatment for bipolar disorder and cyclothymic disorder.

Answer to Patient Snapshot Question

12-1. This patient has symptoms of “masked” depression. He does not recognize that he is depressed, even though symptoms of depression (e.g., vague physical complaints, lack of interest in former activities, lack of interest in sex, and weight loss) have been present for the past 8 months.

Cognitive Disorders

I Overview

A. ETIOLOGY

1. **Cognitive disorders** (formerly called organic mental syndromes) are caused primarily by abnormalities in the chemistry, structure, or physiology of the brain.
2. The problem may originate in the brain itself or may result from **physical illness** affecting the brain.



Patient Snapshot 13-1. A 25-year-old patient who was hospitalized with herpes encephalitis 1 year ago now shows impairment in memory, the inability to register new memories, and emotional lability.

What is the most appropriate diagnosis for this patient at this time?

- B. TYPES.** The major cognitive disorders are **delirium, dementia, and amnesic disorder**. Characteristics of these disorders are listed in Table 13-1.

C. MAJOR FEATURES

1. The behavioral hallmarks of cognitive disorders are **cognitive problems**, such as **deficits in memory, orientation, or judgment**.
2. Mood changes, anxiety, irritability, paranoia, and psychosis, if present, are secondary to the cognitive loss.



Patient Snapshot 13-2. A 74-year-old hypertensive man whose mental functioning was typical until 1 month ago suddenly cannot remember how to turn on the TV. While his wife reports that he is generally “like his old self,” she also notes that he has been walking more slowly and has urinated in bed on at least 2 occasions.

What is the most likely diagnosis for this patient at this time? (See Table 13-2.)




II Dementia of the Alzheimer Type (Alzheimer Disease)

A. DIAGNOSIS

1. Alzheimer disease is the **most common type of dementia**. In confused elderly persons, depression must first be ruled out because depressed patients also have cognitive problems (Chapter 12). Causes of dementia other than Alzheimer disease are described in Table 13-2.
2. **Typical aging** is associated with reduced ability to learn new information quickly and a general slowing of mental processes. In contrast to Alzheimer disease, changes associated with typical aging do not interfere with normal activities.
3. Problems with motor speed, control, and coordination as well as abnormal movements such as chorea, tics, and dystonia are less common in Alzheimer disease, than in some other dementias.

TABLE 13-1

CHARACTERISTICS OF THE COGNITIVE DISORDERS

Characteristic	Delirium	Dementia	Amnesic Disorder
	 <p>Three days after surgery to repair an aortic aneurysm, a 70-year-old woman with no psychiatric history seems confused and frightened</p>	 <p>A 76-year-old retired banker is alert but cannot relate what day, month, or year it is, nor can he identify the object in his hand as a cup</p>	 <p>An alert 50-year-old man with a 30-year history of alcoholism claims that he was born in 1995</p>
Hallmark	Impaired consciousness	Loss of memory and intellectual abilities, but with a normal level of consciousness	Loss of memory, with few other cognitive problems and a normal level of consciousness
Occurrence	<ul style="list-style-type: none"> • More common in children and the elderly • Causes psychiatric symptoms in medical and surgical patients 	<ul style="list-style-type: none"> • Increased incidence with age • Seen in about 20% of individuals older than age 65 	<ul style="list-style-type: none"> • Patients commonly have a history of alcohol abuse
Etiology	<ul style="list-style-type: none"> • CNS disease, trauma, or infection • Systemic disease • High fever • Substance abuse • Substance withdrawal 	<ul style="list-style-type: none"> • Alzheimer disease • Vascular disease • CNS disease, trauma, or infection (e.g., HIV) • Lewy body dementia • Pick disease • Parkinson disease 	<ul style="list-style-type: none"> • Thiamine deficiency due to long-term alcohol abuse leading to destruction of mediotemporal lobe structures (Korsakoff syndrome) • Temporal lobe trauma, disease, or infection • Herpes simplex encephalitis (limbic system damage)
Associated physical findings	<ul style="list-style-type: none"> • Acute medical illness • Autonomic dysfunction • Abnormal EEG 	<ul style="list-style-type: none"> • No medical illness • Little autonomic dysfunction • Normal EEG 	<ul style="list-style-type: none"> • No medical illness • Little autonomic dysfunction • Normal EEG
Associated psychological findings	<ul style="list-style-type: none"> • Poor orientation to person, place, and time • Illusions or hallucinations • Anxiety and agitation • Worsening of symptoms at night 	<ul style="list-style-type: none"> • No psychotic symptoms • Depression • Little diurnal variability 	<ul style="list-style-type: none"> • No psychotic symptoms • Depression • Little diurnal variability
Course	<ul style="list-style-type: none"> • Develops quickly • Fluctuating course with lucid intervals 	<ul style="list-style-type: none"> • Develops slowly • Progressive course 	<ul style="list-style-type: none"> • Course depends on the cause
Management and prognosis	<ul style="list-style-type: none"> • Increase external sensory stimuli • Identify and treat the underlying medical cause and symptoms usually remit 	<ul style="list-style-type: none"> • Provide medical and psychological support • Usually irreversible 	<ul style="list-style-type: none"> • Identify and treat the underlying medical cause • May be temporary or chronic, depending on the cause

EEG, electroencephalogram.

TABLE 13-2

DIFFERENTIATING DEMENTIAS

Type of Dementia	Onset	Presents with	Functional Deterioration	Focal Neurological Signs	Other Characteristics
Alzheimer	Gradual	Memory loss	Steady	No	Enlarged brain ventricles
Vascular (multi-infarct)	Sudden	Memory loss	Stepwise	Yes	Gait abnormalities, incontinence, hyperintensities on MRI
Pick disease (frontotemporal)	Gradual	Behavioral changes, e.g., disinhibition or apathy	Steady	No	Inappropriate affect, unclear speech, family history
Lewy body	Gradual	Visual hallucinations; parkinsonism; blank staring	Steady	Yes	Marked sensitivity to antipsychotic agents, REM sleep behavior disorder

B. CLINICAL COURSE

1. Patients show a **gradual loss of memory and intellectual abilities**, inability to control impulses, and lack of judgment.
2. Later in the illness, symptoms include confusion and psychosis that progress to coma and **death** (usually **8–10 years from diagnosis**).

C. PATHOPHYSIOLOGY

1. Several gross and microscopic **neuroanatomic, neurophysiological, neurotransmitter, and genetic factors** are implicated in Alzheimer disease (Table 13-3).
2. Alzheimer disease is **seen more commonly in women**.

D. MANAGEMENT

1. **Pharmacological interventions** include
 - a. **Psychotropic agents** to treat associated symptoms of anxiety, depression, or psychosis.
 - b. **Acetylcholinesterase inhibitors**. Donepezil (Aricept), rivastigmine (Exelon), and galantamine (Reminyl) to prevent the breakdown of acetylcholine.
 - c. **N-Methyl-D-aspartate (NMDA) receptor antagonists** such as memantine (Namenda) to prevent overstimulation of NMDA receptors by **glutamate and calcium**.
 - d. Acetylcholinesterase inhibitors and NMDA receptor antagonists are used to **temporarily slow progression** of the disease. These agents cannot restore function already lost.
2. The most effective **behavioral interventions** involve providing a structured environment, including
 - a. Putting labels on doors identifying the room's function.
 - b. Providing daily written information about time, date, and year.
 - c. Providing daily written activity schedules.
 - d. Providing practical safety measures (e.g., disconnecting the stove).

TABLE 13-3**PATHOPHYSIOLOGY OF ALZHEIMER DISEASE**

Category	Characteristics
Gross neuroanatomy	<ul style="list-style-type: none"> • Enlarged ventricles, diffuse atrophy, flattened sulci
Microscopic neuroanatomy	<ul style="list-style-type: none"> • Amyloid plaques and neurofibrillary tangles (also seen in Down syndrome and, to a lesser extent, in typical aging) • Loss of cholinergic neurons in the basal forebrain • Neuronal loss and degeneration in the hippocampus and cortex
Neurophysiology	<ul style="list-style-type: none"> • Reduction in brain levels of choline acetyltransferase, which is needed to synthesize acetylcholine • Abnormal processing of amyloid precursor protein • Decreased membrane fluidity as a result of abnormal regulation of membrane phospholipid metabolism
Neurotransmitters	<ul style="list-style-type: none"> • Hypoactivity of acetylcholine and norepinephrine • Excitotoxicity due to influx of glutamate and calcium • Abnormal activity of somatostatin, vasoactive intestinal polypeptide, and corticotropin
Genetic associations (see also Table 8-3)	<ul style="list-style-type: none"> • Abnormalities of chromosome 21 (as in Down syndrome) • Abnormalities of chromosomes 1 and 14 (implicated particularly in Alzheimer disease occurring before age 65) • Possession of at least 1 copy of the apo E₄ gene on chromosome 19

Answers to Patient Snapshot Questions

13-1. Retrograde (for past events) and anterograde (inability to put down new memories) amnesia as well as emotional lability can be sequelae of herpes encephalitis. Without the other major signs and symptoms of dementia, the most appropriate diagnosis for this patient is amnesic disorder.

13-2. A history of cardiovascular illness (e.g., hypertension), sudden cognitive loss (forgetting how to turn on the TV), focal neurological symptoms (slowed gait), and incontinence in the presence of well-preserved personality characteristics indicate that this patient is showing the onset of vascular dementia.

Other Psychiatric Disorders

I Anxiety Disorders



Patient Snapshot 14-1. A 34-year-old man tells his physician that he is frequently troubled by recurrent thoughts that gas is leaking from his stove and will kill him as he sleeps. He has had the stove checked and no leakage has been found. Despite the fact that he knows there is no leakage, the patient's negative thoughts persist and, because he gets out of bed so often to make sure that the burners are turned off, he frequently feels exhausted during the day.

What disorder does this man have, and what is the most effective management? (See Table 14-1 and I C 2.)

A. CHARACTERISTICS

1. **Fear** is a normal reaction to a known environmental source of danger. Individuals with **anxiety** experience apprehension, but the **source of danger is unknown or is inadequate to account for the symptoms.**
2. The **physical characteristics** of anxiety are similar to those of fear. They include restlessness, shakiness, dizziness, palpitations (subjective experience of tachycardia), mydriasis (pupil dilation), tingling in the extremities, numbness around the mouth, gastrointestinal disturbances such as diarrhea and other signs of irritable bowel syndrome, and urinary frequency.
3. **Organic causes** of anxiety include excessive caffeine intake, substance abuse, vitamin B₁₂ deficiency, hyperthyroidism, hypoglycemia, anemia, pulmonary disease, cardiac arrhythmia, and pheochromocytoma (adrenal tumor).
4. The **neurotransmitters** involved in the manifestations of anxiety include decreased γ -aminobutyric acid (GABA) and serotonin activity, and increased norepinephrine activity (see Chapter 9).

B. CLASSIFICATION. The *Diagnostic and Statistical Manual of Mental Disorders* (4th edition, Text Revision [DSM-IV-TR]), classification of anxiety disorders includes **panic disorder, phobias, obsessive-compulsive disorder, acute stress disorder, posttraumatic stress disorder, and generalized anxiety disorder.** A related disorder, adjustment disorder, often must be distinguished from posttraumatic stress disorder (Table 14-1).

C. MANAGEMENT

1. **Benzodiazepines and buspirone** are used to manage anxiety (see Chapter 10). The **β -blockers** (e.g., propranolol) are used also particularly to control the **autonomic symptoms of anxiety.**
2. **Antidepressants**, particularly the selective serotonin reuptake inhibitors (**SSRIs**) (see Chapter 10), are the most effective long-term therapy for **panic disorder and OCD.**

TABLE 14-1

**DSM-IV-TR CLASSIFICATION OF THE ANXIETY DISORDERS
AND ADJUSTMENT DISORDER**

Classification	Characteristics
Panic disorder ^a	<ul style="list-style-type: none"> • Episodic periods of intense anxiety with a sudden onset, each episode lasting approximately 30 min • Cardiac and respiratory symptoms and feelings of impending doom • More common in young women in their 20s • Attacks can be induced by administration of sodium lactate or CO₂ • Strong genetic component
Phobias (specific and social)	<ul style="list-style-type: none"> • Irrational fear of specific things (e.g., snakes, airplane travel, injections) or social situations (e.g., public speaking, eating in public, using public restrooms) • Because of the fear, the patient avoids the object or social situation; this avoidance leads to social and occupational impairment
Obsessive–compulsive disorder (OCD)	<ul style="list-style-type: none"> • Recurrent negative, intrusive thoughts, feelings, and images (i.e., obsessions), which cause anxiety • Performing repetitive actions (i.e., compulsions, such as hand washing) relieves the anxiety • Patients have insight (i.e., they realize that the obsessions and compulsions are irrational and want to eliminate them)
Generalized anxiety disorder	<ul style="list-style-type: none"> • Persistent anxiety symptoms lasting 6 mo or more • Gastrointestinal symptoms are common • Symptoms are not related to a specific person or situation (i.e., symptoms are “free-floating”)
Posttraumatic stress disorder (PTSD) and acute stress disorder (ASD)	<ul style="list-style-type: none"> • Emotional symptoms, intrusive memories, guilt, and symptoms occurring after a potentially catastrophic or life-threatening event (e.g., rape, earthquake, fire, serious accident) • In PTSD, symptoms last for >1 mo and can last for years • In ASD, symptoms last only between 2 d and 4 wk
Adjustment disorder	<ul style="list-style-type: none"> • Emotional symptoms (e.g., anxiety, depression, conduct problems) causing social, school, or work impairment that occur within 3 mo and last less than 6 mo after a stressful life event (e.g., divorce, bankruptcy, moving)

^aPanic disorder may or may not be associated with agoraphobia (i.e., fear of open places or situations involving the inability to escape or to obtain help).

II

Somatoform Disorders, Factitious Disorder, and Malingering



Patient Snapshot 14-2. A 50-year-old man reports that he has felt “sick” and “weak” for the last 10 years. He believes that he has stomach cancer and frequently changes physicians (i.e., goes “doctor shopping”) when one cannot find anything wrong with him. He often misses work and social events because he is so worried about his health. Physical examination is unremarkable.

What diagnosis best fits this clinical picture, and what is the most effective management? (See Table 14-2 and II A 3.)

A. CHARACTERISTICS, CLASSIFICATION, AND MANAGEMENT

1. Patients with somatoform disorders are characterized as having physical symptoms without sufficient organic cause. The most important differential diagnosis is unidentified organic disease.
2. The *DSM-IV-TR* categories of somatoform disorders and their characteristics are listed in Table 14-2.

TABLE 14-2

DSM-IV-TR CLASSIFICATION OF SOMATOFORM DISORDERS

Classification	Characteristics
Somatization disorder	<ul style="list-style-type: none"> • History of multiple physical complaints (e.g., nausea, dyspnea, menstrual problems) over years • Onset before 30 y of age
Conversion disorder	<ul style="list-style-type: none"> • Sudden loss of sensory or motor function (e.g., blindness, paralysis, pseudoseizures) • Often associated with a stressful life event • Patients appear relatively unconcerned (<i>la belle indifférence</i>) • More common in adolescents and young adults
Hypochondriasis	<ul style="list-style-type: none"> • Exaggerated concern with health and illness lasting at least 6 mo • Patient goes to different physicians seeking help (“doctor shopping”) • More common in middle and old age
Body dysmorphic disorder	<ul style="list-style-type: none"> • Normal-appearing patient believes he or she appears abnormal • Patient may refuse to appear in public • Patient seeks plastic surgery
Pain disorder	<ul style="list-style-type: none"> • Intense, prolonged pain not explained completely by physical disease • Onset usually in the 30s and 40s

3. **Management** includes forming a good physician–patient relationship, including scheduling regular appointments and providing ongoing reassurance.

B. **FACTITIOUS DISORDER AND MALINGERING.** Individuals with somatoform disorders truly believe that they are ill, but patients with factitious and related disorders **feign illness for psychological (factitious disorder) or tangible (malinger) gain** (Table 14-3).

III Personality Disorders



Patient Snapshot 14-3. A 40-year-old man asks his physician to see him first whenever he has an appointment with her. The patient states that the physician should not be annoyed

TABLE 14-3

DSM-IV-TR CLASSIFICATION OF FACTITIOUS DISORDER AND MALINGERING

Classification	Characteristics
Factitious disorder ^a	<ul style="list-style-type: none"> • Conscious simulation or induction of physical or psychiatric illness for the purpose of receiving attention from medical personnel • Patient undergoes unnecessary medical and surgical procedures • May have a “grid abdomen” (multiple crossed scars from repeated surgeries)
Factitious disorder by proxy	<ul style="list-style-type: none"> • Conscious simulation or induction of physical or psychiatric illness in another person, typically in a child by a parent, to receive attention from medical personnel • Is a form of child abuse and must be reported to child welfare authorities
Malingering	<ul style="list-style-type: none"> • Conscious simulation of physical or psychiatric illness for financial or other obvious gain • Avoids treatment by medical personnel • Health complaints cease when the desired gain is achieved

^aFormerly called Münchhausen syndrome.

by this request, but instead should understand that he should get special treatment because he is “superior” to her other patients.

What personality disorder best fits this clinical picture? (See Table 14-4.)

A. CHARACTERISTICS AND CLASSIFICATION

1. Patients with personality disorders have **long-standing, rigid, unsuitable patterns of relating to others** that cause social and occupational problems.

TABLE 14-4

DSM-IV-TR CLASSIFICATION OF PERSONALITY DISORDERS

Pain disorder	Characteristics
Cluster A	Hallmarks: peculiar, avoids social relationships; not psychotic Genetic associations: psychotic illnesses
Paranoid	<ul style="list-style-type: none"> • Suspicious, mistrustful, litigious • Responsibility for own problems attributed to others • Doubts the physician’s motives when ill
Schizoid	<ul style="list-style-type: none"> • Lifelong pattern of voluntary social withdrawal without psychosis • Becomes even more withdrawn when ill
Schizotypal	<ul style="list-style-type: none"> • Peculiar appearance • Odd thought patterns and behavior (e.g., communication with animals) without psychosis
Cluster B	Hallmarks: dramatic, erratic Genetic associations: mood disorders, substance abuse
Histrionic	<ul style="list-style-type: none"> • Extroverted, emotional, sexually provocative behavior • Inability to maintain intimate relationships • Presents symptoms in a dramatic manner when ill
Narcissistic	<ul style="list-style-type: none"> • Grandiosity, envy, and sense of entitlement • Lack of empathy for others • Illness or treatment can threaten self-image • Insists on special consideration when ill
Antisocial	<ul style="list-style-type: none"> • Inability to conform to social norms; criminality • Diagnosed as conduct disorder in those younger than age 18 • Commonly used terms are <i>psychopath</i> and <i>sociopath</i>
Borderline	<ul style="list-style-type: none"> • Unstable; impulsive mood and behavior • Feels bored, empty, and alone • Suicide attempts for trivial reasons • Self-mutilation • Eating disorders
Cluster C	Hallmarks: fearful, anxious Genetic associations: anxiety disorders
Avoidant	<ul style="list-style-type: none"> • Overly sensitive to criticism or rejection • Socially withdrawn and shy • Feels inferior to others
Obsessive–compulsive	<ul style="list-style-type: none"> • Orderly, stubborn, indecisive • Perfectionistic • Fears loss of control and tries to control the physician when ill
Dependent	<ul style="list-style-type: none"> • Lack of self-confidence • Lets others assume responsibility • Increased need for the physician’s attention when ill

2. Personality disorders are categorized by the *DSM-IV-TR* into **3 clusters—clusters A, B, and C**—each with specific characteristics and familial associations (Table 14-4).

B. MANAGEMENT. Patients with personality disorders usually are not aware of their problems and do not seek psychiatric help. Individual and group psychotherapy may be useful for those who do seek help.

IV Dissociative Disorders



Patient Snapshot 14-4. One week after losing his job, a 30-year-old salesman from New Jersey is found working in a strip mall in Ohio. He does not remember his former life or how he got to Ohio. His level of consciousness is normal, and there is no evidence of head injury.

What diagnosis best fits this clinical picture? (See Table 14-5.)

A. CHARACTERISTICS

1. The dissociative disorders are characterized by **temporary loss of memory or personal identity or by feelings of detachment** due to **psychological factors**. There is no psychosis.
2. These disorders are often related to **disturbing psychological events** in the recent or remote past.
3. The differential diagnosis of dissociative disorders includes memory loss occurring as a result of **head injury**, substance abuse, or other factors.

B. CLASSIFICATION AND MANAGEMENT

1. The *DSM-IV-TR* categories of dissociative disorders are listed in Table 14-5.
2. Management includes **hypnosis**, **drug-assisted interviews** (see Chapter 16), and **psychotherapy** to recover “lost” (repressed) memories.

V Obesity and Eating Disorders



Patient Snapshot 14-5. The mother of a 15-year-old girl tells the doctor that she is concerned because she often finds candy and cookie wrappers stuffed under the mattress in her daughter’s bedroom. Her daughter is on both the swim team and track team at school and is of normal weight. When questioned, the mother remembers that her daughter had 10 cavities on a recent dental visit. The teenager’s blood test reveals evidence of hypokalemia.

TABLE 14-5

DSM-IV-TR CLASSIFICATION OF DISSOCIATIVE DISORDERS

Classification	Characteristics
Dissociative amnesia	<ul style="list-style-type: none"> • Inability to remember important personal information
Dissociative fugue	<ul style="list-style-type: none"> • Amnesia combined with sudden wandering from home and taking on a different identity
Dissociative identity disorder (formerly called multiple personality disorder)	<ul style="list-style-type: none"> • At least 2 separate personalities within an individual • More common in women • Associated with sexual abuse in childhood
Depersonalization disorder	<ul style="list-style-type: none"> • Persistent, recurrent feelings of detachment from one’s own body, a social situation, or the environment (derealization)

TABLE 14-6

EATING DISORDERS

Classification	Psychological/Social Characteristics	Physiological Characteristics
Anorexia nervosa	<ul style="list-style-type: none"> • Excessive dieting • Abnormal eating habits (e.g., simulating eating) • Disturbance of body image; overwhelming fear of becoming obese • Lack of interest in sex • Excessive exercising • Abuse of laxatives, diuretics, and/or enemas • Most common in adolescents and young adults • High academic achievement • Interfamily conflicts particularly between mother and daughter • Normal mood (if not compelled to eat) 	<ul style="list-style-type: none"> • Severe weight loss (losing at least 15% body weight) • Normal appetite but refusal to eat • Amenorrhea (3 or more missed menstrual periods) • Lanugo (downy body hair on trunk) • Melanosis coli (blackened area on the colon if there is laxative abuse) • Increased risk for osteoporosis • Mild anemia and leukopenia • Electrolyte disturbances
Bulimia nervosa	<ul style="list-style-type: none"> • Secretive binge eating followed by induced vomiting • Excessive exercising • Abuse of laxatives, diuretics, and/or enemas • Poor self-image • Depression • Borderline personality disorder 	<ul style="list-style-type: none"> • Normal body weight • Erosion of tooth enamel due to gastric acid in the mouth • Swelling or infection of the parotid glands due to vomiting • Callouses on the dorsal surface of the hand from inducing gagging • Electrolyte disturbances, e.g., hypokalemia • Esophageal varices caused by repeated vomiting

What is the most appropriate diagnosis and management for this teenager? (See Table 14-6 and V B 3.)

A. CLASSIFICATION AND CHARACTERISTICS

1. **Obesity** is defined as being more than 20% over ideal weight or having a **body mass index** (body weight in kilograms per height in square meters) of **30** or higher. Obesity occurs in at least 25% of American adults, and, while **not an eating disorder**, increases the risk for cardiovascular and respiratory diseases, diabetes mellitus, some cancers and osteoarthritis.
2. **The eating disorders** anorexia nervosa and bulimia nervosa occur **more often in women** than in men and are more common during teenage years and in higher socioeconomic groups (Table 14-6).

B. MANAGEMENT

1. **Management of obesity.** Commercial dieting and weight loss programs and surgical techniques are initially effective in the management of obesity, but are of little value in maintaining long-term weight loss. Most often, all lost weight is regained within 5 years. The most effective long-term management is a combination of diet and exercise.

2. **Management of anorexia nervosa.** This life-threatening condition is treated initially by hospitalization to restore nutritional status. Family therapy and cognitive therapy are the most useful forms of psychotherapy for this disorder.
3. **Management of bulimia nervosa** includes psychotherapy or behavioral therapy. Repeated induced vomiting in eating disorder patients can cause low potassium levels in blood (**hypokalemia**), which can result in life-threatening cardiac arrhythmias.
4. Antidepressants, particularly the SSRIs, are more useful for bulimia nervosa than for anorexia nervosa.

VI Neuropsychiatric Disorders in Childhood



Patient Snapshot 14-6. At the start of first grade, a 7-year-old boy often complains of feeling ill and refuses to go to school. Medical examination is unremarkable. At home, the child is appropriately interactive with his parents and, when friends visit, he plays well with them. At first his parents let him stay at home but they are becoming increasingly concerned that he is falling behind in his schoolwork. The parents ask the pediatrician what is wrong with the child and whether they should hire a home tutor for him.

How should the pediatrician advise these parents?

- A. **CLASSIFICATION.** Childhood disorders include pervasive developmental disorders, attention deficit hyperactivity disorder (ADHD), disruptive behavior disorders, Tourette disorder, separation anxiety disorder, and selective mutism. Their characteristics are shown in Table 14-7.
- B. **INCIDENCE.** Rett disorder, separation anxiety disorder, and selective mutism, are more common in girls; most of the other disorders are **more common in boys**.

TABLE 14-7

NEUROPSYCHIATRIC DISORDERS IN CHILDHOOD

Classification	Characteristics
Pervasive Developmental Disorders	
Autistic disorder	<ul style="list-style-type: none"> • Begins before age 3 y • Severe communication problems despite normal hearing • Significant problems forming social relationships, including those with caregivers • Repetitive behavior (e.g., spinning, self-injury) • Unusual abilities (e.g., calculating) in some children, known as <i>savant skills</i> • Intelligence is usually below normal • Neurological (not psychological) etiology • History of perinatal complications • Genetic component • Management involves increasing social, communication, and self-care skills • Poor prognosis; few can live and work independently
Asperger disorder	<ul style="list-style-type: none"> • A mild form of autistic disorder • Significant problems forming social relationships • Repetitive behavior • Normal verbal and cognitive skills

(Continued)

TABLE 14-7**NEUROPSYCHIATRIC DISORDERS IN CHILDHOOD (Continued)**

Classification	Characteristics
Rett disorder	<ul style="list-style-type: none"> • Loss of social, verbal, and cognitive development leading to mental retardation after up to 4 y of normal functioning • Seen only in girls; is X-linked and affected males die before birth • Stereotyped hand-wringing movements • Breathing abnormalities
ADHD and Disruptive Behavior Disorders	
ADHD	<ul style="list-style-type: none"> • Begins in early childhood • Is relatively common, occurring in 3%–5% of children; more common in males • Hyperactivity and/or limited attention span • Prone to accidents • Impulsivity, emotional lability, irritability • Minor brain dysfunction • Normal intelligence • Managed with CNS stimulants, such as methylphenidate (Ritalin, Concerta [a long-acting form]) or atomoxetine (Strattera) • In 20% of patients, the characteristics persist into adulthood
Conduct disorder	<ul style="list-style-type: none"> • Persistent behavior that violates social norms (e.g., harming animals, stealing, fire-setting) • At age 18 and older, this disorder is diagnosed as antisocial personality disorder (see Table 14-4)
Oppositional defiant disorder	<ul style="list-style-type: none"> • Persistent defiant, negative, and noncompliant behavior (e.g., argumentativeness, resentment) toward authority figures (e.g., parents, teachers) • Does not grossly violate social norms
Other Disorders of Childhood	
Tourette disorder	<ul style="list-style-type: none"> • Onset before age 18 and usually at 7–8 y of age • Motor (e.g., touching others, eye blinking) and vocal (e.g., throat clearing, grunting) purposeless behaviors (tics) • Involuntary use of profanity • Genetic relationship to ADHD and OCD • Haloperidol or pimozide are the primary agents used in management • Lifelong chronic symptoms
Separation anxiety disorder	<ul style="list-style-type: none"> • Overwhelming fear of the loss of a major attachment figure (e.g., the mother) in a school age child • Production of physical complaints to avoid going to school
Selective mutism	<ul style="list-style-type: none"> • Refusal to speak in some or all social situations; child may communicate with gestures or whispers • Not typical shyness

Answers to Patient Snapshot Questions

14-1. This man has OCD, which is an anxiety disorder. He is troubled by recurrent, unwanted thoughts (obsessions) about gas leaking; these obsessions are relieved by engaging in repetitive actions (checking the stove). The most effective long-term management for OCD is antidepressant medication, particularly the SSRIs as well as cognitive therapy.

14-2. This patient has hypochondriasis, a somatoform disorder. He is not physically ill but has exaggerated concerns about illness and goes “doctor shopping” to get help. The most effective

management is for the physician to provide support, schedule regular appointments, and work this patient up for any new symptoms.

14-3. The disorder that best fits this clinical picture is narcissistic personality disorder. People with this disorder have a sense of entitlement and often insist on special treatment by others, including physicians.

14-4. This man has dissociative fugue. People with this psychological disorder have a normal level of consciousness but have memory problems coupled with wandering away from home. This condition is rare but may occur after a stressful life event such as losing one's job.

14-5. This 15-year-old girl has bulimia nervosa, which involves binge eating and then inappropriate behavior such as purging to avoid weight gain. Evidence for secretive ingestion of high-calorie foods and dental caries due to erosion of tooth enamel from vomiting provide evidence of this condition. Management for bulimia typically includes psychotherapy and antidepressant medication. Because hypokalemia can be life-threatening, this patient should be hospitalized and treated as soon as possible.

14-6. This child is showing evidence of separation anxiety disorder. By the age of 7 y children should be able to spend time away from parents in a school setting. The pediatrician's best recommendation is for the parents to go to school with the child and, over days, gradually decrease the time they spend there. Allowing the child to stay at home or hiring a tutor will just increase the child's difficulty separating from his parents.

Suicide



Patient Snapshot 15-1. A hospitalized, depressed 18-year-old patient tells her physician that she plans to kill herself with her father's gun when she is released from the hospital. She insists on going home. The father wants his daughter to come home and promises to get rid of the gun.

What should the physician do?

I Epidemiology

- A. Over the past decade, suicide has become the **10th leading cause of death** in the United States, after heart disease, cancer, chronic obstructive pulmonary disease, stroke, accidents, Alzheimer disease, diabetes mellitus, pneumonia, and kidney disease (See Table 21-2).
- B. The **suicide rate** in the United States is in the midrange of that of other developed countries.

II Suicidal Behavior

A. ATTEMPTS

1. There are many **more suicide attempts** than actual suicides. Many people who attempt suicide try again.
2. Although women attempt suicide more often than men, **men successfully commit suicide more often than women.**

- B. **CLINICAL ASSESSMENT.** Clinicians should assess suicide risk during every examination of patients who might have a depressed mood.

III Risk Factors (Table 15-1)

- A. **HIERARCHY OF RISK.** The 5 highest risk factors for suicide (in decreasing order of risk) are
 1. **Serious recent prior suicide attempt**
 2. Age older than 45
 3. Alcohol dependence
 4. History of rage and violent behavior and possession of firearms
 5. Male gender

TABLE 15-1

RISK FACTORS FOR SUICIDE

Factor	Increased Risk	Decreased Risk
Gender	Male	Female
Age	Middle aged and elderly Adolescence (third leading cause of death in this group)	Children Young adult (age 25–40)
Occupation	Professional	Nonprofessional
Ethnicity and religion	Caucasian Native American Jewish Protestant	African American Asian American and Latino Catholic Muslim
Social and work relationships	Unmarried, divorced, or widowed (particularly men) Poor social support Lives alone Unemployed	Married or in a relationship Strong social support Has children Employed
Family history	Parent committed suicide Early loss of a parent through divorce or death	No family history of suicide Intact family in childhood
Psychiatric picture	Severe depression Psychotic symptoms Hopelessness Impulsiveness	Mild depression No psychotic symptoms Some hopefulness Thinks things out
Health	Serious medical illness	Good health
Previous suicidal behavior	Serious prior suicide attempt Rescue was remote <3 mo since the last attempt	No prior attempt Rescue was inevitable >3 mo since the last attempt
Method	Self-inflicted gunshot wound Crashing one's vehicle Hanging oneself Jumping from a high place	Overdose of pills Slashing one's wrists

B. DEPRESSION

1. **Patients recovering from severe depression** are at higher risk for committing suicide than those who are still severely depressed. The reason for this is that these patients have regained enough clarity of thought and energy to act on their suicidal ideas.
2. **The sudden appearance of peacefulness** in a previously agitated, depressed patient is another risk factor for suicide. This may indicate that the patient has reached an internal decision to kill himself and is now calm.
3. Depressed patients who **believe that they have a serious illness** are at increased risk. Most patients who commit suicide have visited a physician with a physical complaint in the 6 months prior to the act.

C. OCCUPATION. The risk of suicide is increased among professional women, especially **physicians**. High-risk professions for both sexes include physicians, dentists, police officers, attorneys, and musicians.

D. MANAGEMENT

1. If the threat is serious and the patient already is hospitalized, suggest that the patient remain in the hospital.
2. Emergency or **involuntary hospitalization** is used for patients who cannot or will not agree to hospitalization and requires the certification of 1 or 2 physicians.
3. Depending on individual state law, the patient can be held for days to weeks before a court hearing.

E. INDICATIONS FOR HOSPITALIZATION

1. Has a history of suicide attempts
2. Has a means (e.g., has access to a gun)
3. Has a plan (e.g., has chosen the time, place, or circumstances)
4. Is intoxicated
5. Has psychotic symptoms
6. Lacks social support

Answer to Patient Snapshot Question

15-1. The physician should suggest to this adult patient that she remain in the hospital. If she refuses, the physician should hold the patient involuntarily until a court hearing can be held to determine if she is a danger to herself. Getting rid of the gun will not eliminate the risk of suicide in this patient.

Tests to Determine Neuropsychological Functioning



Patient Snapshot 16-1. A 52-year-old man presents to his primary care physician on a number of occasions over a period of 1 year, complaining of physical ailments for which no obvious cause can be found. He seems sad and, although he denies it, the physician suspects that the patient is depressed (see Chapter 12).

What neuropsychological test can this physician use to augment her diagnostic impression of this patient? (See Table 16-2.)

I Overview

- A. **PSYCHOLOGICAL AND NEUROPSYCHOLOGICAL TESTS** are used to assess intelligence, personality, and neuropsychopathology.
- B. **CULTURE AND EARLY EXPERIENCES** can influence the results of any psychological or neuropsychological test.

II Intelligence Tests

- A. **INTELLIGENCE AND MENTAL AGE**
 - 1. **Intelligence** is defined as the ability to reason; understand abstract concepts; assimilate facts; recall, analyze, and organize information; and meet the requirements of a new situation.
 - 2. **Mental age (MA)**, as defined by Alfred Binet, is the average intellectual level of people of a specific chronological age (CA).
- B. **INTELLIGENCE QUOTIENT (IQ)**
 - 1. IQ is the ratio of MA to CA multiplied by 100. That is, $IQ = MA/CA \times 100$.
 - a. An **IQ of 100** indicates that the person's MA and CA are the same.
 - b. The standard deviation in IQ scores is about 15 points. An individual with an IQ that is more than 2 standard deviations lower than the mean ($IQ < 70$) is usually considered **to have mental retardation** (Table 16-1).
 - c. IQ is relatively **stable throughout life**. An individual's IQ is usually the same in old age as in childhood. The highest CA used to determine IQ is 15 years.

TABLE 16-1 IQ AND THE CLASSIFICATION OF AVERAGE AND BELOW-AVERAGE INTELLIGENCE

IQ ^a	Classification
<20	Profound mental retardation
20–40	Severe mental retardation
35–55	Moderate mental retardation
50–70	Mild mental retardation
71–89	Borderline to low average intelligence
90–109	Average intelligence

^aOverlaps in IQ scores are due to differences in *DSM-IV-TR* and WAIS scales. IQ, intelligence quotient; *DSM-IV-TR*, *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. Text Revision; WAIS, Wechsler Adult Intelligence Scale.

2. Biological factors associated with IQ

- a. IQ has a **strong genetic component**.
- b. **Poor nutrition and illness** during development can negatively affect IQ.

C. WECHSLER INTELLIGENCE TESTS

1. The **WAIS-IV** is the most commonly used intelligence test.
2. The WAIS-IV has 4 index scores. Verbal Comprehension Index (VCI), Working Memory Index (WMI), Perceptual Reasoning Index (PRI), and Processing Speed Index (PSI). The VCI and WMI together make up the Verbal IQ. The PRI and PSI together make up the Performance IQ. The Full Scale IQ is generated from all 4 index scores.
3. The **Wechsler Intelligence Scale for Children** is used to test children 6–16½ years of age.
4. The **Wechsler Preschool and Primary Scale of Intelligence** is used to test children 4–6½ years of age.

III Personality Tests

A. CHARACTERISTICS

1. Personality tests are used to evaluate psychopathology (e.g., depression, thought disorders, hypochondriasis) and personality characteristics.
2. These tests are classified by whether information is gathered objectively or projectively.
 - a. An **objective test** (rating scale or self-report measure) is based on questions that are **easily scored** and statistically analyzed.
 - b. A **projective test** (free response measure) requires the subject to **interpret the questions**. Responses are assumed to be based on the subject's motivational state and defense mechanisms.

B. COMMON PERSONALITY TESTS are listed in Table 16-2.

IV Neuropsychological Tests





Patient Snapshot 16-2. A 78-year-old patient with kidney failure who is stable on dialysis states that he wants to stop dialysis and receive no further treatment. The patient's Folstein Mini-Mental State Examination score is 17.

Should the physician follow the patient's wishes?

TABLE 16-2

PERSONALITY TESTS

Test	Characteristics	Examples
Minnesota Multiphasic Personality Inventory (MMPI)	Patient takes a paper-and-pencil test containing more than 550 true-or-false questions Useful for primary care physicians because no training is required for administration or interpretation	"I often feel jealous" "I avoid social situations"
Rorschach Test	Patient gives his interpretation of 10 bilaterally symmetrical ink blot designs (e.g., "Describe what you see in this figure")	
Thematic Apperception Test (TAT)	Patient creates a verbal scenario based on drawings depicting ambiguous situations (e.g., "Using this picture, make up a story that has a beginning, a middle, and an end")	
Sentence Completion Test (SCT)	Patient completes short sentences started by the examiner	"I wish ..." "My father ..." "Most people ..."

Original source of Rorschach illustration: Kleinmuntz B. *Essentials of Abnormal Psychology*. New York, NY: Harper & Row; 1974.
Original source of TAT illustration: Phares EJ. *Clinical Psychology: Concepts, Methods, and Profession*. 2nd ed. Homewood, IL: Dorsey; 1984. Both from Krebs D, Blackman R. *Psychology: A First Encounter*. New York, NY: Harcourt, Brace, Jovanovich; 1988. Used by permission of the publisher.

A. USES. Neuropsychological tests assess general intelligence, memory, reasoning, orientation, perceptuomotor performance, language function, attention, and concentration in patients with neurological problems such as dementia and brain injury.

B. SPECIFIC TESTS

1. The **Halstead-Reitan Battery** is used to detect and localize brain lesions and determine their effects.
2. The **Luria-Nebraska Neuropsychological Battery** is used to determine left or right cerebral dominance and to identify specific types of brain dysfunction, such as dyslexia.
3. The **Bender Visual Motor Gestalt Test** is used to evaluate visual and motor ability by recall and reproduction of designs.
4. The **Folstein Mini-Mental State Exam** is the most commonly used cognitive screening test (Table 16-3). It is used primarily to follow improvement or deterioration in patients with dementia or delirium.

V

Psychological Evaluation of Patients with Psychiatric Symptoms

A. PSYCHIATRIC HISTORY. The patient's psychiatric history is taken as a part of the medical history. The psychiatric history includes questions about **mental illness, drug and alcohol use, sexual activity, current living situation, and sources of stress.**

TABLE 16-3**FOLSTEIN MINI-MENTAL STATE EXAMINATION**

Skills Evaluated	Sample Instructions to the Patient	Maximum Possible Score ^a
Orientation	Tell me where you are and what day it is	10
Language	Name the object that I am holding	8
Attention and concentration	Subtract 7 from 100 and then continue to subtract 7s	5
Registration	Repeat the names of these 3 objects	3
Recall	After 5 min, recall the names of these 3 objects	3
Construction	Copy this design	1

^aMaximum possible total score, 30; total score of 23 or higher suggests competence; total score of 18 or lower suggests incompetence (Applebaum, 2007; N. Engl J Med, 357).

B. MENTAL STATUS EXAMINATION

1. The mental status examination evaluates an individual's **current state of mental functioning** (see Table 16-4).
2. Terms used to describe psychophysiological symptoms and mood in patients with psychiatric illness are listed in Table 16-5.

VI

Biological Evaluation of Patients with Psychiatric Symptoms

A. TESTS USED IN CLINICAL PSYCHIATRY

1. Abnormalities in both catecholamine and catecholamine metabolite levels are found in some psychiatric syndromes (see Table 9-3).
2. In some patients, plasma levels of psychotropic drugs are measured to evaluate compliance, especially with antipsychotic agents, or to determine whether therapeutic blood levels of a drug have been reached, especially with cyclic antidepressant agents.
3. Other tests that are used for psychiatric evaluation are shown in Table 16-6.

- B. LABORATORY TESTING OF PATIENTS WITH BEHAVIORAL SYMPTOMS.** Patients with medical illnesses not uncommonly present with psychiatric symptoms. Laboratory testing can help identify such patients (Table 16-7).

TABLE 16-4**VARIABLES EVALUATED ON THE MENTAL STATUS EXAMINATION**

Category	Examples
Appearance	Dress, grooming, appearance for age
Attitude toward interviewer	Interested, seductive, defensive, cooperative
Behavior	Posture, gait, eye contact, restlessness
Cognitive functioning	Level of consciousness, memory, orientation
Emotions	Mood, affect
Intellectual functions	Intelligence, judgment, insight
Perception	Depersonalization, illusions, hallucinations
Speech	Rate, clarity, vocabulary abnormalities, volume
Thought process and content	Loose associations, delusions, ideas of reference

TABLE 16-5**PSYCHOPHYSIOLOGICAL STATES****Mood**

- Euphoria: strong feelings of elation
- Expansive mood: feelings of self-importance and generosity
- Euthymic mood: normal mood, with no significant depression or elevation of mood
- Dysphoric mood: subjectively unpleasant feeling
- Anhedonia: inability to feel pleasure

Affect

- Restricted affect: decreased display of emotional responses
- Blunted affect: strongly decreased display of emotional responses
- Flat affect: complete lack of emotional responses
- Labile affect: sudden alterations in emotional responses not related to environmental events

Consciousness and Attention

- Normal: alert, can follow commands, normal verbal responses (Glasgow Coma Scale score of 15)
- Clouding of consciousness: inability to respond normally to external events
- Somnolence: abnormal sleepiness
- Stupor: little or no response to environmental stimuli
- Coma: total unconsciousness (Glasgow Coma Scale score of 3)

TABLE 16-6**TESTS USED IN CLINICAL PSYCHIATRY**

Test	Conditions Identified	Description
EEG	Epilepsy Delirium (EEG is usually normal in dementia) Demyelinating illness	Measures electrical activity in the cortex
Evoked potentials	Vision and hearing loss in infants Brain responses in coma	Measures electrical activity in the cortex in response to sensory stimulation
Drug (e.g., sodium amobarbital) assisted interview	Conversion disorder Dissociative disorders	Relaxes patients so that they can express themselves during an interview
Galvanic skin response	Stress	Measures sweat gland activity; high levels are seen with sympathetic nervous system arousal, resulting in decreased electrical resistance of skin
Sodium lactate administration or CO ₂ inhalation	Panic disorder	Causes panic attacks in susceptible or patients
Neuroimaging (CAT, MRI, fMRI, and PET scans)	Anatomically based brain changes Demyelinating illness Metabolism of glucose in neural tissue	Identifies biochemical condition and anatomy of neural tissues and areas of brain activity during specific tasks

EEG, electroencephalogram; CAT, computed axial tomography; fMRI, functional magnetic resonance imaging; PET, positron emission tomography.

TABLE 16-7 LABORATORY TESTING OF PATIENTS WITH BEHAVIORAL SYMPTOMS

Behavioral Symptom	Physical Condition	Physical Symptoms	Laboratory Test Results
Depression	• Hypothyroidism	<ul style="list-style-type: none"> • Fatigue • Weight gain • Constipation • Edema • Hair loss • Decreased cold tolerance 	<ul style="list-style-type: none"> • Increased TSH • Decreased T₃ • Decreased free T₄
	<ul style="list-style-type: none"> • Addison disease (adrenocortical insufficiency) • Cushing syndrome (adrenocortical excess) 	<ul style="list-style-type: none"> • Hyperpigmentation • Hypotension • Weakness/fatigue • Purple stria on skin • Central (abdominal) obesity • Bruising • Muscle weakness 	<ul style="list-style-type: none"> • Decreased Na⁺ • Increased K⁺ • Eosinophilia • Positive dexamethasone suppression test • Poor glucose tolerance
Anxiety	• Hyperthyroidism	<ul style="list-style-type: none"> • Flushing • Weight loss • Diarrhea 	<ul style="list-style-type: none"> • Decreased TSH • Increased T₃ • Increased free T₄
	• Pheochromocytoma	<ul style="list-style-type: none"> • Hypertension • Headache • Tachycardia • Tremor 	<ul style="list-style-type: none"> • Elevated VMA
Psychosis or personality changes	• Acute intermittent porphyria	<ul style="list-style-type: none"> • Peripheral neuropathy • Abdominal pain, nausea and vomiting • Purple colored urine 	<ul style="list-style-type: none"> • Elevated δ-aminolevulinic acid • Elevated porphobilinogen • Leukocytosis
	• Connective tissue disorders (e.g., SLE, RA)	<ul style="list-style-type: none"> • Joint pain • Fever • Headache • Skin changes 	<ul style="list-style-type: none"> • Anemia • Positive antiphospholipid • Positive ANA (in SLE) • Positive rheumatoid factor (in RA)
	• Wilson's disease	<ul style="list-style-type: none"> • Gait abnormalities • Rigidity • Copper deposition in the cornea 	<ul style="list-style-type: none"> • Increased urinary copper • Decreased serum ceruloplasmin

ANA, antinuclear antibody; SLE, systemic lupus erythematosus; RA, rheumatoid arthritis; TSH, thyrotropin-stimulating hormone; T₃, triiodothyronine; T₄, thyroxine, VMA, vanillylmandelic acid.

Answers to Patient Snapshot Questions

16-1. Because no psychologically specific training is required for administration or interpretation, this primary care physician can use the MMPI to augment her psychological assessment of this patient.

16-2. This 78-year-old patient's Folstein Mini-Mental State Examination score of 16 indicates that the patient may not be competent to make medical decisions. Because it is not clear that he understands the consequences of his decision to stop dialysis, the physician must evaluate the patient further before deciding whether to follow his wish to stop treatment (see also Chapter 22).

The Family, Culture, and Illness

I The Family



Patient Snapshot 17-1. The principal of a high school is trying to estimate how many of the school's students live with their 2 married parents.

If the school's African American, Hispanic American and white American populations are representative of the US population, what percentage of the students live in 2-parent families? (See I A 4. below.)

A. TYPES OF FAMILIES

1. The traditional **nuclear family** includes a mother, a father, and dependent children under age 18 living together in **1 household**.
2. The **extended family** includes family members (e.g., grandparents, aunts, and uncles) who live **outside of the household**.
3. Other types of families include cohabiting heterosexual and gay parent families, single-parent families, and step and blended families.
4. The percentages of American children living in different family types can be found in Table 17-1.

B. MARRIAGE AND CHILDREN

1. In the United States, most **people of age 30 to 54 years are married**.
2. About 50% of children live in families in which both parents work; only about 25% live in a "traditional" family (i.e., father works, mother stays home).

C. DIVORCE

1. **Close to 50% of all American marriages end in divorce.**
2. Factors associated with divorce include short courtship, premarital pregnancy, teenage marriage, divorce in the family, religious or socioeconomic differences, and serious illness or death of a child.

D. SINGLE-PARENT FAMILIES

1. Single-parent families often have **lower incomes and less social support** than 2-parent families. As a result, single-parent families are at increased risk for physical and mental illness.
2. Children in single-parent families are at increased risk for failure in school, depression, drug abuse, suicide, criminal activity, and divorce.
3. Types of child custody
 - a. In **joint custody**, children spend equal time with both parents.
 - b. In **split custody**, each parent has custody of at least 1 child.
 - c. In **sole custody**, children live with 1 parent and the other has visitation rights.
 - d. Fathers are increasingly being granted joint or sole custody.

Ethnic Group	Married Parents (%)	Unmarried Parents (%)	Single Mother (%)	Single Father (%)	No Parent (%)
African American	34.7	4.6	49.7	3.6	7.5
Hispanic American	60.9	6.0	26.3	2.7	4.0
White American	71.5	3.4	18.3	3.5	3.4

Data from US Census Bureau. *America's Families and Living Arrangements: 2010*.

E. FAMILY SYSTEMS THEORY AND FAMILY THERAPY

1. According to family systems theory, symptoms such as depression or eating disorders are not signs of individual pathology but indicate **dysfunction** within the family.
2. Family systems exhibit **homeostasis** (i.e., deviations from typical family patterns occur within a restricted range).
3. Breakdowns in communication within a **dyad**, or relationship between 2 family members, result in emotional isolation, and dysfunctional coalitions form between 2 family members against a third (i.e., a **triangle**).
4. In family therapy, all members of the family are involved in the treatment of the psychological problem of 1 family member.

II United States Culture

- A. COMPOSITION.** The United States has more than 310 million people, including various **minority subcultures** as well as a **large white middle class**.
1. **Financial and personal independence** are valued at all ages, especially in the **elderly**. Most elderly Americans spend their last years **living on their own**. Only about 20% live with family members and about 5% live in nursing homes.
 2. **Personal hygiene and cleanliness** are emphasized.
- B. CULTURE AND ILLNESS.** Although ethnic groups are not homogeneous and stereotyping should be avoided, these groups may show similarities in response to illness (Table 17-2).

Subculture (Approximate Population)	Characteristics
African American (37 million)	<ul style="list-style-type: none"> • Average income approximately one-half that of White American families • Decreased access to health care services and increased risk of illness and early death (see Table 3-1) • Higher rates of hypertension, heart disease, stroke, obesity, asthma, tuberculosis, diabetes, prostate cancer, and AIDS • Higher death rates from heart disease and most forms of cancer • Lower suicide rate across age groups; equal suicide rate in teenagers • Religion and strong extended kinship networks important in social and personal support

(Continued)

TABLE 17-2 CHARACTERISTICS OF ETHNIC SUBCULTURES IN THE UNITED STATES (*Continued*)

Subculture (Approximate Population)	Characteristics
Hispanic/Latino American (45 million)	<ul style="list-style-type: none"> • Great value placed on the nuclear family and on large families • Respect for the elderly • Protect elderly relatives from negative medical diagnoses • Make medical decisions for elderly relatives • May seek health care from folk healers (e.g., <i>chamanes</i>, <i>curanderos</i>, <i>espiritistas</i>) • Emphasis on herbal and botanical remedies • Women are less likely to get mammograms than other ethnic groups • Obesity is a problem • “Hot” and “cold” dietary influences • Dramatic presentation of symptoms
Asian American (13 million)	<ul style="list-style-type: none"> • Children are expected to respect and care for elderly parents • Protect elderly relatives from negative medical diagnoses • Make medical decisions for elderly relatives • Emphasis on education • May express emotional pain as physical illness • Some use folk remedies (e.g., “coining” or rubbing medicated oil into the skin with a coin) • In some, the abdominal-thoracic area rather than the brain is the spiritual core of the person; the concept of brain death and organ transplant are not well accepted in these groups • Some accumulate acetaldehyde in the metabolism of alcohol, leading to a flushing reaction
Native American (2.4 million)	<ul style="list-style-type: none"> • Receive medical care under the direction of the Indian Health Service of the federal government • The distinction between mental and physical illness is blurred • Engaging in forbidden behavior and witchcraft is thought to cause illness • Incomes are low and rates of alcoholism and suicide are high
Middle Eastern/North African American (1.2 million)	<ul style="list-style-type: none"> • Most follow the Muslim religion • Some are Christian (e.g., Coptic Christian); fewer are Jewish • Female modesty is valued • Females often prefer a female physician

C. CULTURE SHOCK (ACCULTURATIVE STRESS)

1. Culture shock is a strong emotional response to a move to unfamiliar social and cultural surroundings. It is reduced by the tendency of immigrants to live in the same geographic area.
2. **Young immigrant men** appear to be at **increased risk for psychiatric problems**, such as paranoid symptoms, schizophrenia, and depression, compared with other sex and age groups.

Answer to Patient Snapshot Question

17-1. If the school's population is a representative of the United States population, 34.7%, 60.9%, and 71.5% of the African American, Hispanic American and White American children, respectively, live with their 2 married parents.

I Sexual Development



Patient Snapshot 18-1. While taking a history, a physician learns that a tall, slim 19-year-old woman has never menstruated. While the patient refuses a pelvic examination, external physical examination reveals normal breast development and bilateral inguinal masses. Microscopic examination reveals that there are no Barr bodies in the buccal smear.

What diagnosis best fits this clinical picture? (See Table 18-1.)

A. PRENATAL SEX DETERMINATION

1. Differentiation of the **gonads** depends on the presence of the SRY (sex-determining factor on the Y chromosome) gene, which encodes the testis determining factor that directs the bipotential gonad to differentiate into a testis.
2. The hormonal secretions of the **testes** direct the differentiation of **male** internal and external genitalia. If testicular hormones are absent or ineffective during prenatal life, the internal and external genitalia are **female**.
3. Differential exposure to sex hormones during prenatal life causes **gender differences in certain areas of the brain** (e.g., hypothalamus, anterior commissure, corpus callosum, thalamus).

B. GENDER IDENTITY

1. Gender identity is an individual's **sense of being male or female**.
 - a. This awareness develops between 2 and 3 years of age (see Chapter 1).
 - b. Gender identity is affected by genetic and hormonal alterations (Table 18-1).
2. **Gender role** is the expression of gender identity in society.
3. In **gender identity disorder**, a person, commonly referred to as a transsexual or transgender individual, feels that he or she was born into the wrong body and may seek sex-change surgery.

C. SEXUAL ORIENTATION



Patient Snapshot 18-2. A 16-year-old boy tells his family physician that he thinks he is gay. He reveals that he has a “platonic” girlfriend, but all of his sexual fantasies and dreams are about men. He then asks the physician if he is “normal.”

What is the physician's best response? (See I C 2.)

1. Sexual orientation is the persistent and unchanging preference for members of one's own sex (homosexuality) or the opposite sex (heterosexuality) for love and sexual expression.
2. The *Diagnostic and Statistical Manual of Mental Disorders* (4th edition, Text Revision [DSM-IV-TR]) considers homosexuality a normal variant of sexual expression, not a dysfunction.

TABLE 18-1

PHYSIOLOGICAL ABNORMALITIES OF SEXUAL DEVELOPMENT

Syndrome	Genotype	Phenotype	Characteristics
Androgen insensitivity (testicular feminization)	XY	Female	<ul style="list-style-type: none"> • Body cells unresponsive to androgen • Testicles may appear at puberty as labial or inguinal masses
Congenital adrenal hyperplasia (adrenogenital syndrome)	XX	Female (masculinized genitalia)	<ul style="list-style-type: none"> • Adrenal gland unable to produce adequate cortisone, leading to excessive perinatal adrenal androgen secretion • One-third have a lesbian sexual orientation
Turner	XO	Female	<ul style="list-style-type: none"> • Fibrous, nonfunctioning ovaries • Short stature and webbed neck

3. Estimates of the occurrence of homosexuality are 3%–10% in men and 1%–5% in women. No significant ethnic differences are found.
4. Evidence of hormonal and genetic influences on homosexuality include
 - a. Alterations in levels of **prenatal hormones** (e.g., high levels of androgen in female fetuses and decreased levels of androgen in male fetuses). Hormone levels in adulthood are typical.
 - b. A higher concordance rate in monozygotic twins than in dizygotic twins and genetic markers on the X chromosome.
5. Because homosexuality is not a dysfunction, **no psychological treatment is needed**. If needed, psychological intervention helps a person who is uncomfortable with his or her sexual orientation to become more comfortable with it.

II The Biology of Sexuality in Adulthood

A. HORMONES AND BEHAVIOR IN WOMEN

1. **Estrogen** is not involved in **libido** (sexual desire), and therefore **menopause** (i.e., cessation of ovarian estrogen production) and **aging** do not reduce sex drive in women.
2. **Testosterone** is secreted by the adrenal glands throughout adult life and is believed to play an important role in **sex drive** in women as well as in men.
3. **Progesterone**, which is contained in many **oral contraceptives**, may inhibit sexual interest and behavior in women.

B. HORMONES AND BEHAVIOR IN MEN

1. **Stress** may decrease testosterone levels.
2. Medical treatment for **prostate cancer** with estrogens, progesterone, antiandrogens or gonadotropin analogs (e.g., luprolide acetate, Lupron) ultimately leads to decreased androgen production, resulting in reduced sexual interest and behavior.

C. THE SEXUAL RESPONSE CYCLE

1. Masters and Johnson devised a **4-stage model** for sexual response in both men and women (Table 18-2).
2. The stages are **excitement, plateau, orgasm, and resolution**.

TABLE 18-2

THE SEXUAL RESPONSE CYCLE

Men	Women	Both Men and Women
Excitement Stage		
<ul style="list-style-type: none"> • Penile erection 	<ul style="list-style-type: none"> • Clitoral erection • Labial swelling • Vaginal lubrication • Tenting effect (rising of the uterus in the pelvic cavity) 	<ul style="list-style-type: none"> • Increased pulse, blood pressure, and respiration • Nipple erection
Plateau Stage		
<ul style="list-style-type: none"> • Increased size and upward movement of the testes • Secretion of a few drops of sperm-containing fluid 	<ul style="list-style-type: none"> • Contraction of the outer one-third of the vagina, forming the orgasmic platform (enlargement of the upper one-third of the vagina) 	<ul style="list-style-type: none"> • Further increase in pulse, blood pressure, and respiration • Flushing of the chest and face
Orgasm Stage		
<ul style="list-style-type: none"> • Forcible expulsion of seminal fluid 	<ul style="list-style-type: none"> • Contractions of the uterus and vagina 	<ul style="list-style-type: none"> • Contractions of the anal sphincter
Resolution Stage		
<ul style="list-style-type: none"> • Refractory, or resting, period in which restimulation is not possible • Length of this period varies by age and physical condition 	<ul style="list-style-type: none"> • Little or no refractory period 	<ul style="list-style-type: none"> • Muscle relaxation • Return of the sexual and cardiovascular systems to the prestimulated state over 10–15 min

III Sexual Dysfunction and Paraphilias



Patient Snapshot 18-3. A 46-year-old man tells his physician that he is having difficulty gaining erections and would like to have a prescription for Viagra (sildenafil citrate). He then asks the physician how the drug will work to improve his sexual functioning.

How best can the physician describe the action of Viagra to this patient? (See III B 2 a.)

- A. **SEXUAL DYSFUNCTION** involves problems in one or more stages of the sexual response cycle. Categories of sexual dysfunction are shown in Table 18-3.
- B. **MANAGEMENT.** There is a growing tendency for **physicians to manage the sexual problems of patients** rather than refer these patients to specialists.
 1. **Behavioral management** includes the following techniques:
 - a. **Sensate-focus exercise.** In this exercise, the individual's awareness of touch, sight, smell, and sound stimuli are increased during sexual activity, and pressure to achieve an erection or orgasm is decreased.
 - b. **Squeeze technique.** This technique is used to **treat premature ejaculation.** The man is taught to identify the sensation that occurs just before the emission phase, when ejaculation can no longer be prevented. At this moment, the man asks his partner to exert pressure on the coronal ridge of the glans on both sides of the penis until the erection subsides, thereby delaying ejaculation.

TABLE 18-3

DSM-IV-TR CATEGORIES OF SEXUAL DYSFUNCTION

Disorder	Characteristics (Cannot Be Due to Interpersonal Relationship Problem)
Hypoactive sexual desire	<ul style="list-style-type: none"> • Decreased interest in sexual activity
Sexual aversion disorder	<ul style="list-style-type: none"> • Aversion to and avoidance of sexual activity
Female sexual arousal disorder	<ul style="list-style-type: none"> • Inability to maintain vaginal lubrication until the sex act is completed, despite adequate physical stimulation • Reported in as many as 20% of women
Male erectile disorder (commonly called impotence)	<ul style="list-style-type: none"> • Lifelong or primary (rare): Has never had an erection sufficient for penetration • Acquired or secondary (common)^a: Current inability to maintain erections despite normal erections in the past • Situational (common): Difficulty maintaining erections in some situations, but not all
Orgasmic disorder (male and female)	<ul style="list-style-type: none"> • Lifelong: Has never had an orgasm • Acquired: Current inability to achieve orgasm despite adequate genital stimulation and normal orgasms in the past • Reported more often in women than in men
Premature ejaculation	<ul style="list-style-type: none"> • Ejaculation before the man wishes • Short or absent plateau phase • Usually accompanied by anxiety • Second most common of all male sexual disorders
Vaginismus	<ul style="list-style-type: none"> • Spasm of the outer one-third of the vagina making intercourse or pelvic examination difficult or painful • Vaginal dilators and psychological counseling used for treatment
Dyspareunia	<ul style="list-style-type: none"> • Non-organic pain associated with sexual intercourse • Much more common in women, but can occur in men

^aAcquired or secondary erectile disorder is the most common of all male sexual disorders.

- c. **Relaxation techniques, hypnosis, and systematic desensitization** are used to reduce anxiety associated with sexual performance.
- d. **Masturbation** may be recommended (particularly for orgasmic disorders) to help the patient learn what stimuli are most effective.

2. Medical and surgical management

- a. The phosphodiesterase inhibitors **sildenafil (Viagra), tadalafil (Cialis), and vardenafil (Levitra, Nuviva)** are used to manage **erectile dysfunction**. They work by blocking the enzyme phosphodiester (PDE) 5 that enhances nitric oxide-mediated vasodilation in the corpus cavernosum by inhibiting cyclic guanosine monophosphate (cGMP) that is secreted in the penis with sexual stimulation. Thus, degradation of cGMP is slowed and the erection persists.
- b. Apomorphine (**Uprima**) is a drug used to treat erectile dysfunction by increasing the availability of **dopamine**, a sexually stimulating neurotransmitter, in the brain.
- c. **Intracorporeal injection of vasodilators (e.g., phentolamine, papaverine)** or implantation of prosthetic devices is also used to manage erectile dysfunction.
- d. Because they delay orgasm, selective serotonin reuptake inhibitors are used to manage **premature ejaculation**.

TABLE 18-4

SEXUAL PARAPHILIAS

Type	Source of Sexual Gratification
Pedophilia (most common)	Children (under age 14 y); perpetrator must be at least 16 y old and 5 y older than the victim
Exhibitionism	Exposing the genitals to unsuspecting women to shock them
Sexual masochism and sadism	Receiving (masochism) or causing (sadism) physical suffering or humiliation
Fetishism	Inanimate objects (i.e., rubber, women's shoes)
Frotteurism	Rubbing the penis against a nonconsenting, unaware woman
Necrophilia	Corpses
Transvestic fetishism	Wearing women's underclothing (exclusive to heterosexual men)
Voyeurism	Secretly observing people undressing or engaging in sexual activity

- C. **PARAPHILIAS**, which occur almost exclusively in men, involve the preferential use of **unusual objects of sexual desire or unusual sexual activities** (Table 18-4). Some paraphilias can be managed effectively with female hormones or antiandrogens.

IV Special Issues in Sexuality: Illness, Injury, and Aging

A. MYOCARDIAL INFARCTION (MI)

1. After an MI, many patients experience **erectile dysfunction and decreased libido**. These problems are usually caused by fear that sexual activity will lead to another heart attack.
2. Most patients who can tolerate exercise that increases the heart rate to **110–130 bpm** (exertion equal to climbing 2 flights of stairs) can resume sexual activity.
3. Sexual positions that produce the least exertion for the patient (e.g., the partner in the superior position) are safest following MI.

B. DIABETES

1. **Erectile dysfunction** is common in diabetic men; orgasm and ejaculation are less likely to be affected.
2. The major causes of erectile problems in men with diabetes are
 - a. **Diabetic neuropathy**, which involves microscopic damage to **nerve** tissue in the penis as a result of hyperglycemia.
 - b. **Vascular changes** that affect the blood vessels in the penis. Phosphodiesterase inhibitors such as sildenafil are effective for many of these patients.
3. **Good metabolic control** of diabetes improves erectile function.

C. SPINAL CORD INJURIES

1. In **men**, spinal cord injury causes erectile and orgasmic dysfunction, retrograde ejaculation (into the bladder), reduced testosterone levels, and decreased fertility.
2. The effects of spinal cord injury in **women** include impaired vaginal lubrication, pelvic vasocongestion, and likelihood of orgasm.
3. Sexual stimulation in spinal cord-injured patients (particularly those with higher lesions) can result in **autonomic dysreflexia**, a syndrome involving overactivity of the autonomic nervous system leading to increased blood pressure and decreased heart rate that can lead to seizures, stroke, or death.

- D. AGING.** Most men and women continue to have sexual interest as they age.
- 1. In men,** physical changes include the need for more direct genital stimulation, slower erection, diminished intensity of ejaculation, and an increased refractory period.
 - 2. In women,** physical changes include vaginal thinning, shortening of vaginal length, and vaginal dryness. Since **hormone replacement therapy** is used less now than in the past, local application of a moisturizing agent can be helpful for these problems.

V

Drugs and Sexuality

A. PRESCRIPTION AND NONPRESCRIPTION DRUGS. Antihypertensives, antidepressants, antipsychotics, as well as antihistaminic (e.g., diphenhydramine) and anticholinergic (e.g., atropine) agents affect libido, erection, vaginal lubrication, orgasm, and ejaculation, often as a result of their effects on neurotransmitter systems (Table 18-5). Among the antihypertensives, angiotensin-converting enzyme inhibitors (e.g., lisinopril) are least likely to cause sexual dysfunction.

B. DRUGS OF ABUSE also affect sexuality (Table 18-6).

TABLE 18-5

THE NEUROTRANSMITTERS AND SEXUAL RESPONSE

Neurotransmitter (Representative Drug) (↑ increased availability, ↓ decreased availability)	Effect on Sexual Function (↑ enhanced, ↓ inhibited)
↑ Serotonin (fluoxetine; trazodone)	↓ Orgasm and ejaculation; may cause priapism
↑ Dopamine (levodopa, apomorphine)	↑ Libido and erection
↓ Dopamine (perphenazine)	↓ Erection
↓ Norepinephrine β (propranolol)	↓ Erection
↑ Norepinephrine α_2 in the periphery (prazosin)	↓ Erection

TABLE 18-6

THE EFFECTS OF DRUGS OF ABUSE ON SEXUALITY

Drug	Effect
Alcohol	<ul style="list-style-type: none"> • Acute use: Increased libido because of psychological disinhibition; erectile dysfunction • Chronic use: Erectile dysfunction due to increased estrogen availability as a result of liver damage
Marijuana	<ul style="list-style-type: none"> • Acute use: Increased libido because of psychological disinhibition • Chronic use: Reduced testosterone levels in men and lowered pituitary gonadotropin levels in women
Amphetamines and cocaine	<ul style="list-style-type: none"> • Increased libido because of enhancement of dopaminergic effects on the brain
Heroin and methadone	<ul style="list-style-type: none"> • Reduced libido and inhibited ejaculation • Fewer problems with methadone

Answers to Patient Snapshot Questions

18-1. The most likely diagnosis for this patient is androgen insensitivity syndrome (testicular feminization). Patients with this condition are males with a genetic defect in which the body cells do not respond to androgen produced by the testes. External genitalia are feminine, and the testicles, which descend at puberty, may appear as labial or inguinal masses.

18-2. The physician's best response is to reassure this young man that he is normal. The young man may or may not have a homosexual sexual orientation; like heterosexuality, homosexuality is a normal variant of sexual expression.

18-3. Sildenafil citrate (Viagra) works directly on the penis. Its action involves blocking PDE 5, which destroys cGMP, which is secreted in the penis with sexual stimulation. Degradation of cGMP, a vasodilator, is slowed and the erection persists.

Violence and Abuse



Patient Snapshot 19-1. A 25-year-old man is brought to the emergency room after being injured in a fight that he provoked at a football game. The patient, who is a bodybuilder, denies that he has been drinking or taking drugs. Aside from contusions on the face and arms, the physical examination is unremarkable and the toxicology screen is negative. The patient, who has no previous psychiatric history, tells the doctor, “I am taking my orders directly from heaven.” Given this clinical picture, what is the most likely cause of this man’s behavior? (See I B 1 b.)

I Violence

A. SOCIAL DETERMINANTS OF VIOLENCE

1. **Homicide**, which occurs more often in **low socioeconomic groups**, is increasing. At least 50% of homicides are committed with **guns**.
2. **Children** who are likely to become violent adults often have the following characteristics:
 - a. High levels of aggression and antisocial behavior (e.g., starting fires, truancy).
 - b. Cruelty to animals and younger children.
 - c. Inability to defer gratification.
 - d. Have experienced repeated household moves and school changes.

B. BIOLOGICAL DETERMINANTS OF VIOLENCE

1. **Androgens**
 - a. Androgens are closely associated with aggression. **Males are more aggressive than females** in most animal species and human societies.
 - b. Bodybuilders who take **androgenic or anabolic steroids** to increase muscle mass may show increased aggression and even psychosis. Withdrawal may cause severe depression.
2. **Drugs of abuse.** While intoxicated, heroin users show little aggression. Increased aggression is associated with the use of **alcohol, cocaine, amphetamines, phen-cyclidine**, and extremely **high doses of marijuana**.
3. **Serotonin and γ -aminobutyric acid inhibit** aggression. **Dopamine and norepi-nephrine increase** aggression.
4. Abnormalities of the brain (e.g., abnormal activity in the amygdala and prepiriform area; psychomotor and temporal lobe epilepsy and lesions of the temporal lobe, frontal lobe, and hypothalamus) are associated with increased aggression. Violent people often have a history of **head injury** and show abnormal electroencephalogram readings.

C. IMPULSE CONTROL DISORDERS

1. These disorders are characterized by **irresistible urges** to commit harmful or il-logical acts and are not explained by intoxication or other mental disorder such as antisocial personality disorder.

2. They include **intermittent explosive disorder** (sudden loss of self-control with violent behavior), **pyromania** (fire-setting), **kleptomania** (stealing for no practical reason), **pathological gambling**, and **trichotillomania** (pulling out one’s hair).
3. **Management** of some impulse control disorders includes **selective serotonin reuptake inhibitors** (e.g., fluoxetine) as well as antipsychotics (e.g., olanzapine) and mood stabilizers (e.g., lithium).

II Abuse and Neglect of Children and the Elderly



Patient Snapshot 19-2. An 82-year-old man is brought to the emergency room by his daughter with whom he lives. The patient seems confused and is unable to tell the physician what year it is or the name of the president of the United States. Physical examination reveals abrasions on one wrist and a spiral fracture of the radius of the other arm. When asked about his injuries, the patient says that he “fell.”

What is the physician’s next step in management? (See II B 1.)

A. CHARACTERISTICS AND INCIDENCE

1. **Child** (under age 18 years) abuse and **elder** (over age 64 years) **abuse** include the following:
 - a. **Physical abuse.** The characteristics of the abused and abuser and signs of abuse are listed in Tables 19-1 and 19-2. When a caregiver shakes an infant violently in order to stop it from crying, the infant may show the “**shaken baby**” syndrome that includes retinal injury and brain damage (e.g., subdural hematoma), which may result in coma or death.
 - b. **Sexual abuse.** Sexual abuse occurs in both children and the elderly. Signs include vaginal bleeding and genital bruising. Signs of sexual abuse of children are listed in Table 19-3.
 - c. **Emotional abuse.** In children, this includes physical neglect as well as rejection by parents or withholding of parental love and attention. In the elderly, neglect of needed care and exploitation for monetary gain are seen.
2. Reported child and elder abuse are **increasing** in the United States; although many cases are not reported, at least **1 million cases of each** are currently reported.

Category	Child Abuse	Elder Abuse
Characteristics of the abuser	<ul style="list-style-type: none"> • Substance abuse • Poverty and social isolation • Closest family member (e.g., mother, father) is most likely to abuse • Personal history of victimization by caretaker or spouse 	<ul style="list-style-type: none"> • Substance abuse • Poverty and social isolation • Closest family member (e.g., spouse, daughter, son, or other relative with whom the elder lives and often financially supports) is most likely to abuse
Characteristics of the abused	<ul style="list-style-type: none"> • Prematurity, low birth weight • Hyperactivity or mild physical handicap • Perception of the child as “slow” or “different” • Colicky or “fussy” infant • Most are younger than age 5 	<ul style="list-style-type: none"> • Some degree of dementia • Physical dependence on others • Incontinence • Does not report the abuse, but instead says that he or she injured self

TABLE 19-2**SIGNS OF ABUSE**

Sign	Child Abuse	Elder Abuse
Neglect	<ul style="list-style-type: none"> • Poor personal care (e.g., diaper rash, dirty hair) • Lack of needed nutrition • Delay in seeking treatment for the child 	<ul style="list-style-type: none"> • Poor personal care (e.g., urine odor in incontinent person) • Lack of needed nutrition • Lack of medication or health aids (e.g., eyeglasses, dentures)
Bruises	<ul style="list-style-type: none"> • Particularly in areas not likely to be injured during normal play, such as buttocks or lower back • Belt or belt buckle marks • Around the mouth from force-feeding 	<ul style="list-style-type: none"> • Often bilateral and often on the inner surface of the arms, from being grabbed • Belt or belt buckle marks • Around the mouth from force-feeding
Fractures and burns	<ul style="list-style-type: none"> • Fractures at different stages of healing • Spiral fractures caused by twisting the limbs • Cigarette burns and rope burns (caused by tying to a bed or chair) • Burns on the feet or buttocks due to immersion in hot water 	<ul style="list-style-type: none"> • Fractures at different stages of healing • Spiral fractures caused by twisting the limbs • Cigarette burns and rope burns (caused by tying to a bed or chair)

TABLE 19-3**SEXUAL ABUSE OF CHILDREN**

Occurrence	<ul style="list-style-type: none"> • At least 250,000 cases are reported annually • Reported more now than in the past • Approximately 25% of all girls and 12% of all boys report sexual abuse at some time during their lives
Characteristics of the abuser	<ul style="list-style-type: none"> • Most are male and known to the child (e.g., uncle, father, mother's boyfriend, family acquaintance) • Alcohol and drug use • Marital problems or no appropriate alternate sexual partner • May be a pedophile
Characteristics of the abused	<ul style="list-style-type: none"> • Most are 9–12 y of age • 25% are younger than 8 y • Fear of withdrawal of affection or retribution from the abuser if the abuse is revealed • Shame and inappropriate guilt
Physical signs of abuse	<ul style="list-style-type: none"> • STDs; children do not contract STDs through casual contact with an infected person or from bedclothes, towels, or toilet seats • Genital or anal injury • Recurrent urinary tract infections
Psychological signs of abuse	<ul style="list-style-type: none"> • Specific knowledge about sexual acts (e.g., fellatio) in a young child; children have only a vague knowledge about sexual activities • There may be no physical findings in cases not involving penetration • Excessive initiation of sexual activity with friends or much younger children

STDs, sexually transmitted diseases.

B. ROLE OF THE PHYSICIAN

1. If child or elder neglect or physical or sexual abuse is suspected, the **physician must report the case to the appropriate social service agency** and, if necessary, admit the abused to the hospital to ensure his or her safety.

- Physicians are **not required to inform suspected child or elder abusers** that they suspect abuse and do not need family consent to hospitalize the abused child or elderly person for protection or treatment.

III Physical and Sexual Abuse of Domestic Partners

A. OVERVIEW

- Domestic abuse is a **common** reason for young and middle-aged women (ages 18 to 64 years) to visit the hospital emergency room. Bruises, blackened eyes, and broken bones are often seen.
- A woman's risk of being killed by her abuser is greatly increased if she leaves him.
- Characteristics of abusers and abused partners** are listed in Table 19-4.

B. ROLE OF THE PHYSICIAN

- In contrast to physical or sexual abuse of a child or elderly person, direct reporting by the physician of domestic partner abuse is not appropriate because the victim is usually a competent adult.
- A physician who suspects domestic abuse should **provide emotional support** to the abused partner, refer her to an appropriate shelter or program, and **encourage her to report** the case to law enforcement officials.

IV Sexual Aggression: Rape and Related Crimes

A. DEFINITIONS

- Rape** is a crime of violence, not of passion. Rape is known legally as **sexual assault or aggravated sexual assault and** includes vaginal penetration by penis, finger, or object.
- Sodomy** is **oral or anal penetration**. The victim may be male or female.
- Characteristics of rape, the rapist, and the victim are listed in Table 19-5.

B. LEGAL CONSIDERATIONS

- Rapists may use condoms** to avoid contracting HIV and/or to avoid DNA identification. Because rapists may have difficulty with erection or ejaculation, semen may not be present in the vagina of a rape victim.

TABLE 19-4

PHYSICAL AND SEXUAL ABUSE OF DOMESTIC PARTNERS

Characteristics of the abuser	<ul style="list-style-type: none"> Is almost always male Often uses alcohol or drugs Is impulsive and angry Has a low tolerance for frustration Has threatened to kill the abused if she reports or leaves him Shows apologetic and loving behavior after the abuse Has low self-esteem
Characteristics of the abused	<ul style="list-style-type: none"> Is financially or emotionally dependent on the abuser Is often pregnant (injuries are often in the "baby zone," i.e., the breasts and abdomen) Blames herself for the abuse May neither report to the police nor leave the abuser Has low self-esteem

TABLE 19-5

RAPE

Definition	<ul style="list-style-type: none"> • Sexual contact without consent involving vaginal penetration by a penis, finger, or object • Erection and ejaculation do not have to occur
Characteristics of the rapist	<ul style="list-style-type: none"> • Usually younger than age 25 • Usually the same race as the victim • Usually known by the victim • Alcohol use
Characteristics of the victim	<ul style="list-style-type: none"> • Usually between 16 and 24 y of age • Usually occurs inside the victim's home • Vaginal injuries may be absent, particularly in parous women (those who have had children)
Characteristics of the crime recovery	<ul style="list-style-type: none"> • Most rapes are not reported; only 25% are reported to the police • Others tend to blame the victim (e.g., for wearing provocative clothing or for going out at night) • The emotional recovery period commonly lasts at least 1 y • Posttraumatic stress disorder may occur (see Chapter 14) • Group therapy with other rape victims is the most effective management

2. A victim is **not required to prove that she resisted the rapist** for him to be convicted.
3. **Husbands can be prosecuted for raping their wives.** It is illegal to force anyone to engage in sexual activity.
4. **Statutory rape.** Consensual sex may be considered rape if the victim is younger than 16–18 years (depending on state law) or is **mentally handicapped**.

C. ROLE OF THE PHYSICIAN

1. The physician is not required to notify the police if the woman is a competent adult. As in cases of domestic abuse (see III B), the physician should **encourage the patient to notify the police**.
2. The physician should **be supportive and nonjudgmental** during the history and physical examination and should not question the patient's veracity or judgment.

Answers to Patient Snapshot Questions

19-1. It is likely that this bodybuilder has been taking anabolic steroids. In addition to increasing aggressiveness, these agents may cause psychotic symptoms (e.g., the belief that his behavior is being directed from heaven).

19-2. It is likely that this elderly, demented patient has been physically abused, probably by his daughter. The physician's next step is to notify the appropriate social service agency and to protect the patient until the agency takes over the case.

The Physician–Patient Relationship

I Communicating with Patients



Patient Snapshot 20-1. A 7-year-old girl, who is carrying no identifying information, has been in a car accident. The child is not hurt but, when asked her name, she does not respond.

What should the physician say or do to facilitate communication with this child?

A. GIVING INFORMATION TO PATIENTS

1. The treating physician is responsible for dealing with the questions and behavioral problems of his or her patients. **Referral to other physicians should be reserved for medical problems** outside the range of the treating physician.
2. **Adult patients** generally **are told the complete truth** about the diagnosis and prognosis of their illness.
 - a. Falsely reassuring or patronizing statements are not appropriate.
 - b. Information about the illness is given directly to the adult patient and not relayed through relatives.
3. **Children** should also be told the truth about their illness or the discomfort of treatment in a way that they can understand. However, parents have the ultimate choice as to whether, when, and how much to tell a child who is ill.
4. Tables 20-1 and 20-2 provide information about common **USMLE questions** that require students to choose the correct verbal response to a patient's query or action (students often refer to these questions as **the "Quote" questions**).

B. GETTING INFORMATION FROM PATIENTS

1. **Communication and interviewing skills.** During a clinical interview, a physician must establish a relationship (rapport), gain the patient's trust, and then gather physical, psychological, and social information to identify the patient's problem.
2. **Interviewing techniques**
 - a. **Direct questions** are used to elicit information quickly in an emergency situation (e.g., "Have you been shot?") or when **the patient is seductive** or overly talkative.
 - b. **Open-ended questions** are used to obtain as much information as possible and **encourage the patient to speak freely** (e.g., "What brought you to the hospital today?").
 - c. **Children** may have difficulty responding to open-ended or direct questions from a doctor. Therefore, it is often more appropriate to ask a young child a question in the **third person**, for example, "What do you think a child who is scared would want the doctor to say." It is also helpful to use **non-verbal** means of expression, for example, "Let's draw a picture together of someone going to the doctor's office."
 - d. Table 20-3 lists interviewing techniques that are useful in communicating with patients.

TABLE 20-1

THE USMLE “QUOTE” QUESTIONS: EMOTIONAL ISSUES

Patient Snapshot	Physician “Quote”	Comment
<p>Angry and Seductive Patients</p> <p> A 42-year-old female patient complains about how “disorganized” the doctor’s office is.</p>	<p>“I am sorry. Please tell me what you experienced and let me know if you have any suggestions about how we can make it better.”</p>	<p>Try to see the problem from the patient’s point of view. Patients, especially those with obsessive–compulsive personality characteristics, are often fearful about becoming dependent as well as of being ill.</p>
<p> A 50-year-old, dirty, disheveled patient has had at least one complaint about the office or staff on every visit. Today she complains that one of the best nurses was “fresh” to her.</p>	<p>“I apologize. I will speak to the nurse about what happened.”</p>	<p>Do not blame the patient, no matter how provocative he or she is, for problems with the office staff.</p>
<p> A 28-year-old male patient comes up close to the doctor and tells her that he finds her attractive.</p>	<p>“The important thing is that we talk about the problem that brought you here.”</p>	<p>Romantic relationships with patients are never appropriate. Gather information using direct rather than open-ended questions, set limits on the behavior that the doctor will tolerate, and use a chaperone when interviewing and examining the patient.</p>
<p> A 38-year-old cancer patient complains to the doctor about the way one of her other physicians spoke to her.</p>	<p>“It is a good idea to speak to your other physician directly about your concerns.”</p>	<p>Do not intervene in the patient’s relationship with the other physician unless there is a medical reason to do so.</p>
<p> A 40-year-old male patient with pneumonia insists on having a CAT scan, which the physician knows he does not need.</p>	<p>“Tell me why you want the CAT scan.”</p>	<p>Find out why the patient wants the CAT scan and try to address his underlying concerns. Do not perform a procedure or test that is not necessary.</p>
<p>Noncompliant Patients</p> <p> A 45-year-old patient whose parents both died of colon cancer before age 50 refuses to have a colonoscopy because she heard that the procedure was uncomfortable.</p>	<p>“Tell me more about your concerns related to the procedure.”</p>	<p>Identify the real reason for the patient’s refusal (e.g., fear that cancer will be found). Do not attempt to frighten the patient into adhering (e.g., providing photographs of untreated cases).</p>

(Continued)







TABLE 20-1

THE USMLE “QUOTE” QUESTIONS: EMOTIONAL ISSUES (*Continued*)

Patient Snapshot	Physician “Quote”	Comment
 <p>A 68-year-old female patient insists on stopping a needed treatment (e.g., wants her pacemaker removed or wants to stop chemotherapy) because it is making her uncomfortable.</p>	“Let’s discuss ways that we can make the treatment more tolerable for you.”	Do not stop treatment before the alternatives have been explored.
 <p>A nurse tells the doctor that she saw a hospitalized 55-year-old patient with diabetes putting sugar in her coffee.</p>	“Let’s discuss your diet again.”	Do not become angry at non-compliant patients. This patient may need to be reminded of how to follow her diet.
 <p>A patient believes (falsely) that his poor health behavior (e.g., smoking) is actually beneficial to his health.</p>	“Tell me more about how you feel about your cigarette smoking?”	Do not recommend methods of smoking cessation until the patient expresses willingness to try to stop.
Depressed and Anxious Patients		
 <p>A 48-year-old married woman who had a mastectomy says she feels “ugly” when she gets undressed at night.</p>	“Tell me about your relationship with your husband since the surgery.”	Anticipate that mastectomy is likely to affect the patient’s physical relationship with her spouse. Do not offer a solution such as “We have new breast reconstruction options” until more is known about the problem.
 <p>Without telling you what he is feeling, a 54-year-old hypertensive patient asks the doctor to tell him more about his illness and the side effects of medication he is taking.</p>	“Tell me about the side effects you have been experiencing.”	This patient may be reluctant to bring up embarrassing issues associated with the illness or treatment (e.g., sexual problems).
 <p>A 45-year-old woman has an illness that has caused skin lesions. She asks the doctor how she should deal with the negative reactions of other people.</p>	“Let’s come up with something that you can say to a person who has a reaction that bothers you.”	Work with the patient to devise a statement such as, “I had an illness that caused some skin problems, but it is not contagious.”
 <p>A 44-year-old AIDS patient tells the doctor that he will kill himself when he gets out of the hospital.</p>	“I would like you to remain in the hospital for a few more days.”	Do not release a patient who has made a serious suicidal threat. If the patient refuses to stay the doctor can hold him involuntarily for a period of time (see Chapter 15).





TABLE 20-2

THE USMLE “QUOTE” QUESTIONS: DEVELOPMENTAL ISSUES

Patient Snapshot	Physician “Quote”	Comment
Child and Adolescent Patients		
 <p>A 9-year-old child with leukemia asks the doctor what is wrong with him. His parents have told the doctor that they do not want him to know he has leukemia.</p>	<p>“What have your parents told you about your illness?”</p>	<p>The parents of ill children decide what to tell the child about the illness. With the parents’ permission, the doctor may present the information to the child in the most supportive and nonthreatening way possible.</p>
 <p>A 5-year-old girl needs to have a procedure that involves minor pain.</p>	<p>“This will feel like a bug bite and it will stop hurting after we count to five together.”</p>	<p>The doctor should tell the child about how much pain she is likely to feel in a way that she will understand</p>
 <p>The parents of a 15-year-old girl want the doctor to tell her to give up her newborn child for adoption. The girl wants to keep the baby.</p>	<p>“If you decide to keep the child, these are the things that you can expect that the child will need from you as he grows up.”</p>	<p>Provide information to the teenager about the practical issues of what the baby will need throughout its childhood. Do not make decisions for the family regarding adoption. If they ask, it is appropriate to tell them about the options.</p>
Reproductive Issues for Patients		
 <p>A couple with 5 children would like to use sterilization for birth control. They ask the doctor whether they should choose a tubal ligation or a vasectomy.</p>	<p>“Here are the pros and cons of each procedure; think about them and let me know what you decide.”</p>	<p>Do not make medical decisions for patients and do not get involved in the issue of which partner will have the procedure. Give them all of the relevant information and let them decide on a course of action.</p>
 <p>The parents of a healthy, mentally retarded, pregnant 17 y old want the doctor to perform an abortion. The girl wants to keep the baby whom tests have shown has Down syndrome.</p>	<p>“Let’s all discuss the possible options.”</p>	<p>Do not recommend a course of action (e.g., adoption), but do facilitate discussion about the options between the parents and the patient. The fact that the baby has Down syndrome is irrelevant.</p>
 <p>A 25-year-old patient requests a first-trimester abortion from a physician who has religious and moral prohibitions against abortion.</p>	<p>“I do not perform abortions, but I will refer you to a doctor who does.”</p>	<p>Doctors are not required to perform any procedure a patient requests. Do not be judgmental, do not impose your own beliefs on the patient, and do not try to change her mind.</p>

(Continued)

TABLE 20-2 THE USMLE “QUOTE” QUESTIONS: DEVELOPMENTAL ISSUES (Continued)

Patient Snapshot	Physician “Quote”	Comment
Elderly and Dying Patients		
 An 82-year-old woman has had 2 falls at home. She tells the doctor that her adult children are concerned and want her to go into a nursing home. She does not want to go.	“Let’s try to find out why you are falling.”	Conduct a medical evaluation and a home evaluation to determine why the patient is falling. Then treat her medical problems and recommend environmental changes (e.g., remove area rugs to prevent tripping) that will allow her to stay safely at home as long as possible
 A 60-year-old dying patient asks the doctor how long he has to live. The doctor knows that he is likely to live about 3 mo.	“While there have been expectations, most people at this stage of the illness live about three months.”	Be truthful and direct. Reassure the patient that you will not abandon him, but do not offer philosophical or religious statements.
 A 76-year-old male patient, who is of a different religion than you are, tells the doctor that he had a religious “vision” while praying and asks the doctor to pray with him.	“That must have been a very important moment for you.”	Although the doctor does not have to pray with the patient, the doctor should show support and understanding of his belief system.
 The brother of a 60-year-old competent woman who has terminal lung cancer asks the doctor to tell him her diagnosis and prognosis	“Please ask your sister.”	Do not discuss issues concerning patients with their relatives or anyone else without the patients’ permission.

II The Ill Patient

A. SEEKING MEDICAL AND PSYCHIATRIC CARE

1. Only about **one-third of individuals with physical symptoms seek medical care**; most people treat themselves at home using over-the-counter medications.
2. Patients with psychiatric symptoms are even less likely to seek care.
 - a. In the United States, there is a **stigma attached to having psychological problems**; they are considered an indication of “moral weakness” or lack of self-control.
 - b. Psychiatric illness is strongly associated with physical illness. **Morbidity and mortality rates** are much higher in patients who need psychiatric care.

- B. THE “SICK ROLE.”** A sick person assumes a specific role in society and follows predictable behavioral patterns, that is, the “sick role.” These patterns include **exemption** from usual responsibilities, **expectation of care** by others, **efforts** toward getting better, and **cooperation** with health care personnel.

TABLE 20-3

INTERVIEWING TECHNIQUES



Patient Snapshot. The emergency squad brings a 75-year-old man to the hospital after a fall. While taking a brief history, the physician notes that the patient seems frightened and in pain. The patient says that he is “fine” and just wants to go home

How can the physician use the clinical interview to find out what this patient is experiencing now?

Aim	Technique	Specific Use	Example
To establish rapport	Support and empathy	To express the physician’s interest and concern	“That fall must have been frightening for you”
	Validation	To give value and credence to the patient’s feelings	“Many people would feel scared if they had had a fall like yours”
To maximize information gathering	Facilitation	To encourage the patient to speak	“Please tell me what happened”
	Reflection	To encourage the patient to elaborate on an answer	“Your pain started during the ambulance trip?”
	Silence	To increase the chance that the patient will speak	Waiting patiently for the patient to speak
To clarify information	Confrontation	To call attention to inconsistencies in the patient’s responses	“You say that you are fine but you seem to be in pain”
	Recapitulation	To sum up information obtained during the interview	“Let’s go over what happened this morning. Do I have it right?”

- C. **DEFENSE MECHANISMS**, such as denial (i.e., refusal to admit to being sick; see Chapter 4), may help patients to cope with the initial phase of serious illness. Over the long term, such defense mechanisms can cause a delay in seeking treatment and thus may prove harmful.

III Adherence



Patient Snapshot 20-2. A physician becomes very angry with her 80-year-old patient when he confesses that he has not been following her recommended diet and activity program. The physician’s own father died of congestive heart failure 5 years earlier, and he had never exercised and rarely watched his diet.

What is going on in this physician–patient relationship? (See III B 3.)

A. CHARACTERISTICS

1. Adherence is the extent to which a patient **follows the instructions** of the physician.
2. Adherence is **not related** to a patient’s gender, **religion**, socioeconomic or marital status, race, **intelligence**, or education.
3. Factors that increase and decrease adherence are listed in Table 20-4.

TABLE 20-4

FACTORS ASSOCIATED WITH ADHERENCE TO MEDICAL ADVICE

Factors That Increase Adherence	Factors That Decrease Adherence
Good physician–patient relationship (most important factor)	Perception of the physician as cold and unapproachable; anger at the physician
Feeling ill and limitation of usual activities	Few symptoms and little disruption of activities
Written instructions for taking medication	Verbal instructions for taking medication
Acute illness	Chronic illness
Simple treatment schedule	Complex treatment schedule
Short time spent in the waiting room	Long time spent in the waiting room
Recommending one behavioral change at a time (e.g., “This month, stop smoking”)	Recommending multiple behavioral changes at the same time (e.g., “This month, stop smoking, start exercising, and begin a diet”)
Belief that the benefits of care outweigh its financial and time costs (the “Health Belief Model”)	Belief that the financial and time costs of care outweigh its benefits
Peer support (particularly in adolescents with chronic illnesses)	Little peer support

- B. TRANSFERENCE REACTIONS.** Patients have unconscious reactions to their physicians, which involve a transfer of emotions from childhood parent–child relationships (see also Chapter 4). These emotions may affect patient adherence.
- 1. In positive transference,** patients view physicians as excessively good and may have an unrealistic level of confidence in their abilities.
 - 2. In negative transference,** patients feel excessive resentment or anger toward the physician if the patients’ expectations are not met. These patients may not adhere to a physician’s treatment plan.
 - 3. Countertransference** is the unconscious reaction of physicians toward their patients. Physicians may feel guilty when they cannot help a patient, may minimize the severity of illness in a colleague whom they are treating, or may have **positive, negative, or inappropriate feelings toward patients who remind them of close relatives or friends.** All of these can result in the patient not receiving the appropriate care from the physician.

IV Stress and Illness

- A. LIFE STRESS** is associated with both **physical and emotional illness.**
- Stressful life events may be **negative** (e.g., death of a spouse) or **positive** (e.g., birth of a wanted child).
 - Holmes and Rahe categorized life stressors according to a **point value system**, with 100 points (e.g., death of a spouse) representing the highest level of stress. Individuals who accumulate 300 points in 1 year may be at risk for serious illness.
- B. PSYCHOSOMATIC FACTORS**
- Psychological stress **exacerbates physical disorders** such as congestive heart failure, cardiac arrhythmia, hyperthyroidism, peptic ulcer disease, ulcerative colitis, rheumatoid arthritis, low back pain, tension and migraine headaches, diabetes mellitus, and immune system disorders.

2. The **type A personality** is characterized by **time pressure and competitiveness**. **Coronary artery disease** is seen more commonly in type A patients who also are **aggressive and hostile**.
3. **Hans Selye** described the stages of the body's response to stress as the **general adaptation syndrome**. Adrenocorticotrophic hormone is released rapidly, followed by the release of corticosteroids that suppress immune response. This results in illnesses such as cancer and infection.

V

Special Patient Populations

- A. AT-RISK PATIENTS.** When hospitalized, certain patients are at greater risk for psychological reactions to illness, hospitalization, or surgery. These include
1. Patients with a history of **psychiatric illness** and having certain personality styles and disorders (see Table 14-4).
 2. Patients whose relationships with their families or with the medical staff worsen during the illness. Fear of illness can result in expressions of anger toward medical personnel.
 3. Patients in the **ICU**, who lack a sense of control of the environment and have few orienting cues.
 4. Patients receiving **renal dialysis**, because of their dependence on technology and other people for survival.
 5. **Surgical patients** who have unrealistic expectations for a procedure, believe that they will not survive surgery, or deny that they are seriously worried before surgery.
 - a. Surgical patients who **express their anxiety** are at **lower** risk for morbidity and mortality.
 - b. The outcome is also improved for surgical patients who **know what to expect** during and after the procedure (e.g., pain, disorientation, mechanical support).
- B. PATIENTS WITH AIDS**
1. Common responses to this diagnosis include intense anxiety, hopelessness, depression, and guilt (if their behavior may have led to the disease).
 2. Patients require reassurance that **they will not be abandoned** by their physician, family, and friends.
- C. CHRONIC PAIN PATIENTS**
1. **Chronic pain** is common and may be caused by **psychological or physical factors** or both. A good physician–patient relationship is an important part of the management of chronic pain.
 2. **Psychosocial factors** associated with chronic pain include **depression**, neglect, physical and sexual abuse in childhood, and life **stress**.
 3. **Scheduled administration of medication** is more effective than medication administered on demand because scheduled administration separates the experience of pain from the receipt of medication. Medication **given** on demand links the two.
 4. Many patients with chronic pain are **undermedicated**.
 - a. Patients may be undermedicated because the physician fears that the patient will become addicted to the medication.
 - b. However, there is evidence that patients with chronic pain **do not show long-term dependence on** opioid drugs. Unlike addicts, these patients easily discontinue the use of drugs as the pain remits.
 5. **Pain tolerance** can be increased through biofeedback, physical therapy, hypnosis, psychotherapy, meditation, and relaxation training.

Answers to Patient Snapshot Questions

20-1. Because a young child may not respond to open ended or even to direct questions such as “What is your name?,” the physician should play an interactive game such as drawing or coloring with the child to build rapport and get information.

20-2. This physician who becomes angry at her patient for failing to adhere to her recommendations is showing a countertransference reaction. This show of emotion is a result of unconsciously reexperiencing feelings about her own father in her current relationship with the patient.

Health Care Delivery



Patient Snapshot 21-1. An 89-year-old man with a spinal compression fracture is brought to the hospital by ambulance. After a 7-day hospital stay, the patient is moved to a nursing facility for rehabilitation. After 1 month in the nursing facility, it is determined that the patient cannot care for himself and will need long-term nursing home care.

How will this patient's medical bills—for example, ambulance, hospital bill, rehabilitation facility, and nursing home bills—be paid? (See Table 21-1.)

I Health Care Delivery Systems

A. HOSPITALS

1. **Bed surplus.** The United States has close to 6,000 hospitals and 1,000,000 hospital beds. The current surplus of hospital beds is partly due to restrictions on length of hospital stays imposed by insurance companies.
2. **Types of hospitals**
 - a. **Community hospitals ($n = 5,008$).**
 - i. Nongovernment not-for-profit type.
 - ii. Investor-owned for-profit type.
 - iii. State and local government type.
 - b. **Federal government hospitals ($n = 211$).** Veteran's Administration and military hospitals that are federally owned and reserved for those who have served or are serving in the military.
 - c. **Nonfederal psychiatric hospitals ($n = 444$).** Hospitals for chronically mentally ill patients that usually are owned and operated by state governments.
 - d. **Nonfederal long-term care hospitals ($n = 117$).** Hospitals for chronically physically ill patients.

B. LONG-TERM CARE: NURSING HOMES AND RELATED FACILITIES. The United States currently has about 15,500 state-certified nursing homes with a capacity of over 1.6 million beds that provide long-term care, particularly for the elderly.

1. Nursing homes and related facilities are classified and priced according to the level of care that they offer.
 - a. **Assisted living** facilities provide limited care, for example, meals and house-keeping, and typically cost about \$36,000 per year.
 - b. **Skilled nursing home** facilities provide these services and professional nursing care and typically cost at least \$75,000 year.
2. In part because it is **not covered by Medicare**, only about 5% of the elderly utilize long-term care. **Most** elderly Americans spend the last years of life **in their own residences**.

TABLE 21-1 MEDICARE AND MEDICAID		
Funding	Eligibility	Coverage
Medicare		
Federal government (through the Social Security system)	<ul style="list-style-type: none"> • People eligible for Social Security benefits (e.g., those 65 y of age regardless of income) and people of any age with chronic disabilities or debilitating illnesses 	<ul style="list-style-type: none"> • Part A: Inpatient hospital costs, home health care, hospice care • Part B (optional): Physician fees, dialysis, physical therapy, laboratory tests, ambulance services, medical equipment • Part D (optional): Prescription drug coverage
Medicaid (Medical in California)		
Both federal and state governments ^a	<ul style="list-style-type: none"> • Indigent (very low income) people • One-third of all monies are allocated for nursing home care for indigent, elderly people 	<ul style="list-style-type: none"> • Inpatient and outpatient hospital costs • Physician services • Home health care • Hospice care • Laboratory tests and dialysis • Prescription drugs • Long-term nursing home care • Dental care, eyeglasses, hearing aids

^aThe state contribution is determined by average per capita income of the state.

C. HOSPICE

1. Hospice care utilizes physicians, nurses, social workers, and volunteers to provide **inpatient and outpatient supportive care to terminally ill patients** (i.e., those expected to live <6 months).
2. Hospice care offers patients **death with dignity** and **as little pain as possible**. Grief counseling, peer and family support, and administration of pain medication as needed are provided funded by Medicare Part A.

II Physicians

A. MEDICAL DOCTORS

1. The United States currently has **approximately 950,000 physicians**.
2. **Primary care physicians**, including family practitioners, internists, and pediatricians, provide initial care to patients and account for one-third of all physicians. This number is increasing and is expected to soon reach one-half of all physicians. **The number of specialists is decreasing.**

B. PATIENT CONSULTATIONS

1. In the United States, people average **5 visits to physicians per year**, significantly fewer visits than people in developed countries with systems of socialized medicine.
2. For high-income patients, most physician–patient contact occurs in a physician’s office. Because hospitals are required by law to stabilize any patient who presents for treatment even those unable to pay, low-income patients are more likely to seek treatment in hospital outpatient departments.

III

Cost of Health Care

A. HEALTH CARE EXPENDITURES

1. Health care expenditures in the United States total more than 14% **of the total economy**, more than in any other industrialized society.
2. Health care expenditures have increased because of the **increasing age of the population**, advances in medical technology, and the availability of health care to the poor and elderly through Medicaid and Medicare, respectively (see IV D).

B. ALLOCATION OF HEALTH CARE FUNDS

1. **Hospitalization** (31%) and **professional services** (31%) such as physician costs are **the most expensive** portions of the **health care dollar** in the United States. The health care dollar also includes the cost of retail prescriptions (10%), nursing home care (6%), home health care (3%), and nonprescription medical products (3%).
2. **The federal government, state governments**, private health insurance, and individuals each pay about one-quarter of all health care costs.

IV

Health Insurance

A. OVERVIEW

1. The United States is one of the few industrialized country that **does not have publicly mandated government-funded health care insurance coverage** for all citizens.
2. Certain citizens, such as the **elderly** and the **poor**, do have government-funded health care insurance through Medicare and Medicaid respectively.
3. Most Americans must **obtain their own health insurance** through their employer or on their own. About 15% of Americans have **no health insurance** and must pay the costs of health care themselves; many others are “**underinsured.**”
4. Privacy of health information is protected by the federal “**Privacy Rule,**” which implements the requirements of the Health Insurance Portability and Accountability Act of 1996 (**HIPAA**).

B. PRIVATE HEALTH INSURANCE

1. **Blue Cross/Blue Shield**, a nonprofit private insurance carrier, is regulated by insurance agencies in each state and pays for hospital costs (Blue Cross) and physician fees and diagnostic tests (Blue Shield) for 30%–50% of working people in the United States.
2. Individuals can also contract with one of approximately 1,000 other **private insurance carriers**, such as Aetna or Prudential.
3. Most insurance carriers offer a traditional, **fee-for-service** insurance plan and at least one type of managed care plan.

C. MANAGED CARE AND FEE-FOR-SERVICE PLANS

1. **Managed care** describes a health care delivery system in which all aspects of an individual’s health care are coordinated or managed by a group of providers to enhance cost effectiveness.
 - a. A managed care plan has restrictions on provider choice and referrals and relatively low premiums.
 - b. Because fewer patient visits result in lower costs, the philosophy of managed care stresses **prevention** rather than acute treatment.

- c. Types of managed care plans include health maintenance organizations, preferred provider organizations, and point of service plans. In the more restrictive, less costly plans, there is a “**gatekeeper**” physician who decides if and when a patient needs to see a specialist.
2. A **fee-for-service plan** has **no restrictions on provider choice** or referrals but commonly has **higher premiums**.

D. FEDERAL AND STATE-FUNDED INSURANCE COVERAGE

1. Medicare and Medicaid are government-funded programs that provide medical insurance to certain groups of people (Table 21-1).
2. **Diagnosis-related groups** are used by Medicare and Medicaid to pay hospital bills. The amount paid is based on an estimate of what the cost of hospitalization should be for an illness rather than the actual charges incurred. Medicare does not pay but Medicaid does pay for long-term nursing home care for the elderly.

V Demographics of Health



Patient Snapshot 21-2. A physician has 4 patients waiting to see her in the hospital emergency room: 2 men (1 from a low socioeconomic group and 1 from a high socioeconomic group) and 2 women (1 from a low socioeconomic group and 1 from a high socioeconomic group).

If the physician were to see the sickest person first, which patient would that probably be? (See V B 2, C 1.)

A. LIFESTYLE, ATTITUDES, AND HEALTH

1. Lifestyle and poor dietary and other habits (particularly smoking) are responsible for many **physical illnesses**.
2. **Attitudes** are also important in health. For example, although transplants can save many lives, there are fewer transplant procedures done than are needed. This is primarily because there are **not enough people willing to donate their organs** at death.

B. SOCIOECONOMIC STATUS AND HEALTH

1. Socioeconomic status is based on **occupation** and **education**; it is associated also with place of residence and with income.
2. Because of the costs, people in low socioeconomic groups **delay seeking health care** and are more likely to be very ill when first consulting a physician.

C. GENDER, AGE, AND HEALTH

1. Men are less likely to seek medical care. They are also more likely to have heart disease and shorter life expectancies than women.
2. **Women** are at higher risk than men for developing **autoimmune diseases, smoking and alcohol-related illnesses, and AIDS when they are already HIV positive**.
3. Although the **elderly** make up only 12% of the population, they currently incur over **30% of all health care costs**; this figure is expected to rise to 50% by the year 2020.
4. The leading **causes of death** in the United States are listed in Table 21-2.

TABLE 21-2**THE 15 LEADING CAUSES OF DEATH IN THE UNITED STATES IN 2009**

Causes of Death	Deaths per 100,000 people
1. Diseases of the heart	195.2
2. Cancer	184.9
3. Chronic lung diseases	44.7
4. Stroke and cerebrovascular diseases	42.0
5. Accidents	38.4
6. Alzheimer disease	25.7
7. Diabetes	22.4
8. Influenza and pneumonia	17.5
9. Kidney disease	15.9
10. Suicide	12.0
11. Blood infection (septicemia)	11.6
12. Chronic liver disease and cirrhosis	10.0
13. Essential hypertension	8.4
14. Parkinson disease	6.7
15. Homicide	5.5

Source: Centers for Disease Control and Prevention. National Vital Statistics System, 2009.

Answers to Patient Snapshot Questions

21-1. Medicare will pay this elderly patient's hospital bill and rehabilitation facility bill (Part A) as well as the ambulance bill (Part B). Medicare will only pay for rehabilitative care in the nursing home for a limited time after hospitalization. The patient himself will then use his own funds to pay for long-term nursing home care. After his own funds are used up, Medicaid will pay the costs of his care.

21-2. Of these 4 patients, the man from a low socioeconomic group is the one likely to be most ill when seeing a physician. Individuals in lower socioeconomic groups delay seeking treatment because of the costs; also, men are less likely to seek medical treatment than are women.

Legal and Ethical Issues in Medical Practice

I Professional Behavior



Patient Snapshot 22-1. An internal medicine resident is attracted to one of his patients and would like to ask her out on a date. He asks his residency training director if he can start a relationship with the patient after he turns the case over to another resident.

Can the resident refer the patient to a colleague and then ask her out on a date? (See I B 3.)

A. IMPAIRED PHYSICIANS

1. **Causes** of impairment in physicians include **substance abuse**, physical or mental illness, and impairment in functioning associated with old age.
2. **Reporting** of an impaired medical student (to the dean of the medical school), resident (to the residency training director), or colleague (to the state licensing board or the impaired physicians program) **is an ethical requirement** because patients must be protected and the impaired physician must be helped.

B. MEDICAL MALPRACTICE.

Physicians do not have to be impaired to make errors in treating patients. However, physician error is not necessarily medical malpractice.

1. **The "4 D's."** For a malpractice claim, the patient must prove that the physician demonstrated **dereliction**, or negligence (i.e., deviation from normal standards of care), of a duty (i.e., there is an established physician–patient relationship) that caused **damages** (i.e., injury) **directly** to the patient (i.e., the damages were caused by the negligence, not by another factor).
 - a. **Surgeons** (including obstetricians) and **anesthesiologists** are the specialists most likely to be sued for malpractice. Psychiatrists and family practitioners are the least likely to be sued.
 - b. Recently, there has been an increase in the number of malpractice claims, due mainly to a **breakdown** of the traditional **physician–patient relationship**.
2. Malpractice is a tort, or **civil wrong**, not a crime. A physician who is found guilty of malpractice may be required to pay money to compensate the patient for suffering as well as for medical bills and lost income.
3. **Romantic relationships with current or former patients are inappropriate.** The patient can file an ethics complaint, a medical malpractice complaint, or both.

II Legal Competence and Capacity



Patient Snapshot 22-2. A 22-year-old man who has schizophrenia would like to enter a clinical trial for a new antipsychotic medication. The patient lives in a group home and has a part-time job.

Can the patient sign the consent form and enter the clinical trial? (See II C 2.)

A. DEFINITIONS

1. **Competence** is a **legal** term and is decided by the **courts**. To be **legally competent**, a patient must understand the **risks, benefits, and likely outcome** of a health care decision.
2. **All adults** (persons 18 years of age and older) are assumed to be legally competent to make their own health care decisions.
3. **Capacity** (short for decision-making capacity) is a **clinical term** and is decided by a **physician**.

B. MINORS

1. **Minors** (persons younger than 18 years of age) usually are not considered legally competent.
2. **Emancipated minor**. These minors are considered adults and can give consent for their own medical care. To be emancipated, they must meet any of the following criteria:
 - a. They are **self-supporting** or in the **military**.
 - b. They are **married** or **have children** whom they care for.

C. QUESTIONS OF COMPETENCE

1. If an adult's competence is in question (e.g., mentally retarded or demented persons), a **judge** (not the patient's family or physician) **makes the determination** of competence. Physicians are often consulted by the judge for information about whether the patient has the capacity to make health care decisions.
2. Persons may meet the legal standard for competence to accept or refuse medical treatment even if they are **mentally ill or retarded** or are incompetent in other areas of their life (e.g., with finances).
3. If a person is found to be incompetent, a **legal guardian** will be appointed by the court to make decisions for that person.

III Informed Consent



Patient Snapshot 22-3. A competent 55-year-old man who is paralyzed and cannot speak requires surgery. He is informed about the procedure and, as instructed, he blinks his eyes twice for Yes when asked if he gives his consent.

Has the physician obtained informed consent from this patient? (See III A 1.)

A. OVERVIEW

1. With the exception of life-threatening emergencies, physicians must obtain written or oral consent from competent, adult patients before proceeding with **any medical or surgical treatment**. Nonverbal responses from competent patients unable to speak or write are also acceptable.
2. Other hospital personnel (e.g., nurses) usually cannot obtain informed consent.

3. A relative (e.g., a spouse) cannot give consent to treat a patient unless the relative has a durable power of attorney (see VI A 1) or is the patient's legal guardian.

B. COMPONENTS OF INFORMED CONSENT

1. Before patients can give consent to be treated, **they must be informed of and understand the health implications** of their diagnosis. Physicians can delay telling patients the diagnosis until they indicate that they are ready to receive the news.
2. Patients must also be informed:
 - a. Of the **health risks and benefits** of treatment and the **alternatives** to treatment
 - b. Of the likely **outcome if they do not consent** to the treatment
 - c. That they can **withdraw consent at any time** before or during the treatment

C. SPECIAL SITUATIONS

1. Competent patients have the **right to refuse** to have a needed test or procedure for religious or other reasons, even if their health will suffer or death will result from such refusal.
2. If a competent patient **requests cessation of artificial life support**, it is both legal and ethical for a physician to comply with this request.
3. Although medical or surgical intervention may be necessary to protect the health or life of the fetus, a **competent pregnant woman has the right to refuse** intervention (e.g., cesarean section, HIV testing, treatment with AZT), even if the fetus will die or be seriously injured without the intervention.
4. If an **unexpected finding** during surgery necessitates a nonemergency procedure for which the patient has not given consent (e.g., biopsy of an unsuspected ovarian malignancy during a tubal ligation), the additional procedure cannot be performed until the patient wakes up from the surgery and gives informed consent.

D. TREATMENT OF MINORS

1. Only the **parent or legal guardian** can give consent for surgical or medical treatment of a minor (unless the minor is emancipated).
2. A **court order** can be obtained from a judge (within hours if necessary) if a child has a **life-threatening** condition or a correctable birth defect and the parent or guardian refuses to consent to an **established** (but not an experimental) medical or surgical procedure for religious or other reasons.
3. Parental consent is **not required** in the treatment of minors
 - a. In **emergency** situations when the parent or guardian cannot be located and a delay in treatment can cause harm
 - b. For the treatment of **sexually transmitted diseases**
 - c. For prescription of **contraceptives**
 - d. For medical care during **pregnancy**
 - e. For the treatment of **drug and alcohol dependence**
4. Most states require parental consent when a minor seeks an abortion.

IV Confidentiality



Patient Snapshot 22-4. A 35-year-old man tells his physician that he has been sexually abusing his 10-year-old daughter.

Is the physician obligated to report this behavior and, if so, to whom? (See IV A).

- A. In most circumstances, physicians are **expected ethically to maintain patient confidentiality**. They are not required to do so if their patient
1. Is suspected of child or elder abuse
 2. Has a significant risk of suicide
 3. Poses a credible threat to another person
- B. **THE TARASOFF DECISION.** According to this legal decision, if the patient poses a **credible threat**, the physician must **notify** the appropriate law enforcement officials or social service agency and **warn and protect** the intended victim.
- C. **INVOLUNTARY HOSPITALIZATION**
1. Under certain circumstances, patients with psychiatric disorders who are a **danger to themselves or others** may be hospitalized against their will (see Chapter 15).
 2. Patients who are either voluntarily or involuntarily confined to mental health facilities generally have the **right to receive treatment and to refuse treatment**.

V Infectious Diseases



Patient Snapshot 22-5. A physician refuses to treat a 30-year-old man with tuberculosis because she is afraid of infection.

Is the physician's refusal to treat ethical? Is it legal? (See V B 2.)

- A. Most states require physicians to report **varicella (chicken pox), hepatitis, measles, mumps, rubella, salmonellosis, shigellosis, tuberculosis, syphilis, gonorrhea, chlamydia, and AIDS** to their state health departments. Reporting an HIV-positive patient who has not yet been diagnosed with AIDS is required in most states.
1. **States may differ** on which illnesses must be reported.
 2. **State health departments report** these illnesses (without patient names) to the federal Centers for Disease Control and Prevention for statistical purposes.
- B. **HIV INFECTION**
1. Physicians are **not required to inform** either patients or the medical establishment about another physician's HIV-positive status; an HIV-positive physician who follows procedures for infection control does not pose a risk to his or her patients.
 2. Although physicians are **not compelled legally** to treat patients, **it is unethical to refuse** to treat patients because of fear of infection, such as tuberculosis.
 3. Patients who are HIV positive **must protect their sexual partners from infection**. If they fail or refuse to do so (e.g., if they do not use a condom or do not tell their partner of their HIV-positive status) and the physician has knowledge of such failure or refusal, the physician can inform the threatened partner.

VI Advance Directives



Patient Snapshot 22-6. One month after a 75-year-old woman has signed a document giving her neighbor durable power of attorney, she has a stroke. It is determined that there is little chance that she will ever regain consciousness. The patient's son, with whom she lives, insists that his mother be kept on life support. The neighbor tells the physician to remove life support.

What should the physician do? (See VI A 1.)

A. OVERVIEW

1. **Advance directives** are instructions given by patients in anticipation of the need for a medical decision. A durable power of attorney and a living will are examples of advance directives.
 - a. A **durable power of attorney** is a document in which competent persons **designate another person** (e.g., spouse, friend) as their legal representative to make health care decisions about them when they can no longer do so.
 - b. A **living will** is a document or oral statement in which competent persons give directions for their future health care if they become incompetent to make decisions when they need care.
2. Health care facilities that receive Medicare payments (e.g., most hospitals and nursing homes) **are required to ask patients** whether they have advance directives and, if necessary, **help patients** to write them.

B. SPECIAL SITUATIONS

1. **The substituted judgment standard.** If an incompetent patient does not have an advance directive, health care providers or family members (**surrogates**) must determine **what the patient would have done if he or she were competent**. The **personal wishes of surrogates are irrelevant** to the medical decision.
2. A patient who **regains function** (competence), even briefly or intermittently, regains the right to make decisions about his or her health care during those periods.

VII Death and Euthanasia



Patient Snapshot 22-7. A terminally ill 60-year-old woman is in severe pain. The physician knows that the amount of medication required to relieve her pain will depress her respiration and potentially shorten her life.

Is it legal and ethical for the physician to administer the medication? (See VII B.)

A. LEGAL STANDARD OF DEATH

1. In the United States, the legal standard of death (when a person's heart is beating) is **irreversible cessation of all functions of the entire brain**, including the brainstem.
2. If the patient is legally dead, the physician is authorized to **remove life support**. A court order or relative's permission is unnecessary.
3. A patient's **organs** cannot be harvested after death unless the patient (or parent of a minor) has signed a document (e.g., organ donor card) or informed surrogates of his or her wish to donate.

B. EUTHANASIA AND PHYSICIAN ASSISTED AID-IN DYING (PAD)

1. In all states and according to medical codes of ethics (e.g., American Medical Association, medical specialty organizations), **euthanasia** (i.e., killing a patient for compassionate reasons) is a **criminal act** and is not appropriate.
2. In some states (e.g., Oregon, Washington, Montana), **PAD (providing the means for a patient to commit suicide for compassionate reasons)** is legal in **carefully selected cases**.
3. In all states, it is legal and ethical to provide **medically needed analgesia** to a terminally ill patient even if it coincidentally will shorten the patient's life.

Answers to Patient Snapshot Questions

22-1. Romantic relationships with current or former patients are inappropriate. The resident should not ask the patient on a date now or in the future.

22-2. All adults are assumed to be legally competent to make their own health care decisions. Unless a judge has determined that this patient is incompetent, the patient himself can sign the consent form and enter the drug trial.

22-3. The physician has obtained informed consent from this patient. Nonverbal responses (e.g., eye blinks) from competent patients who are unable to speak or write are acceptable for this purpose.

22-4. Physicians are not required to maintain patient confidentiality when they suspect that a patient is abusing a child. The physician must report his or her suspicions to the appropriate law enforcement or social service agency as soon as possible.

22-5. This physician's refusal to treat the patient is unethical but legal. Although it is unethical to refuse to treat a patient because of fear of infection, physicians are not legally compelled to treat most patients.

22-6. The physician should follow the instructions of the neighbor. By virtue of the durable power of attorney, the patient has designated the neighbor as her legal representative to make decisions about her health care when she can no longer do so.

22-7. After obtaining informed consent from the patient, it is both legal and ethical for the physician to administer the medication. Although the medication may shorten the patient's life, the physician's purpose in administering it is to relieve her pain.

Epidemiology

I Overview



Patient Snapshot 23-1. A town in New Jersey has a population of 7,500. In the year 2011, 200 residents of the town are diagnosed with rheumatoid arthritis (RA). In the year 2012, while the town's population remains at 7,500, 100 more residents are discovered to have RA. What is the incidence rate and prevalence rate of RA in this town in 2012? (See I B.)

- A. DEFINITION.** Epidemiology is the study of the factors that determine the occurrence and distribution of diseases in human populations.
- B. INCIDENCE AND PREVALENCE**
- 1. Incidence rate** is the number of individuals who newly develop an illness in a specific time divided by the total number of individuals at risk for the illness during that time; for example, the number of town residents newly diagnosed with RA in 2012 divided by the total number of town residents during 2012 who are at risk for RA. That is, $100/7,300$. (*Note:* The number at risk for RA is 7,500 minus the 200 residents diagnosed with RA in 2011.)
 - 2. Prevalence rate** is the number of individuals in the population who have an illness (e.g., have RA) at a specific point in time (e.g., on March 4, 2011) or during a specific period (e.g., during 2011) divided by the total population midyear in 2011.
 - 3. Relationship between incidence and prevalence**
 - Prevalence is equal to incidence multiplied by the average duration of the disease process.
 - Prevalence is greater than incidence if the disease is long-lasting.

II Research Study Design

- A. RESEARCH STUDY DESIGNS** include **cohort** (both prospective and historical), **case-control**, and **cross-sectional** studies (Table 23-1).
- B. CLINICAL TREATMENT TRIALS**
- These are special types of cohort studies in which some members of the group (cohort) with a specific illness are given one treatment and other members of the cohort are given another treatment or a placebo.
 - The results of the 2 treatments are then compared (e.g., differences in survival rates between men with heart disease who receive a new drug and men with heart disease who receive a standard drug are compared).

TABLE 23-1 RESEARCH STUDY DESIGN

Type of Study	Population at the Initiation of the Study	Example
Prospective (concurrent) cohort study	Subjects who are free of illness	A study is designed to determine whether students who start to smoke at age 16 will have more respiratory complaints by their 21st birthdays than students who do not start to smoke
Historical (nonconcurrent) cohort study	Subjects who are free of illness	A study is designed to determine whether chemical exposure 30 y ago is associated with an increased incidence of lung cancer in 2,000 men who worked in a paint manufacturing plant
Case control	Subjects who have an illness (i.e., cases) and subjects who do not have the illness (i.e., controls)	A study is designed to determine whether more women with lung cancer (cases) report a history of smoking during teenage years than women without lung cancer (controls)
Cross-sectional	Subjects studied at a specific point in time (may or may not have the illness)	A study is designed to determine whether smokers have more colds than nonsmokers according to a random telephone sample

III Measurement of Risk

- A. RISK FACTORS** are variables that are linked to the cause of a disease.
- B. ABSOLUTE RISK (ESSENTIALLY, THE INCIDENCE RATE), RELATIVE RISK, ATTRIBUTABLE RISK, AND THE ODDS RATIO** are measures of risk used to analyze the results of population studies (Table 23-2).
- C. NUMBER NEEDED TO TREAT (NNT)**
 1. NNT is the number of persons who need to be treated for 1 person to benefit from the treatment and is calculated as 1 divided by the absolute risk reduction (the inverse of attributable risk).
 2. Absolute risk reduction = 1 – absolute risk.
 3. $NNT = 1/\text{absolute risk reduction}$.
 4. NNT allows comparison of the effectiveness of different treatments (Example 23-1).
- D. NUMBER NEEDED TO HARM (NNH)**
 1. NNH is the number of persons who need to be exposed to a risk factor for 1 person to be harmed who would not otherwise have been harmed.
 2. $NNH = 1/\text{attributable risk}$.

Example 23-1. Number Needed to Treat

A new drug (Drug X) was designed to prevent lung cancer in men who smoke cigarettes. Four thousand male smokers aged 55–65 were randomly assigned to a group taking Drug X ($n = 2,000$) or to a group taking a placebo ($n = 2,000$). After 10 years, there were 200 cases of lung cancer in the placebo group and 100 cases of lung cancer in the Drug X group. The absolute risk of lung cancer

TABLE 23-2 ABSOLUTE RISK, RELATIVE RISK, ATTRIBUTABLE RISK, AND ODDS RATIO											
Type of Analysis	Used to Analyze	Example									
Absolute risk	Cohort studies	If the incidence rate of lung cancer among people in Newark, NJ, in 2012 is 10:1,000, the absolute risk is also 10:1,000 or 1%									
Relative risk	Cohort studies	If the incidence rate of lung cancer among smokers in Newark, NJ, in 2012 is 50:1,000 and the incidence rate of lung cancer among nonsmokers in Newark in 2012 is 2:1,000, the relative risk is 50:2, or 25. That is, the risk of lung cancer is 25 times higher for smokers than for nonsmokers									
Attributable risk	Cohort studies	Given the data above, the risk of lung cancer attributable to smoking (the attributable risk) is 50:1,000 – 2:1,000, or 48:1,000. That is, 48:1,000 cases of lung cancer can be attributed to smoking									
Odds ratio	Case–control studies	<p>Of 200 patients treated in a hospital, 50 have lung cancer; of these patients, 45 are smokers; of the remaining 150 patients, 60 are smokers; the odds ratio for smoking and the risk of lung cancer is</p> <table border="0" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td style="text-align: center;">Smokers</td> <td style="text-align: center;">Nonsmokers</td> </tr> <tr> <td>Persons with lung cancer</td> <td style="text-align: center;">A = 45</td> <td style="text-align: center;">B = 5</td> </tr> <tr> <td>Persons without lung cancer</td> <td style="text-align: center;">C = 60</td> <td style="text-align: center;">D = 90</td> </tr> </table> $\frac{(A)(D)}{(B)(C)} = \frac{(45)(90)}{(5)(60)} = 13.5 = \text{Odds ratio}$ <p>The risk of lung cancer is 13.5 times higher for smokers than for nonsmokers in this population</p>		Smokers	Nonsmokers	Persons with lung cancer	A = 45	B = 5	Persons without lung cancer	C = 60	D = 90
	Smokers	Nonsmokers									
Persons with lung cancer	A = 45	B = 5									
Persons without lung cancer	C = 60	D = 90									

in the placebo group was therefore 200/2,000 = 10%, and the absolute risk of lung cancer in the Drug X group was 100/2,000 = 5%. The absolute risk reduction is therefore 10% – 5% = 5%. If 5% of smoking men were saved from lung cancer by the drug, the NNT is 1/0.05 = 20. Therefore, 20 smoking men would have to be treated with Drug X to prevent 1 case of lung cancer.

IV Testing

To be useful, testing instruments must be bias-free, reliable, and valid (i.e., sensitive and specific).

A. REDUCING BIAS

1. A biased test is constructed so that one outcome is more likely than another. Placebos, blind, crossover, and randomized studies are used to reduce bias.
 - a. **Selection bias** can occur if subjects or investigators are permitted to choose the drug or placebo group rather than the subjects being assigned randomly.
 - b. **Sampling bias** can occur if factors unrelated to the aim of the study distinguish the subjects from the rest of the population (e.g., college students who volunteer for a study on cocaine use may be different from the rest of the student population).
2. **Placebo responses.** At least one-third of patients respond to treatment with placebos (inert substances). In psychiatric illness, the placebo effect is even greater.
3. **Blind studies.** In a double-blind study, neither the subject nor the experimenter knows which treatment the subject is receiving.
4. **Crossover studies**
 - a. In a crossover study, subjects in Group 1 first receive the drug and subjects in Group 2 first receive the placebo.

- b. Later in the study, the groups switch (i.e., those in Group 1 receive the placebo; those in Group 2 receive the drug). Thus each subject acts as his or her own control.
5. **Randomization.** To ensure that the number of sick and well persons is proportional in treatment and control or placebo groups, patients are randomly assigned to the groups.

B. RELIABILITY AND VALIDITY

- 1. **Reliability** is the reproducibility of results.
 - a. **Interrater reliability** means that the results of the test are similar when the test is administered by a different rater or examiner.
 - b. **Test-retest reliability** means that the results are the same when the subject is tested a second or third time.
- 2. **Validity** is a measure of whether the test assesses what it was designed to assess. Sensitivity and specificity are components of validity.

C. SENSITIVITY AND SPECIFICITY (Example 23-2)

- 1. **Sensitivity** measures how well a test identifies truly ill persons.
- 2. **Specificity** measures how well a test identifies truly well persons.

Example 23-2. Sensitivity, Specificity, Predictive Value, and Prevalence

A new test to detect the presence of tuberculosis (TB) was given to 1,000 patients. Although 200 of the patients were infected with the bacillus, the result was positive in only 160 patients (true +); the other 40 infected patients had negative results (false -) and thus were not identified by this new test. Of the 800 patients who were not infected, the result was negative in 720 patients (true -) and positive in 80 patients (false +).

Use this information to calculate the sensitivity, specificity, positive predictive value, and negative predictive value of the test and the prevalence of TB in this population.

	Patients Infected with TB	Patients Not Infected with TB	Total Patients
Positive TB test result	160 (true +)	80 (false +)	240 (those with + test result)
Negative TB test result	40 (false -)	720 (true -)	760 (those with - test result)
Total patients	200	800	1,000

$$\text{Sensitivity} = \frac{160 \text{ (true +)}}{160 \text{ (true +)} + 40 \text{ (false -)}} = \frac{160}{200} = 80.0\%$$

$$\text{Specificity} = \frac{720 \text{ (true -)}}{720 \text{ (true -)} + 80 \text{ (false +)}} = \frac{720}{800} = 90.0\%$$

$$\text{Positive predictive value} = \frac{160 \text{ (true +)}}{160 \text{ (true +)} + 80 \text{ (false +)}} = \frac{160}{240} = 66.67\%$$

$$\text{Negative predictive value} = \frac{720 \text{ (true -)}}{720 \text{ (true -)} + 40 \text{ (false -)}} = \frac{720}{760} = 94.7\%$$

$$\text{Prevalence} = \frac{200 \text{ (total infected patients)}}{1000 \text{ (total patients)}} = 20.0\%$$

D. PREDICTIVE VALUE (see Example 23-2)

1. The **predictive value** of a test is a measure of the percentage of test results that match the actual diagnosis.
2. **Positive predictive value** is the probability that someone with a positive test actually has the illness.
3. **Negative predictive value** is the probability that a person with a negative test is actually well.

Example 23-3. Effect of prevalence on sensitivity, specificity, positive predictive value, and negative predictive value. The same new test is used to detect the presence of TB in a different city in which only 10% of the population ($n = 1,000$) is infected with tuberculosis. Use the information from Example 23-2 to calculate the sensitivity, specificity, positive predictive value, and negative predictive value of the test and the prevalence of TB in this population.

	Patients Infected with TB	Patients Not Infected with TB	Total Patients
Positive TB test result	80 (true +)	90 (false +)	170 (those with + test result)
Negative TB test result	20 (false -)	810 (true -)	830 (those with - test result)
Total patients	100	900	1,000

$$\text{Sensitivity} = \frac{80 \text{ (true +)}}{80 \text{ (true +)} + 20 \text{ (false -)}} = \frac{80}{100} = 80\%$$

$$\text{Specificity} = \frac{810 \text{ (true -)}}{810 \text{ (true -)} + 90 \text{ (false +)}} = \frac{810}{900} = 90\%$$

$$\text{Positive predictive value} = \frac{80 \text{ (true +)}}{80 \text{ (true +)} + 90 \text{ (false -)}} = \frac{80}{170} = 47\%$$

$$\text{Negative predictive value} = \frac{810 \text{ (true -)}}{810 \text{ (true -)} + 20 \text{ (false -)}} = \frac{810}{830} = 98\%$$

$$\text{Prevalence} = \frac{100 \text{ (total infected patients)}}{1000 \text{ (total patients)}} = 10.0\%$$

4. If the prevalence of a disease changes, sensitivity and specificity are not affected.
5. If the **prevalence of a disease in the population is low** (as in example 23-3), even tests with very high sensitivity will have low positive predictive value. However, with low prevalence, negative predictive value will be high.

E. CLINICAL PROBABILITY AND ATTACK RATE

1. **Clinical probability** is the number of times an event occurs divided by the number of times that the event can occur (Example 23-4).
2. **Attack rate** is a type of incidence rate used to describe disease outbreaks.
 - a. It is calculated by dividing the number of persons who become ill during the study period divided by the number of persons at risk during the study period.
 - b. For example, if 45 of 60 persons who eat turkey and 15 of 30 persons who eat steak at a banquet become ill 1 hour later, the attack rate is 75% for the turkey and 50% for the steak.

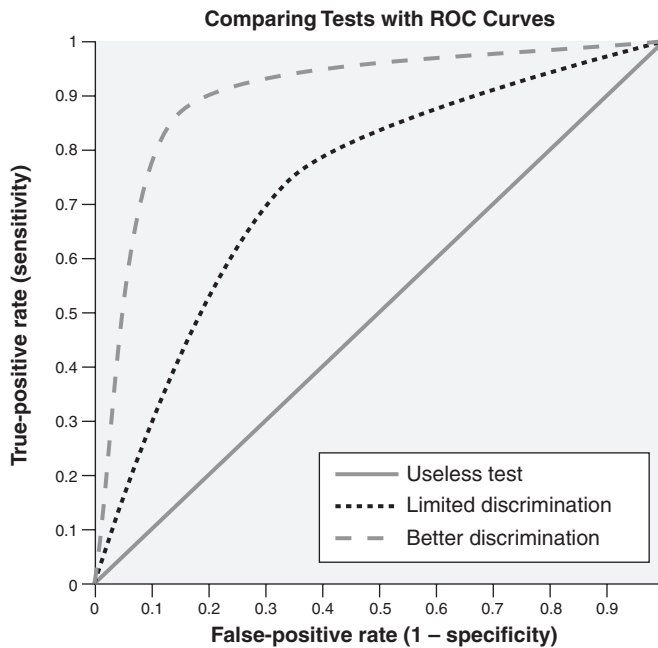
Example 23-4. Clinical Probability

After 2 years of clinical trials, it is determined that 20% of patients who take a new drug for hypertension develop nausea. If 2 patients (patients A and B) take the drug, calculate the following probabilities:

The Probability That	Calculations
Both patients A and B will experience nausea	Multiply the probability of patient A experiencing nausea by the probability of patient B experiencing nausea: $0.20 \times 0.20 = 0.04 = 4\%$
At least 1 patient (i.e., either A or B or both A and B) will experience nausea	Add the probability of patient A experiencing nausea to the probability of B experiencing nausea and then subtract the probability of both A and B experiencing nausea (see above): $0.20 + 0.20 - 0.04 = 0.36 = 36\%$
Neither patient A nor patient B will experience nausea	Multiply the probability of patient A feeling well by the probability of patient B feeling well: $0.80 \times 0.80 = 0.64 = 64\%$

F. RECEIVER OPERATING CHARACTERISTIC (ROC) CURVES

1. An ROC curve is a graphic representation of the relationship between sensitivity (true-positive rate) and 1– specificity (false-positive rate) for a diagnostic test (Fig. 23-1).



● **Figure 23-1 ROC Curve.** The closer the curve is to the diagonal, the less the discriminating ability; the closer the curve “hugs” the y axis, the better the discriminating ability of the test. (Reprinted with permission from Goroll AH, Muley AG. *Primary Care Medicine: Office Evaluation and Management of the Adult Patient*. 6th ed. Philadelphia, PA: Lippincott Williams & Wilkins; 2009. Figure 2.5.)

Answer to Patient Snapshot Question

23-1. The incidence rate of RA in 2012 is $100/7,300$, the number who were diagnosed with the illness divided by the number of persons at risk for the illness. Because the 200 persons who were diagnosed with RA in 2011 are no longer at risk for getting the illness in 2012, the denominator in this equation (the number of persons at risk) is 7,300 (rather than 7,500). The prevalence rate of this disease in 2012 is $300/7,500$. This represents the persons who were diagnosed in 2012 (100 persons) plus the persons who were diagnosed in 2011 and still have the disease (200 persons) divided by the total population.

Statistical Analyses

I Variables and Measures of Dispersion and Central Tendency



Patient Snapshot 24-1. Analysis of the data from a research study designed to test the hypothesis that estrogen replacement therapy is associated with an increased risk for breast cancer reveals a *P* value of less than .01.

Is this a statistically significant result? Can the researcher reject the null hypothesis? (See II B.)

A. VARIABLES

1. A **variable** is a quantity that changes under different circumstances.
2. **Independent variables** are characteristics that an experimenter can change (e.g., amount of salt in the diet).
3. **Dependent variables** are outcomes that reflect the experimental change (e.g., blood pressure under different salt regimens).

B. MEASURES OF DISPERSION

1. **Standard deviation** is the average distance of observations from their mean. It is obtained by squaring each variation, or deviation from the mean in a group of scores; adding the squared deviations; dividing the sum by the number of scores in the group minus 1; and determining the square root of the result.
2. A standard normal value, or ***z* score**, is the difference between an individual variable and the population mean in units of standard deviation. For example,

$$z = \frac{\text{A score in the distribution} - \text{the mean score of the distribution}}{\text{The standard deviation of the distribution}}$$

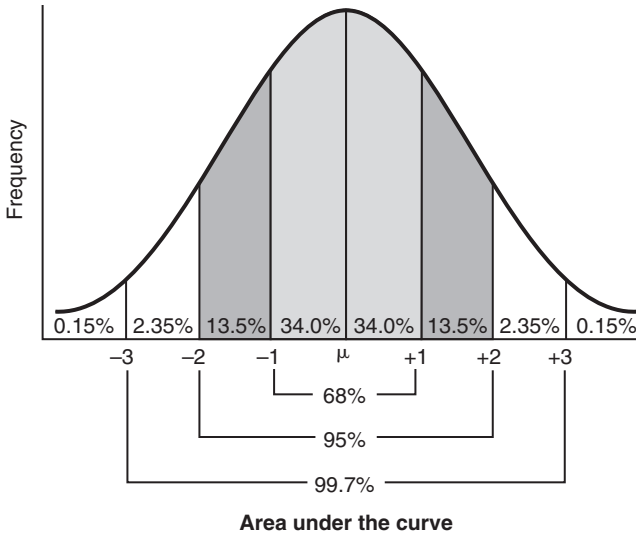
3. **Standard error (SE)** is the standard deviation divided by the square root of the number of scores in a sample.

C. MEASURES OF CENTRAL TENDENCY. In a group of scores

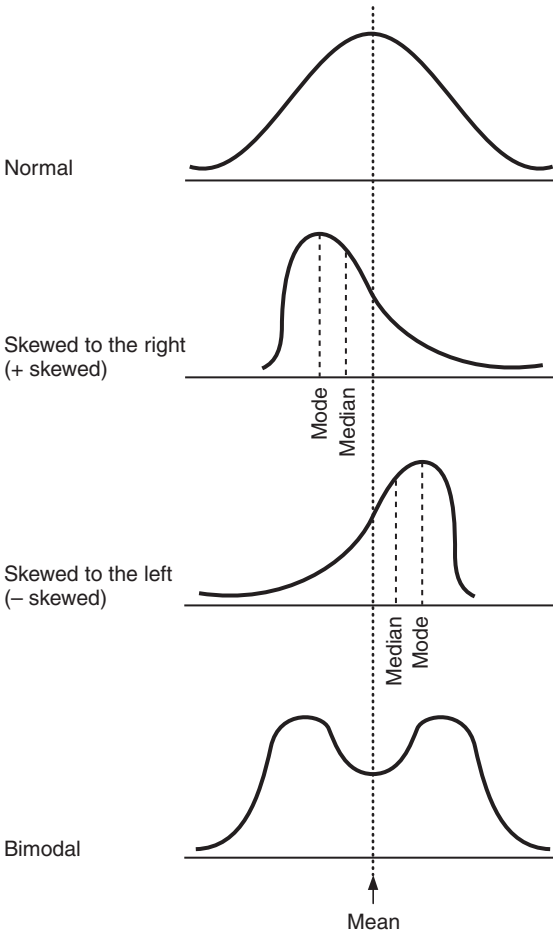
1. The **mean** is the average score.
2. The **median** is the middle value when the scores are ordered sequentially.
3. The **mode** is the value that appears most often.

D. NORMAL DISTRIBUTION

1. A **normal distribution** is also known as a **Gaussian**, or **bell-shaped**, distribution. It is a theoretical distribution of scores in which the mean, median, and mode are equal (Fig. 24-1).
2. In a positively or negatively **skewed distribution**, the modal peak (the highest point in the distribution) shifts to one side (Fig. 24-2).



● **Figure 24.1** The normal (Gaussian) distribution. The number of standard deviations (–3 to +3) from the mean is shown on the x axis. The percentage of the population that falls under the curve within each standard deviation is shown. (From Fadem B. *BRS Behavioral Science*. 5th ed. Baltimore, MD: Lippincott Williams & Wilkins; 2009:275.)



● **Figure 24.2** Frequency distributions. (From Fadem B. *BRS Behavioral Science*. 5th ed. Baltimore, MD: Lippincott Williams & Wilkins; 2009:275.)

E. CONFIDENCE INTERVAL (CI)



Patient Snapshot 24-2. Mean systolic blood pressure of 25 men working in a chemical plant was 160 mm Hg with a standard error of 2.

What are the 95% and 99.7% confidence intervals for this sample?

1. The mean of a sample is only an estimate. The CI specifies the limits within which a given percentage of a population would be expected to fall.
2. $CI = \text{mean} + \text{or} - \text{the } z \text{ score} \times SE.$
3. For the 95% CI (conventionally used in medical research), a z score of 2 is used; for the 99% CI, a z score of 2.5 is used; and for the 99.7% CI a z score of 3 is used.

II Hypothesis Testing

A hypothesis is a statement based on inference, literature, or preliminary studies. The statement postulates that a difference exists between 2 groups. The possibility that the observed difference occurred by chance is tested with statistical procedures.

A. THE NULL HYPOTHESIS postulates that there is no difference between the 2 groups. This hypothesis is either rejected or not rejected after statistical analysis.

1. Example of the null hypothesis.

- a. A group of 50 patients who have similar serum uric acid levels at the beginning of a study (time 1) is divided into 2 groups of 25 patients each. One group is given daily doses of an experimental drug (experimental group). The other group is given a placebo daily (placebo or control group). Uric acid level is measured 4 weeks later (time 2).
- b. The null hypothesis assumes that there are no significant differences in uric acid level between the 2 groups at time 2.
- c. If, at time 2, patients in the experimental group show serum uric acid levels similar to those in the placebo group, the null hypothesis (i.e., there is no significant difference between the groups) is not rejected.
- d. If, at time 2, patients in the experimental group have significantly lower serum uric acid levels than those in the placebo group, the **null hypothesis is rejected**.

2. Type I (α) and type II (β) error

- a. α is a preset level of significance, usually set at 0.05 by convention.
- b. A **type I error** occurs when the null hypothesis is rejected even though it is true (e.g., the drug does not reduce uric acid level).
- c. A **type II error** occurs when the null hypothesis is not rejected even though it is false (e.g., the drug reduces uric acid level).
- d. **Power** ($1 - \beta$) is the ability to detect a difference between groups if it is truly there. The larger the sample size, the more power a researcher has to detect this difference.

B. STATISTICAL PROBABILITY

1. The P (probability) value is the chance of a type I error occurring. If a P value is $\leq .05$, it is unlikely that a type I error has been made (i.e., a type I error is made 5 or fewer times out of 100 attempts).
2. A P value $\leq .05$ (e.g., $P < .01$) is generally considered statistically significant.

Example 24-1. *Commonly Used Statistical Tests*

To evaluate the success of 3 commercial weight loss programs, a consumer group assigns subjects to one of 3 programs (A, B, or C). The average weight of the subjects among the programs is not significantly different at the start of the study (time 1). Each program follows a different diet regimen. At time 1 and at the end of the 6-week study (time 2), the subjects are weighed and their blood pressures are measured. Examples of how statistical tests can be used to analyze the results of this study are given below.

1. **t Test: difference between the means of 2 samples.**
 - a. **Independent (nonpaired) test:** Tests the difference between the mean body weights of persons in program A and those in program B at time 2. Two different groups of persons are sampled on one occasion.
 - b. **Dependent (paired) test:** Tests the difference between mean body weights of persons in program A at time 1 and time 2. The same persons are sampled on 2 occasions.
2. **Analysis of variance: Differences between the means of more than 5 samples.**
 - a. **One-way analysis:** Tests the difference among mean body weights of persons in programs A, B, and C at time 2 (i.e., 1 variable: program).
 - b. **Two-way analysis:** Tests the differences between mean body weights of men versus women and among mean body weights of programs A, B, and C at time 2 (i.e., 2 variables: program and gender).
3. **Linear correlation: Mutual relation between 2 continuous variables.** Tests the relation between blood pressure and body weight in all subjects at time 2. Correlation coefficients (r) are negative and range from 0 to -1 (i.e., if 1 variable increases as the other decreases) and are positive and range from 0 to $+1$ (if both variables change in the same direction).
4. **Chi-square test: Differences among frequencies in a sample.** Tests the differences among the percentage of subjects with body weight of less than 140 lb in programs A, B, and C at time 2.
5. **Meta-analysis:** A statistical procedure that integrates the results of several independent studies considered to be “combinable.” Tests the differences in weight loss among the 3 diet programs using 5 different studies done at different times.



Statistical Tests

Statistical tests are used to analyze data from epidemiological studies.

- A. **PARAMETRIC STATISTICAL TESTS** are used to evaluate the presence of statistically significant differences between groups when the distribution of scores in a population is normal and when the sample size is large.
- B. **NONPARAMETRIC STATISTICAL TESTS** include Wilcoxon’s (rank sum and signed-rank), Mann–Whitney, and Kruskal–Wallis tests. These tests are used when the distribution of scores in a population is not normal or the sample size is small.
- C. **CATEGORICAL TESTS**, including the **chi-square or Fisher’s Exact tests**, are used to analyze categorical data or compare proportions. Frequently used statistical tests are listed in Example 24-1.

Answers to Patient Snapshot Questions

24-1. A P value of less than .01 is considered to be statistically significant. Thus, the researcher can reject the null hypothesis.

24-2. The 95% confidence interval for this sample is $160 \pm 2(2) = 160 \pm 4$, or 156 to 164 mm Hg. The 99.7% confidence interval for this sample is $160 \pm 3(2) = 160 \pm 6$, or 154 to 166 mm Hg.

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Note: Page numbers followed by 'f' indicate figures; those followed by 't' indicate tables.

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