Robert E. Rakel
David P. Rakel

TEXTBOOK OF FAMILY MEDICINE

NINTH EDITION

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Textbook of Family Medicine

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Textbook of Family Medicine

NINTH EDITION

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Although he is the founder and main editor of this text, I would like to dedicate my contribution as co-editor to my father, mentor, and friend, Robert Rakel. He started this text in 1971 when he perceived a need to give the generalist guidance on how to specialize in the whole person and family. Now in its 9th edition, his legacy continues within these pages and within more than 50 other texts he has authored and edited. The science has evolved, but the mission remains, which is to facilitate health with the patients and communities we are privileged to serve. I am grateful to have had the opportunity to learn from his artistry as a clinician, teacher, and father. We are truly lucky souls to be able to do this work together.

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Preface

The first edition of *Textbook of Family Medicine* was published in 1973, just after the specialty of family practice, now family medicine, was approved by the American Board of Medical Specialties.

Although the practice of medicine has changed considerably since that first edition, the content of the specialty remains essentially the same. Our goal is to provide in one text the information essential to our discipline. While some family physicians, especially those in urban areas, no longer deliver babies, the breadth of knowledge required to practice comprehensive primary care remains unchanged. Because of the great deficit of primary care physicians in the United States, those trained in other specialties are often called upon to provide primary care. They may benefit significantly from the breadth of material presented here.

The entire content of this edition is available electronically and can be accessed by iPad, iPhone, PC, and Mac. In order to limit the size (and weight) of the book, some material (such as references) is available only online. Also available online are 38 videos from Elsevier's Procedures Consult. Videos range from how to repair a wound with tissue glue to performing a vasectomy. See the *Video Contents* for the full list.

This text is designed to be a resource for family physicians to help them remain current with advances in medicine. It is especially valuable to those preparing for certification or recertification by the American Board of Family Medicine.

Following the policy we established in the first edition, most of the authors of this text are family physicians. The clinical chapters combine a family physician with an authority in the field to ensure that the material is current and relevant to the needs of the family physician.

This edition continues an evidence-based approach, giving the Strength of Recommendation (SOR) taxonomy in the Key Treatment boxes, focusing on Grade A recommendations. More than 1000 tables and color illustrations facilitate the rapid retrieval of essential information and are used to present in-depth data conveniently.

Although this text focuses on problems most frequently encountered in the primary care setting, significant attention is also given to potentially serious problems that would be dangerous if missed. Diagnosing a problem in its early, undifferentiated stage is much more difficult than after symptoms have progressed to the point that the diagnosis is evident.

Our thanks to the staff at Elsevier for their high publishing standards and insistence on quality.

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PART **ONE**

PRINCIPLES OF FAMILY MEDICINE

CONTENTS

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1 Family Physician

ROBERT E. RAKEL

CHAPTER OUTLINE

Key Points

- The rewards in family medicine come from knowing patients intimately over time and from sharing their trust, respect, and friendship, as well as from the variety of problems encountered in practice that keep the family physician professionally stimulated and challenged.
- The American Board of Family Practice was established in 1969 and changed its name to the American Board of Family Medicine in 2004. It was the first specialty board to require recertification every 7 years to ensure ongoing competence of its diplomates.
- The American Academy of Family Physicians (AAFP) began as the American Academy of General Practice in 1947 and was renamed in 1971.
- Primary care is the provision of continuing, comprehensive care to a population undifferentiated by age, gender, disease, or organ system.
- The most challenging diagnoses are those for diseases or disorders in their early, undifferentiated stage, when there are often only subtle differences between serious disease and minor ailments.
- The family physician is the conductor, orchestrating the skills of a variety of health professionals who may be involved in the care of a seriously ill patient.
- The most cost-effective health care systems depend on a strong primary care base. The United States has the most expensive health care system in the world but ranks among the worst in overall quality of care because of its weak primary care base.
- The greater the number of primary care physicians in a country, the lower the mortality rate and the lower the cost.

The family physician provides continuing, comprehensive care in a personalized manner to patients of all ages, regardless of the presence of disease or the nature of the presenting complaint. Family physicians accept responsibility for managing an individual's total health needs while maintaining an intimate, confidential relationship with the patient.

Family medicine emphasizes continuing responsibility for total health care—from the first contact and initial assessment through the ongoing care of chronic problems. Prevention and early recognition of disease are essential features of the discipline. Coordination and integration of all necessary health services (minimizing fragmentation) and the skills to manage most medical problems allow family physicians to provide cost-effective health care.

Family medicine is a specialty that shares many areas of content with other clinical disciplines, incorporating this shared knowledge and using it uniquely to deliver primary medical care. In addition to sharing content with other medical specialties, family medicine's foundation remains clinical, with the primary focus on the medical care of people who are ill.

The curriculum for training family physicians is designed to represent realistically the skills and body of knowledge that the physicians will require in practice. This curriculum is based on an analysis of the problems seen and the skills used by family physicians in their practice. The randomly educated primary physician has been replaced by one specifically prepared to address the types of problems likely to be encountered in practice. For this reason, the "model office" is an essential component of all family medicine residency programs.

The Joy of Family Practice

If you cannot work with love but only with distaste, it is better that you should leave your work and sit at the

gate of the temple and take alms from those who work with joy.

KAHLIL GIBRAN (1883-1931)

The rewards in family medicine come largely from knowing patients intimately over time and from sharing their trust, respect, and friendship. The thrill is the close bond (friendship) that develops with patients. This bond is strengthened with each physical or emotional crisis in a person's life, when he or she turns to the family physician for help. It is a pleasure going to the office every day and a privilege to work closely with people who value and respect our efforts.

The practice of family medicine involves the joy of greeting old friends in every examining room, and the variety of problems encountered keeps the physician professionally stimulated and perpetually challenged. In contrast, physicians practicing in narrow specialties often lose their enthusiasm for medicine after seeing the same problems every day. The variety in family medicine sustains the excitement and precludes boredom. Our greatest days in practice are when we are fully focused on our patients, enjoying to the fullest the experience of working with others.

PATIENT SATISFACTION

Attributes considered most important for patient satisfaction are listed in Table 1-1 (Stock Keister et al., 2004a). Overall, people want their primary care doctor to meet five basic criteria: "to be in their insurance plan, to be in a location that is convenient, to be able to schedule an appointment within a reasonable period of time, to have good communication skills, and to have a reasonable amount of experience in practice." They especially want "a physician who listens to them, who takes the time to explain things to them, and who is able to effectively integrate their care" (Stock Keister et al., 2004b, p. 2312).

PHYSICIAN SATISFACTION

Physician satisfaction is associated with quality of care, particularly as measured by patient satisfaction. The strongest factors associated with physician satisfaction are not personal income but rather the ability to provide high-quality care to patients. Physicians are most satisfied with their practices when they can have an ongoing relationship with their patients, the freedom to make clinical decisions without financial conflicts of interest, adequate time with patients, and sufficient communication with specialists (DeVoe et al., 2002). Landon and colleagues (2003) found that rather than declining income, the strongest predictor of decreasing satisfaction in practice is loss of clinical autonomy. This includes the inability to obtain services for their patients, the inability to control their time with patients, and the freedom to provide high-quality care.

In an analysis of 33 specialties, Leigh and associates (2002) found that physicians in high-income "procedural" specialties, such as obstetrics-gynecology, otolaryngology, ophthalmology, and orthopedics, were the most dissatisfied. Physicians in these specialties and those in internal medicine were more likely than family physicians to be dissatisfied with their careers. Among the specialty areas most satisfying was geriatrics. Because the population older than 65 years in the United States has doubled since 1960 and will double again by 2030, it is important that we have sufficient primary care physicians to care for them. The need for and the rewards of this type of practice must be communicated to students before they decide how to spend the rest of their professional lives.

A study of medical students (Clinite et al., 2013) showed that most of them say that enjoying their work is the most important factor in selecting a specialty. Students who ranked primary care as their first choice ranked time with family, work/life balance, and personal time outside work high, and salary and prestige low. In comparison, students who were least interested in primary care ranked salary and prestige highest. It is clear what changes must be made if we are to increase the number of students entering primary care.

Table 1-1 What Patients Want in a Physician

Does not judge.
Understands and supports me.
Is always honest and direct.
Acts as a partner in maintaining my health.
Treats serious and nonserious conditions.
Attends to my emotional as well as physical health.
Truly listens to me.
Encourages me to lead a healthier lifestyle.
Tries to get to know me.
Can help with any problem.
Is someone I can stay with as I grow older.

Modified from Stock Keister MC, Green LA, Kahn NB, et al. What people want from their family physician. *Am Fam Physician.* 2004a;69:2310.

Development of the Specialty

As long ago as 1923, Francis Peabody commented that the swing of the pendulum toward specialization had reached its apex and that modern medicine had fragmented the health care delivery system too greatly. He called for a rapid return of the generalist physician who would give comprehensive, personalized care.

Dr. Peabody's declaration proved to be premature; neither the medical establishment nor society was ready for such a proclamation. The trend toward specialization gained momentum through the 1950s, and fewer physicians entered general practice. In the early 1960s, leaders in the field of general practice began advocating a seemingly paradoxical solution to reverse the trend and correct the scarcity of general practitioners—the creation of still another specialty. These physicians envisioned a specialty that embodied the knowledge, skills, and ideals they knew as primary care. In 1966, the concept of a new specialty in primary care received official recognition in two separate reports published 1 month apart. The first was the report of the Citizens' Commission on Medical Education of the American Medical Association, also known as the Millis Commission Report. The second report came from the Ad Hoc Committee on Education for Family Practice of the Council of Medical

Education of the American Medical Association, also called the Willard Committee (1966). Three years later, in 1969, the American Board of Family Practice (ABFP) became the 20th medical specialty board. The name of the specialty board was changed in 2004 to the *American Board of Family Medicine* (ABFM).

Much of the impetus for the Millis and Willard reports came from the American Academy of General Practice, which was renamed the *American Academy of Family Physicians* (AAFP) in 1971. The name change reflected a desire to increase emphasis on family-oriented health care and to gain academic acceptance for the new specialty of family practice.

SPECIALTY CERTIFICATION

The ABFM has distinguished itself by being the first specialty board to require recertification (now called *maintenance of certification*) every 7 years to ensure the ongoing competence of its members. Certification was achieved initially only by examination, with no "grandfathering" as had been the practice when other specialties were established. Recertification required the attainment of a specified amount of continuing medical education; a full, valid, and unrestricted license; the completion of an audit of office records; and successful performance on a recertification examination. These "firsts" raised the bar for specialty certification in the United States and established the ABFM as a leader and innovator among specialty boards. The logic of the ABFM's emphasis on continuing education to maintain required knowledge and skills has been adopted by other specialties and state medical societies. All specialty boards are now committed to the concept of recertification to ensure that their diplomates remain current with advances in medicine.

The maintenance of certification now requires that all diplomates comply with the ABFM policy on professionalism, licensure, and personal conduct; complete a combination of self-assessment modules and performance in practice activities every 3 years; accumulate at least 50 continuing medical education credits per year; and successfully pass the maintenance of certification examination every 10 years.

In 2003, the ABFM began transitioning diplomates from its old recertification paradigm into its new process, termed Maintenance of Certification for Family Physicians. By the end of 2009, this transition was complete, and the ABFM became the first specialty board to have all of its diplomates enrolled and participating in maintenance of certification.

The ABFM also offers subspecialty *certificates of added qualifications* in five areas: adolescent medicine, geriatric medicine, hospice and palliative medicine, sleep medicine, and sports medicine. In additional, a special pathway within the maintenance of certification pathway, Recognition of Focused Practice in Hospital Medicine, is offered to family physicians who primarily practice in the hospital setting. Combined residency programs are available and are offered conjointly by ABFM and the appropriate specialty board. These provide training in family medicine and preventive medicine (six programs), family medicine and psychiatry (five programs), family medicine and emergency medicine (two programs), and family medicine and internal medicine (two programs). These combined residencies make candidates eligible for certification by both specialty boards with 1 year less training than that required for two separate residencies through appropriate overlap of training requirements.

Definitions

FAMILY MEDICINE

Family medicine is the medical specialty that provides continuing and comprehensive health care for the individual and the family. It is the specialty in breadth that integrates the biologic, clinical, and behavioral sciences. The scope of family medicine encompasses all ages, both genders, each organ system, and every disease entity.

In many countries, the term *general practice* is synonymous with *family medicine.* The Royal New Zealand College of General Practitioners emphasizes that a general practitioner provides care that is "anticipatory as well as responsive and is not limited by the age, sex, race, religion, or social circumstances of patients, nor by their physical or mental states." The general practitioner must be the patient's advocate; must be competent, caring, and compassionate; must be able to live with uncertainty; and must be willing to recognize limitations and refer when necessary (Richards, 1997).

FAMILY PHYSICIAN

The family physician is a physician who is educated and trained in the discipline of family medicine. Family physicians possess distinct attitudes, skills, and knowledge that qualify them to provide continuing and comprehensive medical care, health maintenance, and preventive services to each member of a family regardless of gender, age, or type of problem (i.e., biologic, behavioral, or social). These specialists, because of their background and interactions with the family, are best qualified to serve as each patient's advocate in all health-related matters, including the appropriate use of consultants, health services, and community resources.

The World Organization of Family Doctors (World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians [WONCA]) defines the "family doctor" in part as the physician who is primarily responsible for providing comprehensive health care to every individual seeking medical care and arranging for other health personnel to provide services when necessary. Whereas the family physician functions as a generalist who accepts everyone seeking care, other health providers limit access to their services on the basis of age, gender, or diagnosis (WONCA, 1991, p. 2).

PRIMARY CARE

Primary care is health care that is accessible, comprehensive, coordinated, and continuing. It is provided by physicians specifically trained for and skilled in comprehensive first-contact and continuing care for ill persons or those

with an undiagnosed sign, symptom, or health concern (i.e., the "undifferentiated" patient) and is not limited by problem origin (i.e., biologic, behavioral, or social), organ system, or gender.

It is "the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community" (WONCA, 2013).

In addition to diagnosis and treatment of acute and chronic illnesses, primary care includes health promotion, disease prevention, health maintenance, counseling, and patient education in a variety of health care settings (e.g., office, inpatient, critical care, long-term care, home care). Primary care is performed and managed by a personal physician using other health professionals for consultation or referral as appropriate.

Primary care is the backbone of the health care system and encompasses the following functions:

1. It is *first-contact care,* serving as a point of entry for the patient into the health care system.
2. It includes *continuity* by virtue of caring for patients in sickness and in health over some period.
3. It is *comprehensive care,* drawing from all the traditional major disciplines for its functional content.
4. It serves a *coordinative function* for all the health care needs of the patient.
5. It assumes *continuing responsibility* for individual patient follow-up and community health problems.
6. It is a highly *personalized* type of care.

In a 2008 report, *Primary Health Care—Now More Than Ever*, the World Health Organization (WHO) emphasizes that primary care is the best way of coping with the illnesses of the 21st century and that better use of existing preventive measures could reduce the global burden of disease by as much as 70%. Rather than drifting from one short-term priority to another, countries should make prevention equally important as cure and focus on the rise in chronic diseases that require long-term care and strong community support. Furthermore, at the 62nd World Health Assembly in 2009, the WHO strongly reaffirmed the values and principles of primary health care as the basis for strengthening health care systems worldwide (WONCA, 2013).

PRIMARY CARE PHYSICIAN

A primary care physician is a generalist physician who provides definitive care to the undifferentiated patient at the point of first contact and takes continuing responsibility for providing the patient's care. Primary care physicians devote most of their practice to providing primary care services to a defined population of patients. The style of primary care practice is such that the personal primary care physician serves as the entry point for substantially all the patient's medical and health care needs. Primary care physicians are advocates for the patient in coordinating the use of the entire health care system to benefit the patient.

Patients want a physician who is attentive to their needs and skilled at addressing them and with whom they can establish a lifelong relationship. They want a physician who can guide them through the evolving, complex U.S. health care system.

The ABFM and the American Board of Internal Medicine have agreed on a definition of the generalist physician, and they believe that "providing optimal generalist care requires broad and comprehensive training that cannot be gained in brief and uncoordinated educational experiences" (Kimball and Young, 1994, p. 316).

The Council on Graduate Medical Education (COGME) and the Association of American Medical Colleges (AAMC) define generalist physicians as those who have completed 3-year training programs in family medicine, internal medicine, or pediatrics and who do not subspecialize. COGME emphasizes that this definition should be "based on an objective analysis of training requirements in disciplines that provide graduates with broad capabilities for primary care practice."

Although the number of medical students entering family medicine is far below the number needed in the United States for an effective health care system, things appear to be improving. The percentage of medical school graduates choosing family medicine residencies jumped nearly 10% between 2008 and 2013.

For the seventh consecutive year, the demand for family physicians outpaced the demand for other specialists. A 2013 survey noted more searches for family physicians (624) than for other specialists such as internal medicine (194) and psychiatrists (198). As a result, salaries for family physicians increased 6% from 2011 to 2012 (www.aafp.org/news-now/practice-professional-issues/20130916recruitingstudy.html).

Physicians who provide primary care should be trained specifically to manage the problems encountered in a primary care practice. Rivo and associates (1994) identified the common conditions and diagnoses that generalist physicians should be competent to manage in a primary care practice and compared these with the training of the various "generalist" specialties. They recommended that the training of generalist physicians include at least 90% of the key diagnoses they identified. By comparing the content of residency programs, they found that this goal was met by family medicine (95% of the time), internal medicine (91% of the time), and pediatrics (91% of the time) but that obstetrics-gynecology (47% of the time) and emergency medicine (42% of the time) fell far short of this goal.

Personalized Care

It is much more important to know what sort of patient has a disease than what sort of disease a patient has.

SIR WILLIAM OSLER (1904)

In the 12th century, Maimonides said, "May I never see in the patient anything but a fellow creature in pain. May I never consider him merely a vessel of disease" (Friedenwald, 1917). If an intimate relationship with patients remains the primary concern of physicians, high-quality medical care will persist, regardless of the way it is organized and financed. For this reason, family medicine emphasizes

consideration of the individual patient in the full context of her or his life rather than the episodic care of a presenting complaint.

Family physicians assess the illnesses and complaints presented to them, dealing personally with most and arranging special assistance for a few. The family physician serves as the patients' advocate, explaining the causes and implications of illness to patients and families, and serves as an advisor and confidant to the family. The family physician receives great intellectual satisfaction from this practice, but the greatest reward arises from the depth of human understanding and personal satisfaction inherent in family medicine.

Patients have adjusted somewhat to a more impersonal form of health care delivery and frequently look to institutions rather than to individuals for their health care; however, their need for personalized concern and compassion remains. Tumulty (1970) found that patients believe a good physician is one who shows genuine interest in them; who thoroughly evaluates their problem; who demonstrates compassion, understanding, and warmth; and who provides clear insight into what is wrong and what must be done to correct it.

Ludmerer (1999a) focused on the problems facing medical education in this environment:

Some managed care organizations have even urged that physicians be taught to act in part as advocates of the insurance payer rather than the patients for whom they care. ... Medical educators would do well to ponder the potential long-term consequences of educating the nation's physicians in today's commercial atmosphere in which the good visit is a short visit, patients are "consumers," and institutional officials speak more often of the financial balance sheet than of service and the relief of patients' suffering (pp. 881–882).

Cranshaw and colleagues (1995) discussed the ethics of the medical profession:

Our first obligation must be to serve the good of those persons who seek our help and trust us to provide it. Physicians, as physicians, are not, and must never be, commercial entrepreneurs, gate closers, or agents of fiscal policy that runs counter to our trust. Any defection from primacy of the patient's well-being places the patient at risk by treatment that may compromise quality of or access to medical care. ... Only by caring and advocating for the patient can the integrity of our profession be affirmed (p. 1553).

CARING

Caring without science is well-intentioned kindness, but not medicine. On the other hand, science without caring empties medicine of healing and negates the great potential of an ancient profession. The two complement and are essential to the art of doctoring.

B. LOWN (1996, p. 223)

Figure 1-1 *The Doctor* by Sir Luke Fildes, 1891. (© Tate, London, 2005.)

Family physicians do not just treat patients; they also care for people. This caring function of family medicine emphasizes the personalized approach to understanding the patient as a person, respecting the person as an individual, and showing compassion for his or her discomfort. The best illustration of a caring and compassionate physician is *The Doctor* by Sir Luke Fildes (Figure 1-1). The painting shows a physician at the bedside of an ill child in the preantibiotic era. The physician in the painting is Dr. Murray, who cared for Sir Luke Fildes's son, who died Christmas morning, 1877. The painting has become the symbol for medicine as a caring profession.

COMPASSION

The treatment of a disease may be entirely impersonal; the care of a patient must be completely personal.

FRANCIS PEABODY (1930)

Compassion means co-suffering and reflects the physician's willingness somehow to share the patient's anguish and understand what the sickness means to that person. Compassion is an attempt to feel along with the patient. Pellegrino (1979) said, "We can never feel with another person when we pass judgment as a superior, only when we see our own frailties as well as his" (p. 161). A compassionate authority figure is effective only when others can receive the "orders" without being humiliated. The physician must not "put down" the patients but must be ever ready, in Galileo's words, "to pronounce that wise, ingenuous, and

modest statement—'I don't know.'" Compassion, practiced in these terms in each patient encounter, obtunds the inherent dehumanizing tendencies of the current highly institutionalized and technologically oriented patterns of patient care.

The family physician's relationship with each patient should reflect compassion, understanding, and patience combined with a high degree of intellectual honesty. The physician must be thorough in approaching problems but also possess a sense of humor. He or she must be capable of encouraging in each patient the optimism, courage, insight, and self-discipline necessary for recovery.

Bulger (1998, p. 106) addressed the threats to scientific compassionate care in the managed-care environment:

With health care time inordinately rationed today in the interest of economy, Americans could organize themselves right out of compassion. ... It would be a tragedy, just when we have so many scientific therapies at hand, for scientists to negotiate away the element of compassion, leaving this crucial dimension of healing to nonscientific healers.

Time for patient care is becoming increasingly threatened. Bulger (1998, p. 106) described a study involving a "good Samaritan" principle, showing that the decision of whether or not to stop and care for a person in distress is predominantly a function of having the time to do so. Even those with the best intentions require time to be of help to a suffering person.

Characteristics and Functions of the Family Physician

The ideal family physician is an explorer, driven by a persistent curiosity and the desire to know more (Table 1-2).

Table 1-2 Attributes of a Family Physician*

A strong sense of responsibility for the total, ongoing care of the individual and the family during health, illness, and rehabilitation
Compassion and empathy with a sincere interest in the patient and the family
A curious and constantly inquisitive attitude
Enthusiasm for the undifferentiated medical problem and its resolution
Interest in the broad spectrum of clinical medicine
The ability to deal comfortably with multiple problems occurring simultaneously in a patient
Desire for frequent and varied intellectual and technical challenges
The ability to support children during growth and development and in their adjustment to family and society
The ability to assist patients in coping with everyday problems and in maintaining stability in the family and community
The capacity to act as coordinator of all health resources needed in the care of a patient
Enthusiasm for learning and for the satisfaction that comes from maintaining current medical knowledge through continuing medical education
The ability to maintain composure in times of stress and to respond quickly with logic, effectiveness, and compassion
A desire to identify problems at the earliest possible stage or to prevent disease entirely
A strong wish to maintain maximum patient satisfaction, recognizing the need for continuing patient rapport
The skills necessary to manage chronic illness and to ensure maximal rehabilitation after acute illness
Appreciation for the complex mix of physical, emotional, and social elements in personalized patient care
A feeling of personal satisfaction derived from intimate relationships with patients that naturally develop over long periods of continuous care, as opposed to the short-term pleasures gained from treating episodic illnesses
Skills for and a commitment to educating patients and families about disease processes and the principles of good health
A commitment to place the interests of the patient above those of self

* These characteristics are desirable for all physicians but are of greatest importance for family physicians.

CONTINUING RESPONSIBILITY

One of the essential functions of the family physician is the willingness to accept ongoing responsibility for managing a patient's medical care. After a patient or a family has been accepted into the physician's practice, the responsibility for care is total and continuing. The Millis Commission chose the term "primary physician" to emphasize the concept of primary responsibility for the patient's welfare; however, the term *primary care physician* is more popular and refers to any physician who provides first-contact care and is essentially that person's personal physician.

The family physician's commitment to patients does not cease at the end of illness but is a continuing responsibility, regardless of the patient's state of health or the disease process. There is no need to identify the beginning or end point of treatment because care of a problem can be reopened at any time—even though a later visit may be primarily for another problem. This prevents the family physician from focusing too narrowly on one problem and helps maintain a perspective on the total patient in her or his environment. Peabody (1930) believed that much patient dissatisfaction resulted from the physician's neglecting to assume personal responsibility for supervision of the patient's care: "For some reason or other, no one physician has seen the case through from beginning to end, and the patient may be suffering from the very multitude of his counselors" (p. 8).

Continuity of care is a core attribute of family medicine, transcending multiple illness episodes, and it includes responsibility for preventive care and care coordination. "This longitudinal relationship evolves into a strong bond between physician and patient characterized by trust, loyalty, and a sense of responsibility" (Saultz, 2003, p. 134). Trust grows stronger as the physician–patient relationship continues and provides the patient a sense of confidence that care will always be in his or her best interest. It also facilitates improved quality of care the longer the relationship continues.

The greater the degree of continuing involvement with a patient, the more capable the physician is in detecting early signs and symptoms of organic disease and differentiating it from a functional problem. Patients with problems arising

from emotional and social conflicts can be managed most effectively by a physician who has intimate knowledge of the individual and his or her family and community background. This knowledge comes only from insight gained by observing the patient's long-term patterns of behavior and responses to changing stressful situations. This longitudinal view is particularly useful in the care of children and allows the physician to be more effective in assisting children to reach their full potential. The closeness that develops between physicians and young patients increases a physician's ability to aid the patients with problems later in life, such as adjustment to puberty, problems with employment, or marriage and changing social pressures. As the family physician maintains this continuing involvement with successive generations within a family, the ability to manage intercurrent problems increases with knowledge of the total family background.

By virtue of this ongoing involvement and intimate association with the family, the family physician develops a perceptive awareness of a family's nature and style of operation. This ability to observe families over time allows valuable insight that improves the quality of medical care provided to an individual patient. A major challenge in family medicine is the need to be alert to the changing stresses, transitions, and expectations of family members over time, as well as the effect that these and other family interactions have on the health of individual patients.

Although the family is the family physician's primary concern, his or her skills are equally applicable to the individual living alone or to people in other varieties of family living. Individuals with alternative forms of family living interact with others who have a significant effect on their lives. The principles of group dynamics and interpersonal relationships that affect health are equally applicable to everyone.

The family physician must assess an individual's personality so that presenting symptoms can be appropriately evaluated and given the proper degree of attention and emphasis. A complaint of abdominal pain may be treated lightly in one patient who frequently presents with minor problems, but the same complaint would be investigated immediately and in depth in another patient who has a more stoic personality. The decision regarding which studies to perform and when is influenced by knowledge of the patient's lifestyle, personality, and previous response pattern. The greater the degree of knowledge and insight into the patient's background, as gained through years of ongoing contact, the more capable is the physician in making an appropriate early and rapid assessment of the presenting complaint. The less background information the physician has to rely on, the greater the need to depend on costly laboratory studies, and overreaction to the presenting symptom is more likely.

Families receiving continuing comprehensive care have a decreased incidence of hospitalization, fewer operations, and fewer physician visits for illnesses compared with those having no regular physician. This results from the physician's knowledge of the patients, seeing them earlier for acute problems and therefore preventing complications that would require hospitalization, being available by telephone or by e-mail, and seeing them more frequently in the office for health supervision. Care is also less expensive because there is less need to rely on radiographic and laboratory procedures and visits to emergency departments.

Continuity of care improves quality of care, especially for those with chronic conditions such as asthma and diabetes (Cabana and Jee, 2004). Because about 90% of patients with diabetes in the United States receive care from a primary care physician, continuity of care can be especially important. Parchman and associates (2002) found that for adults with type 2 diabetes, continuing care from the same primary care provider was associated with lower Hb_{A1c} values, regardless of how long the patient had diabetes. Having a regular source of primary care helped these adults manage their diet and improve glucose control.

Collusion of Anonymity

The need for a primary physician who accepts continuing responsibility for patient care was emphasized by Michael Balint (1965) in his concept of *collusion of anonymity.* In this situation, the patient is seen by a variety of physicians, not one of whom is willing to accept total management of the problem. Important decisions are made—some good, some poor—but without anyone feeling fully responsible for them. Both the patient and family often wonder who is in charge.

Francis Peabody (1930) examined the futility of a patient's making the rounds from one specialist to another without finding relief because the patient:

> *... lacked the guidance of a sound general practitioner who understood his physical condition, his nervous temperament and knew the details of his daily life. And many a patient who on his own initiative has sought out specialists, has had minor defects accentuated so that they assume a needless importance, and has even undergone operations that might well have been avoided. Those who are particularly blessed with this world's goods, who want the best regardless of the cost and imagine that they are getting it because they can afford to consult as many renowned specialists as they wish, are often pathetically tragic figures as they veer from one course of treatment to another. Like ships that lack a guiding hand upon the helm, they swing from tack to tack with each new gust of wind but get no nearer to the Port of Health because there is no pilot to set the general direction of their course (pp. 21-22).*

Chronic Illness

The family physician must also be committed to managing the common chronic illnesses that have no known cure but for which continuing management by a personal physician is all the more necessary to maintain an optimal state of health for the patient. It is a difficult and often trying job to manage these unresolvable and progressively disabling problems, control of which requires a remodeling of the lifestyle of the entire family.

About 45% of Americans have a chronic condition. The costs to individuals and to the health care system are enormous. In 2000, care of chronic illness consumed 75 cents of every health care dollar spent in the United States (Robert Wood Johnson Foundation Annual Report, 2002).

Comorbidity, the coincident occurrence of coexisting and apparently unrelated disorders, is increasing as the population ages. Those age 60 years or older have an average of 2.2 chronic conditions, and physicians in primary care provide most of this care (Bayliss et al., 2003).

Diabetes is one of the most rapidly increasing chronic conditions. Quality of life is enhanced when care of patients with diabetes is provided in a primary care setting without compromising quality of care (Collins et al., 2009).

Quality of Care

Primary care provided by physicians specifically trained to care for the problems presenting to personal physicians, who know their patients over time, is of higher quality than care provided by other physicians. This has been confirmed by a variety of studies comparing the care given by physicians in different specialties. When hospitalized patients with pneumonia are cared for by family physicians or full-time specialist hospitalists, the quality of care is comparable, but the hospitalists incur higher hospital charges and longer lengths of stay and use more resources (Smith et al., 2002).

In the United States, a 20% increase in the number of primary care physicians is associated with a 5% decrease in mortality (40 fewer deaths per 100,000 population), but the benefit is even greater if the primary care physician is a family physician. Adding one more family physician per 10,000 people is associated with 70 fewer deaths per 100,000 population, which is a 9% reduction in mortality rate. Specialists practicing outside their area have increased mortality rates for patients with acquired pneumonia, acute myocardial infarction, congestive heart failure, and upper gastrointestinal hemorrhage. A study of the major determinants of health outcomes in all 50 U.S. states found that when the number of specialty physicians increases, outcomes are worse, but mortality rates are lower where there are more primary care physicians (Starfield et al., 2005).

Veerappa and colleagues (2011) found that increasing the number of family physicians practicing in the community is associated with reduced hospital readmissions and substantial cost savings. Thirty-day hospital readmission rates for pneumonia, heart attack, and heart failure decrease as the number of family physicians in the community increases. Conversely, increased numbers of physicians in all other major specialties (including general internal medicine) are associated with increased risk of readmission (Figure 1-2).

A comparison of family physicians and obstetrician-gynecologists in the management of low-risk pregnancies showed no difference with respect to neonatal outcomes. However, women cared for by family physicians had fewer cesarean sections and episiotomies and were less likely to receive epidural anesthesia (Hueston et al., 1995).

Patients of subspecialists practicing outside their specialty have longer lengths of hospital stay and higher mortality rates than patients of subspecialists practicing within their specialty (Weingarten et al., 2002). The quality of the U.S. health care system is being eroded by physicians being extensively trained, at great expense, to practice in one area and instead practicing in another area, such as surgeons practicing as generalists. Primary care, to be done well, requires extensive training specifically tailored to problems frequently seen in primary care.

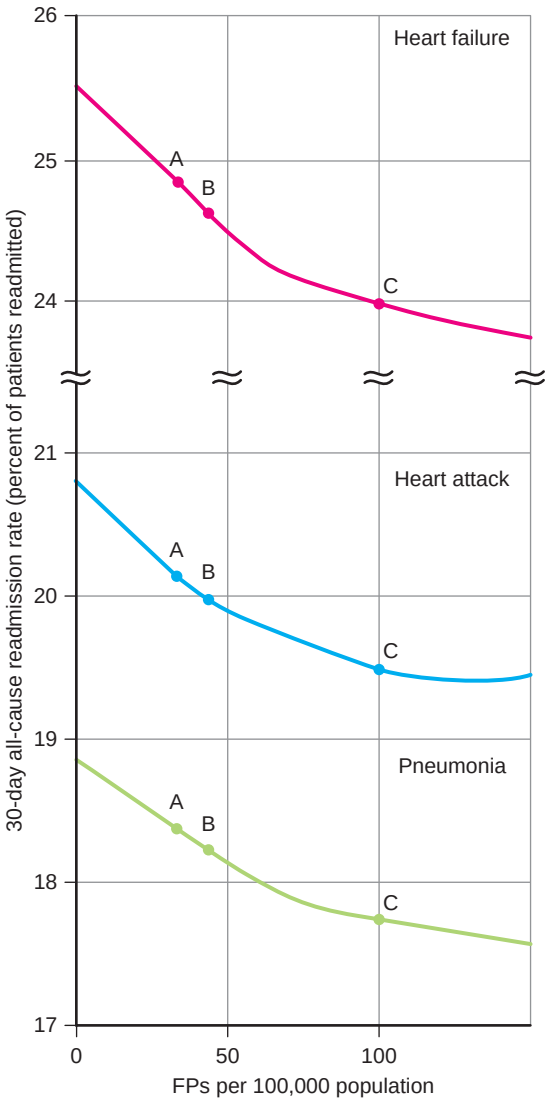

Figure 1-2 Actual and estimated 30-day hospital readmission rates in 2005 per county density of family physicians (FPs). **A,** Actual readmissions in 2005. **B,** Estimated readmissions with 46 FPs per 100,000 population. **C,** Estimated readmissions with 100 FPs per 100,000 population. (From Veerappa K, Culpepper L, Phillips RL, et al. FPs lower hospital readmission rates and costs. *Am Fam Physician.* 2011;83(9):1054).

As much-needed changes in the U.S. medical system are implemented, it would be wise to keep some perspective on the situation regarding physician distribution. Beeson (1974) commented:

I have no doubt at all that a good family doctor can deal with the great majority of medical episodes quickly and competently. A specialist, on the other hand, feels that he must be thorough, not only because of his training but also because he has a reputation to protect. He, therefore, spends more time with each patient and orders more

laboratory work. The result is a waste of doctors' time and patients' money. This not only inflates the national health bill, but also creates an illusion of doctor shortage when the only real need is to have the existing doctors doing the right things (p. 48).

Cost-Effective Care

A physician who is well acquainted with a patient provides more personal and humane medical care and does so more economically than a physician involved in only episodic care. A physician who knows his or her patients well can assess the nature of their problems more rapidly and accurately.

The United States has the most expensive health care system in the world. In 1965, the cost of health care in the United States was just under 6% of the gross domestic product (GDP). It shot up to 16% of GDP in 2008 and continues to increase, with predictions it will reach 20% by 2015. Despite the most expensive health care, however, among industrialized nations, the United States ranks 29th in infant mortality, 48th in life expectancy, and 19th (of 19) in preventable deaths.

Although the rhetoric suggests it is worth this cost to have the best health care system in the world, the truth is that we are far from that goal. The WHO ranks the quality of health care in the United States at 37th in the world, well behind Morocco and Colombia. (For the standing of all countries, see the World Health Organization's ranking of the world's health systems under http://geographic.org/countries/countries.html). In a comparison of the quality of health care in 13 developed countries using 16 different health indicators, the United States ranked 12th, second from the bottom. Evidence indicates that quality of health care is associated with primary care performance. Of the seven countries at the top of the average health ranking, five have strong primary care infrastructures. As Starfield (2000) states, "The higher the primary care physician-to-population ratio, the better most health outcomes are" (p. 485).

Similarly, the greater the number of primary care physicians practicing in a country, the lower is the cost of health care. Figure 1-3 shows that in the United Kingdom, Canada, and the United States, the cost of health care is almost inversely proportional to the percentage of generalists practicing in that country. Great Britain has twice the percentage of family physicians but about half the cost. Administration and profit (31%) of U.S. health care account for a major part of the high overhead cost (Woolhandler et al., 2003). For the same number of physicians, Canada has one "billing clerk" for every 17 in the United States (Lundberg, 2002).

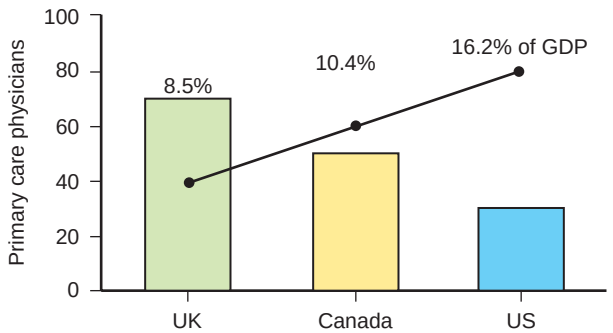

Figure 1-3 Inverse relationship between number of generalists and cost of health care in the United Kingdom, Canada, and the United States. *GDP,* Gross domestic product. (From Henry J. Kaiser Family Foundation. *Snapshots: Health Care Spending in the United States & Selected OECD Countries*, April 12, 2011. Available at kff.org/health-costs/issue-brief/snapshots-health-care-spending-in-the-united-states-selected-oecd-countries/)

Countries with strong primary care have lower overall health care costs, improved health outcomes, and healthier populations (Phillips and Starfield, 2004; Starfield, 2001). In comparing 11 features of primary care in 11 Western countries, the United States ranked lowest in terms of primary care ranking and highest in per-capita health care expenditures. The United States also performed poorly on public satisfaction, health indicators, and the use of medication (Starfield, 1994).

In the United States, the greater the number of primary care physicians, the lower the mortality rate, and conversely, the higher the specialist/population ratio, the greater the mortality rate. Adding one family physician per 10,000 people would result in 35 fewer deaths. Increasing the number of specialists, a process that continues in the United States, is associated with higher mortality rates and increasing cost. One third of the excessive cost is attributed to performance of unnecessary procedures (Starfield et al., 2005).

Uninsured Persons

Before the Affordable Care Act, the number of Americans without health insurance had been increasing by 1 million per year. In 2008, the number of uninsured persons was 16% of the U.S. population. The number of people who were *underinsured* was growing even more rapidly. Contrary to widespread belief, the problem is not confined simply to unemployed or poor persons. More than half of uninsured persons had annual incomes greater than $75,000, and 8 of 10 were in working families. In 2013, medical expenses were responsible for 62% of bankruptcies in the United States. This will certainly change with the Affordable Care Act, but the amount of change remains to be seen because many of those filing for bankruptcy already had medical insurance but were still overwhelmed by medical bills.

The United States is the only developed country that does not have universal health care coverage for all its citizens. According to Geyman (2002), "Today's nonsystem is in chaos. A large part of health care has been taken over by for-profit corporations whose interests are motivated more by return on investment to shareholders than by quality of care for patients" (p. 407).

The United Nations passed a resolution encouraging all governments to move toward providing universal access to affordable and quality health care. In 2013, the WHO published a World Health Report, "Research for Universal Health Coverage," that focused on the need for more research to assist countries in establishing universal health care.

The Institute of Medicine (IOM) report on the uninsured population, *Insuring America's Health: Principles and Recommendations*, called for "health care coverage by 2010 that is universal, continuous, affordable, sustainable, and enhancing of high-quality care that is effective, efficient,

safe, timely, patient centered, and equitable. … While stopping short of advocating a specific approach, the IOM's Committee on the Consequences of Uninsurance acknowledges that the single payer model is the most effective in ensuring continuous universal coverage that would remain affordable for individuals and for society" (Geyman, 2004, p. 635).

Family physicians account for a larger proportion of office visits to U.S. physicians than any other specialty. However, Geyman (2004, p. 631) observed problems:

The country's health care (non) system has undergone a major transformation to a market-based system largely dominated by corporate interests and a business ethic. The goal envisioned in the 1960s of rebuilding the U.S. health care system on a generalist base, with all Americans having ready access to comprehensive health care through a personal physician, has not been achieved. Overspecialization was a problem as long as 4000 years ago, when Herodotus in 2000 BC noted that "The art of medicine is thus divided: each physician applies himself to one disease only and not more."

Comprehensive Care

The term *comprehensive medical care* spans the entire spectrum of medicine. The effectiveness with which a physician delivers primary care depends on the degree of involvement attained during training and practice. The family physician must be trained comprehensively to acquire all the medical skills necessary to care for most problems. The greater the number of skills omitted from the family physician's training and practice, the more frequent is the need to refer minor problems to another physician. A truly comprehensive primary care physician adequately manages acute infections, biopsies skin and other lesions, repairs lacerations, treats musculoskeletal sprains and minor fractures, removes foreign bodies, treats vaginitis, provides obstetric care and care for newborn infants, gives supportive psychotherapy, and supervises diagnostic procedures. The needs of a family physician's patient range from a routine physical examination, when the patient feels well and wants to identify potential risk factors, to a problem that calls for referral to one or more narrowly specialized physicians with highly developed technical skills. The family physician must be aware of the variety and complexity of skills and facilities available to help manage patients and must match these to the individual's specific needs, giving full consideration to the patient's personality and expectations.

Comprehensive care includes complementary and alternative techniques that are of value in managing problems encountered in primary care (see Chapter 12). The book *Integrative Medicine* (Rakel, 2012) focuses on techniques that can be of value to the family physician but also identifies those than can be harmful or ineffective.

Management of an illness involves much more than a diagnosis and an outline for treatment. It also requires an awareness of all the factors that may aid or hinder an individual's recovery from illness. This approach requires consideration of religious beliefs; social, economic, or cultural problems; personal expectations; and heredity. An outstanding clinician recognizes the effects that spiritual, intellectual, emotional, social, and economic factors have on a patient's illness.

A family physician's ability to confront relatively large numbers of unselected patients with undifferentiated conditions and carry on a therapeutic relationship over time is a unique primary care skill. A skilled family physician has a higher level of tolerance for the uncertain than her or his consultant colleagues.

Society benefits more from a surgeon who has a sufficient volume of surgery to maintain proficiency through frequent use of well-honed skills than from one who has a low volume of surgery and serves also as a primary care physician. The early identification of disease while it is in its undifferentiated stage requires specific training; it is not a skill that can be automatically assumed by someone whose training has been mostly in hospital intensive care units.

Interpersonal Skills

One of the foremost skills of family physicians is the ability to use effectively the knowledge of interpersonal relations in the management of patients. This powerful element of clinical medicine may be the specialty's most useful tool. Physicians too often are seen as lacking personal concern and as being unskilled in understanding personal anxiety and feelings. There is a need to nourish the seed of compassion and concern for sick people that motivates students as they enter medical school.

Family medicine emphasizes the integration of compassion, empathy, and personalized concern. Some of the earnest solicitude of the "old country doctor" and his or her untiring compassion for people must be incorporated as effective but impersonal modern medical procedures are applied. The patient should be viewed compassionately as a person in distress who needs to be treated with concern, dignity, and personal consideration. The patient has a right to be given some insight into his or her problems; a reasonable appraisal of the potential outcome; and a realistic picture of the emotional, financial, and occupational expenses involved in his or her care. The greatest deterrents to filing malpractice claims are patient satisfaction, good patient rapport, and active patient participation in the health care process.

To relate well to patients, a physician must develop compassion and courtesy, the ability to establish rapport and to communicate effectively, the ability to gather information rapidly and to organize it logically, the skills required to identify all significant patient problems and to manage these problems appropriately, the ability to listen, the skills necessary to motivate people, and the ability to observe and detect nonverbal clues (see Chapter 13).

Accessibility

The mere availability of the physician is therapeutic. The feeling of security that the patient gains just by knowing he or she can "touch" the physician, in person or by phone, is therapeutic and has a comforting and calming influence. Accessibility is an essential feature of primary care. Services must be available when needed and should be within

geographic proximity. When primary care is not available, many individuals turn to hospital emergency departments. Emergency department care is fine for emergencies, but it is no substitute for the personalized, long-term, comprehensive care a family physician can provide.

Many practices are instituting open-access scheduling, in which patients can be seen the day they call. This tells patients that they are the highest priority and that their problems will be handled immediately. It also is more efficient for the physician who cares for a problem early, before it progresses in severity and becomes complicated, requiring more physician time and greater patient disability.

Some physicians have turned to concierge medicine (also called boutique medicine, retainer-based medicine, and enhanced medical care for an annual fee) in which, for a monthly or annual fee, the physician promises to be available 24/7.

DIAGNOSTIC SKILLS: UNDIFFERENTIATED PROBLEMS

The family physician must be an outstanding diagnostician. Skills in this area must be honed to perfection because problems are usually seen in their early, undifferentiated state and without the degree of resolution that is usually present by the time patients are referred to consulting specialists. This is a unique feature of family medicine because symptoms seen at this stage are often vague and nondescript, with signs being minimal or absent. Unlike the consulting specialist, the family physician does not evaluate the case after it has been preselected by another physician, and the diagnostic procedures used by the family physician must be selected from the entire spectrum of medicine.

At this stage of disease, there are often only subtle differences between the early symptoms of serious disease and those of self-limiting, minor ailments. To an inexperienced person, the clinical pictures may appear identical, but to an astute and experienced family physician, one symptom is more suspicious than another because of the greater probability that it signals a potentially serious illness. Diagnoses are frequently made on the basis of probability, and the likelihood that a specific disease is present frequently depends on the incidence of the disease relative to the symptom seen in the physician's community during a given time of year. Many patients will never be assigned a final, definitive diagnosis because a presenting symptom or a complaint will resolve before a specific diagnosis can be made. Pragmatically, this is an efficient method that is less costly and achieves high patient satisfaction even though it may be disquieting to the purist physician who believes a thorough workup and specific diagnosis always should be obtained. Similarly, family physicians are more likely to use a therapeutic trial to confirm the diagnosis.

The family physician is an expert in the rapid assessment of a problem presented for the first time. He or she evaluates its potential significance, often making a diagnosis by exclusion rather than by inclusion, after making certain the symptoms are not those of a serious problem. Once assured, some time is allowed to elapse. Time is used as an efficient diagnostic aid. Follow-up visits are scheduled at appropriate intervals to watch for subtle changes in the presenting symptoms. The physician usually identifies the symptom that has the greatest discriminatory value and watches it more closely than the others. The most significant clue to the true nature of the illness may depend on subtle changes in this key symptom. The family physician's effectiveness is often determined by his or her knack for perceiving the hidden or subtle dimensions of illness and following them closely.

The maxim that "an accurate history is the most important factor in arriving at an accurate diagnosis" is especially appropriate to family medicine because symptoms may be the only obvious feature of an illness at the time it is presented. Further inquiry into the nature of the symptoms, time of onset, extenuating factors, and other unique subjective features may provide the only diagnostic clues available at such an early stage.

The family physician must be a perceptive humanist, alert to early identification of new problems. Arriving at an early diagnosis may be of less importance than determining the real reason the patient came to the physician. The symptoms may be the result of a self-limiting or acute problem, but anxiety or fear may be the true precipitating factor. Although the symptom may be hoarseness that has resulted from postnasal drainage accompanying an upper respiratory tract infection, the patient may fear it is caused by a laryngeal carcinoma similar to that recently found in a friend. Clinical evaluation must rule out the possibility of laryngeal carcinoma, but the patient's fears and apprehension regarding this possibility must also be allayed.

Every physical problem has an emotional component, and although this factor is usually minimal, it can be significant. A patient's personality, fears, and anxieties play a role in every illness and are important factors in primary care.

THE FAMILY PHYSICIAN AS COORDINATOR

Francis Peabody (1930), a professor of medicine at Harvard Medical School from 1921 to 1927, was ahead of his time. His comments remain appropriate today:

> *Never was the public in need of wise, broadly trained advisors so much as it needs them today to guide them through the complicated maze of modern medicine. The extraordinary development of medical science, with its consequent diversity of medical specialism and the increasing limitations in the extent of special fields—the very factors that are creating specialists—in themselves create a new demand, not for men who are experts along narrow lines, but for men who are in touch with many lines (p. 20).*

The family physician, by virtue of his or her breadth of training in a wide variety of medical disciplines, has unique insights into the skills possessed by physicians in the more limited specialties. The family physician is best prepared to select specialists whose skills can be applied most appropriately to a given case, as well as to coordinate the activities of each, so that they are not counterproductive.

As medicine becomes more specialized and complex, the family physician's role as the integrator of health services

becomes increasingly important. The family physician facilitates the patient's access to the whole health care system and interprets the activities of this system to the patient, explaining the nature of the illness, the implication of the treatment, and the effect of both on the patient's way of life. The following statement from the Millis Commission Report (Citizens' Commission, 1966) concerning expectations of the patient is especially appropriate:

The patient wants, and should have, someone of high competence and good judgment to take charge of the total situation, someone who can serve as coordinator of all the medical resources that can help solve his problem. He wants a company president who will make proper use of his skills and knowledge of more specialized members of the firm. He wants a quarterback who will diagnose the constantly changing situation, coordinate the whole team, and call on each member for the particular contributions that he is best able to make to the team effort (p. 39).

Such breadth of vision is important for a coordinating physician. She or he must have a realistic overview of the problem and an awareness of the many alternative routes to select the one that is most appropriate. As Pellegrino (1966) stated:

It should be clear, too, that no simple addition of specialties can equal the generalist function. To build a wall, one needs more than the aimless piling up of bricks, one needs an architect. Every operation which analyzes some part of the human mechanism requires it to be balanced by another which synthesizes and coordinates (p. 542).

The complexity of modern medicine frequently involves a variety of health professionals, each with highly developed skills in a particular area. In planning the patient's care, the family physician, having established rapport with a patient and family and having knowledge of the patient's background, personality, fears, and expectations, is best able to select and coordinate the activities of appropriate individuals from the large variety of medical disciplines. He or she can maintain effective communication among those involved, as well as function as the patient's advocate and interpret to the patient and family the many unfamiliar and complicated procedures being used. This prevents any one consulting physician, unfamiliar with the concepts or actions of all others involved, from ordering a test or medication that would conflict with other treatment. Dunphy (1964) described the value of the surgeon and the family physician working closely as a team:

It is impossible to provide high quality surgical care without that knowledge of the whole patient, which only a family physician can supply. When their mutual decisions ... bring hope, comfort and ultimately, health to a gravely ill human being, the total experience is the essence and the joy of medicine (p. 12).

The ability to orchestrate the knowledge and skills of diverse professionals is a skill to be learned during training and cultivated in practice. It is not an automatic attribute of all physicians or merely the result of exposure to a large number of professionals. These coordinator skills extend beyond the traditional medical disciplines into the many community agencies and allied health professions as well. Because of his or her close involvement with the community, the family physician is ideally suited to be the integrator of the patient's care, coordinating the skills of consultants when appropriate and involving community nurses, social agencies, the clergy, or other family members when needed. Knowledge of community health resources and a personal involvement with the community can be used to maximum benefit for diagnostic and therapeutic purposes and to achieve the best possible level of rehabilitation.

Only 5% of visits to family physicians lead to a referral, and more than 50% are for consultation rather than direct intervention. Surgical specialists are sent the largest share of referrals at 45.4% followed by medical specialists at 31% and obstetrician-gynecologists at 4.6%. Physicians consulted most frequently are orthopedic surgeons followed by general surgeons, otolaryngologists, and gastroenterologists. Psychiatrists are consulted the least (Forrest et al., 2002; Starfield et al., 2002).

The Family Physician in Practice

The advent of family medicine has led to a renaissance in medical education involving a reassessment of the traditional medical education environment in a teaching hospital. It is now considered more realistic to train a physician in a community atmosphere, providing exposure to the diseases and problems most closely approximating those she or he will encounter during practice. The ambulatory care skills and knowledge that most medical graduates will need cannot be taught totally within a tertiary medical center. The specialty of family medicine emphasizes training in ambulatory care skills in an appropriately realistic environment using patients representing a cross-section of a community and incorporating those problems most frequently encountered by physicians practicing primary care. For this reason, the model office is integral to training in family medicine because it imitates realistically the environment and kind of problems the student and resident will encounter in practice.

The lack of relevance in the referral medical center also applies to the hospitalized patient. Figure 1-4 places the health problems of an average community in perspective. In any given month, 800 people experience at least one symptom. Most of these people are managed by self-treatment, but 217 consult a physician. Of these, eight are hospitalized, but only one goes to an academic medical center. Patients seen in the medical center (with most cases used for teaching) represent atypical samples of illness occurring within the community. Students exposed to

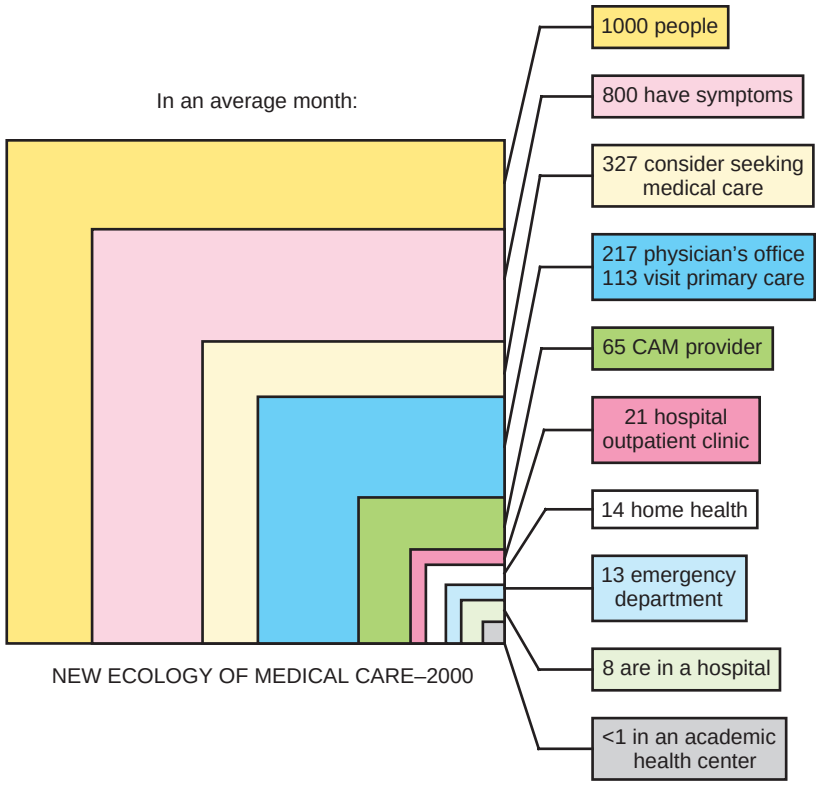

Figure 1-4 Number of persons experiencing an illness during an average month per 1000 people. *CAM,* Complementary and alternative medicine. (From Green LA, Fryer GE Jr, Yawn BP, et al. The ecology of medical care revisited. *N Engl J Med.* 2001;344:2021-2025.)

patients in only this manner develop an unrealistic concept of the types of medical problems prevalent in society and particularly those composing primary care. It focuses their training on knowledge and skills of limited usefulness in later practice.

PRACTICE CONTENT

Since 1975, the National Ambulatory Medical Care Survey conducted by the National Center for Health Statistics (NCHS) of the U.S. Department of Health and Human Services has annually reported the problems seen by office-based physicians (in all specialties) in the United States. The 20 most common diagnoses seen by physicians in their offices are shown in Table 1-3. Note that arthritis is fourth and diabetes mellitus sixth, reflecting the prominence of chronic diseases in practice. For those who think primary care is little more than caring for acute pharyngitis, note that it is ranked 19th. When only chronic conditions are listed (Table 1-4), arthritis is second and diabetes fourth.

Although hypertension is the most common problem encountered in offices (see Table 1-3), primary care physicians checked the blood pressure at 60% of the visits compared with only 20% of surgical specialists and 40% of visits to medical specialists (Woodwell and Cherry, 2002).

Available data concerning primary care indicate that more people use this type of medical service than any other and that, contrary to popular opinion, sophisticated medical technology is not normally either required or overused in basic primary care encounters. Most primary care visits arise from patients requesting care for relatively uncomplicated problems, many of which are self-limiting but which cause the patients concern or discomfort. Treatment is often symptomatic, consisting of pain relief or anxiety reduction rather than a "cure." The greatest cost-efficiency results when these patients' needs are satisfied while the self-limiting course of the disease is recognized, without incurring unnecessary costs for additional tests.

Table 1-3 Rank Order of Office Visits by Diagnosis

1. Essential hypertension
2. Routine infant or child health check
3. Acute upper respiratory infections, excluding pharyngitis
4. Arthropathies and related disorders
5. Malignant neoplasms
6. Diabetes mellitus
7. Spinal disorders
8. Rheumatism, excluding back
9. General medical examination
10. Follow-up examination
11. Specific procedures and aftercare
12. Normal pregnancy
13. Gynecologic examination
14. Otitis media and eustachian tube disorders
15. Asthma
16. Disorder of lipoid metabolism
17. Chronic sinusitis
18. Heart disease, excluding ischemic
19. Acute pharyngitis
20. Allergic rhinitis

From Cherry DK, Woodwell DA, Rechtsteiner EA. 2005 *Summary: National Ambulatory Medical Care Survey.* National Center for Health Statistics, Advance Data Vital Health Statistics. No 387. Washington, DC, US Government Printing Office; 2007.

Table 1-4 Rank Order of Chronic Conditions, All Ages

1. Hypertension
2. Arthritis
3. Hyperlipidemia
4. Diabetes
5. Depression
6. Obesity
7. Cancer
8. Asthma
9. Chronic obstructive pulmonary disease
10. Ischemic heart disease
11. Osteoporosis
12. Cerebrovascular disease
13. Congestive heart failure
14. Chronic renal failure

Patient-Centered Medical Home

The patient-centered medical home (PCMH; see Chapter 2) has been proposed as an enhanced model of primary care by four medical organizations (family medicine, pediatrics, internal medicine, osteopathy) and is focused on reducing fragmentation of care and overcoming the reliance on specialty rather than primary care (Berenson et al., 2008; Rogers, 2008).

Primary care was encouraged to expand beyond its restrictive role as a provider of care to one that analyzes the needs of a community and focuses on those at risk of disease. This process was first described in the 1950s by Sydney Karf, who looked at the needs of his community in South Africa, whether or not they were his patients (Kark and Cassel, 1952; WONCA, 2013). The process involves identifying the health problems of a community, such as diabetes or obesity, developing a program to prevent the disease and care for people in the early stage, and then evaluating the effectiveness of the program (Longlett et al., 2001).

Looking toward the Future

The pace of medical progress may result in tomorrow's innovations exceeding today's fantasies. Family medicine in the future will be different as a result of technology. Every patient and physician is computer literate, with patients having access to the same sources of information as physicians. Patients are likely to have their own home page that contains their medical information and gives them access to whatever services they need (Scherger, 2005). Although the Internet is an excellent tool for consumers to access information about their health and for disseminating health care information, it will never be a substitute for a face-to-face discussion and physical examination. It cannot convey the worry in a voice or the subtle, nonverbal clues to the real reason for the patient's distress. However, the Internet does allow the individual patient to be more active and involved in his or her own care.

The electronic medical record allows the family physician to incorporate the latest evidence-based recommendations into an individual's care, write electronic prescriptions, and be alerted to drug interactions while seeing a patient. Internet-based textbooks such as this one will provide immediate access to information during patient visits.

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The complete reference list is available online at www.expertconsult.com

Web Resources

www.aafp.org: The American Academy of Family Physicians' site with information for members, residents, students, and patients. Publishes the *American Family Physician, Family Practice Management Journal, Annals of Family Medicine,* and *AAFP News Now.* Sponsors the Family Medicine Interest Group (FMIG) for medical students.

www.adfammed.org: The Association of Departments of Family Medicine represents departments of family medicine in U.S. medical schools.

www.familydoctor.org: Family Doctor provides consumer health information, including tips for healthy living, search by symptom, immunization schedules, and drug information.

www.globalfamilydoctor.com: The World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians (WONCA). The World Organization of Family Doctors is made up of 126 organizations in 102 countries.

www.napcrg.org: The North American Primary Care Research Group (NAPCRG) is committed to fostering research in primary care.

www.photius.com/rankings/healthranks.html: The World Health Organization's ranking of the quality of health care in 190 countries. Also available are life expectancy, preventable deaths, and total health expenditure (as percentage of gross domestic product).

www.stfm.org: The Society of Teachers of Family Medicine, representing 5000 teachers, publishes *Family Medicine, Annals of Family Medicine,* and the *STFM Messenger*.

www.theabfm.org: The American Board of Family Medicine, the second largest medical specialty in the United States. The site includes a link to *The Journal of the American Board of Family Medicine,* certification requirements, and reciprocity agreements with other countries.

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2 Patient-Centered Medical Home

DAVID P. RAKEL and WAYNE BOICE JONAS

CHAPTER OUTLINE

Key Points

- Continuous, healing-oriented relationships are the foundation on which the medical home, or "health home," is built. This is the interpersonal environment.
- The patient-centered medical home brings together health professionals to work collectively toward the health needs of the community through the creation of health teams.
- A continuous self-reflective process is required for the physician-leader to prevent burnout, maintain joy in her or his work, and create an optimal healing environment (OHE). This is the inner environment.
- The health home can have the greatest impact on community health by proactive incorporation of positive lifestyle behaviors. This is the behavioral environment.
- Patient empowerment involves providing accurate information in a manner that is understandable to the individual and creating a context that supports the patient's ability to make decisions.
- Infusing the elements of an OHE (including inner, interpersonal, behavioral, and external) within the medical home will encourage patient and team empowerment and enhance change toward positive health.

The intuitive mind is a sacred gift, and the rational mind is a faithful servant. We have created a society in which we honor the servant and have forgotten the gift.

ALBERT EINSTEIN

History

The concept of the "medical home" was first described in *Standards of Child Care* by the American Academy of Pediatrics (AAP) Council on Pediatrics Practice in 1967. It defined "ideal care" for children with disabilities as a practice that provided care that was accessible, coordinated, family-centered, and culturally effective.

The American Academy of Family Physicians (AAFP) used this concept to expand the characteristics based on discussions defining the future of family medicine. These characteristics described the "personal" medical home, which focused on bringing attention to the importance of continuous, relationship-centered, whole-system, comprehensive care for communities (Martin et al., 2004). In 2007, the AAP, AAFP, American College of Physicians (ACP), and American Osteopathic Association (AOA) collaborated to define further the foundational principles of the patient-centered medical home (PCMH; Table 2-1). The goal of the medical home is to emphasize the importance of primary care in maximizing quality of care, health outcomes, and the patient experience, with improved cost efficiency, called "the "triple aim" by the Institute for Healthcare Improvement (IHI, 2014).

However, the ingredients of the medical home (or "health home") continue to be defined and modified based on the needs of the clinicians and communities that implement them. These ingredients and how they are delivered are key to the achievement of the lofty goals of the medical home and family medicine in general. This chapter discusses the most important ingredients for the medical home and the actions that the family physician can take to create one.

Healing, Curing, and the Goals of the Medical Home

Medicine in general and primary care in particular involve constant tension between the diagnosis and elimination of disease (cure) on one hand and the alleviation of suffering (healing) on the other. In this context, *healing* means

Table 2-1 Principles of a Patient-Centered Medical Home

1. Access to care based on an ongoing relationship with a personal physician who is able to provide first-contact, continuous, and comprehensive care
2. Care provided by a physician-led team of individuals within the practice who collectively take responsibility for the ongoing needs of patients
3. Care based on a whole-person (holistic) orientation in which the practice team takes responsibility for either providing care that encompasses all patient needs or arranges for the care to be done by other qualified professionals
4. Care coordinated and integrated across all elements of the complex health care system and the patient's community
5. Care facilitated by the use of office practice systems (e.g., registries, information technology, health information exchange) to ensure that patients receive the indicated care when and where they need and want it in a culturally and linguistically appropriate manner
6. Reimbursement structure that supports and encourages this model of care

Modified from American College of Physicians. *Joint Principles of the Patient-Centered Medical Home,* March 2007. http://www.acponline.org/advocacy/where_we_stand/medical_home/approve_jp.pdf.

optimizing patients' responses to treatments and helping them cope emotionally and practically with whatever condition they face, even when cure is not possible.

In *The Nature of Suffering and the Goals of Medicine,* Cassell (2004) elegantly describes this tension and the continual erosion of healing practices under the pressure to apply more specific, technologic cures. In *A Time to Heal,* Ludmerer (1999) documents how, despite decades of efforts in curriculum change, these core values of healing in medical education have failed to gain significant traction under the forces driving the payment for cure-seeking behaviors.

Thus, physicians seeking to create a medical home that balances cure and healing face considerable challenges, especially in the delivery of healing. What are the essential components of such a health care home? How can they be delivered in the current medical context? What actions must a family physician take to create not only a practice that treats disease but an optimal healing environment (OHE) as well?

BALANCING TREATMENT OF DISEASE AND PROMOTION OF HEALTH AND HEALING

Health is largely a result of positive lifestyle behaviors that are often challenging to implement. Addressing issues such as smoking, obesity, substance abuse, and inactivity can reduce premature death by 40% (McGinnis et al., 2002; Schroeder, 2007). Positive lifestyle behaviors not only prevent premature death but also extend the average life expectancy by 14 years (Khaw et al., 2008). Currently, approximately 4 cents of every dollar spent for health care goes toward prevention and public health, with 96% spent on treating established disease (Lambrew, 2007). Two thirds of chronic disease is behavior-related and could be eliminated or mitigated by working interprofessionally to help guide patients toward healthy choices (McGinnis et al., 2002).

Behaviors that have the greatest impact on preventing chronic disease and its progression are (1) reducing exposure to toxic substances (tobacco, alcohol, drugs, pollution), (2) movement and exercise, (3) healthy diet, (4) psychosocial integration and stress management, and (5) early disease detection and intervention (Jonas, 2009; McGinnis, 2003). For these behaviors to have an impact, the health home needs to be both designed and financially supported with the goal of health as its primary focus. This requires new models for funding that go beyond the disease-focused, payment-by-episode, high-throughput model of payment that currently dominates medicine. A primary care clinic that only works from this model will encourage shorter office visits while promoting reliance on expensive technologies that modify symptoms without addressing the cause of disease. The PCMH needs to push the curve in Figure 2-1 to the left by involving professionals who specialize in health promotion and flatten the disease progression curve and reduce the need for emergency and tertiary care.

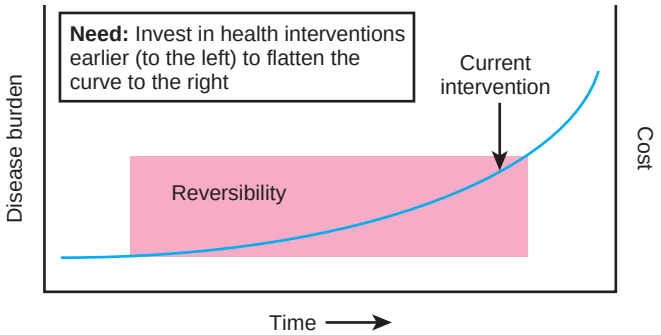

Figure 2-1 Profit in the current U.S. health care system is obtained focusing on the right of the curve. Investment toward the left of the curve will reduce disease burden and cost over time.

ESTABLISHING AN OPTIMAL HEALING ENVIRONMENT

An OHE involves changes in the delivery and context of medical treatment rather than a specific treatment itself. Its goal is to infuse healing processes (salutogenesis) into any disease treatment. This means optimizing the effects of "meaning and context" in care process rather than ignoring or dismissing them as "placebo" effects (Jonas 2011). An OHE involves attending to three primary domains of care delivery: (1) the "inner" personal environment of the team and patient; (2) the "inter" personal or relationship environment of care delivery; and (3) the "external" behavioral and physical environment of the medical home (Chez and Jonas, 2005; Jonas et al., 2014).

The "treatment" itself is given the most credit in medicine when often it should not be so. A prescribed medication is valued for its "specific" medical influence, as deemed beneficial by randomized (placebo-) controlled trials (RCTs). This research focuses on the effects of the drug and attempts to control the context to reduce "nonspecific" (placebo) effects that may compromise the results. This helps physicians understand the specific effects of the drugs they prescribe, but it does not value those nonspecific effects that surround the prescribing of a medication. It is impossible, even undesirable, to remove all nonspecific effects from the patient encounter (Moerman and Jonas, 2002). "Meaning" and "context" effects are rooted in relationship-centered care, including empathy, trust, empowerment, and hope (Walach

Table 2-2 Optimal Healing Environments

Inner Environment to the Outer Environment

Healing Intention	Personal Wholeness	Healing Relationships	Healing Organizations	Healthy Lifestyles	Integrative Collaborative Medicine	Healing Spaces
Expectation	Mind	Compassion	Leadership	Diet	Person oriented	Nature
Hope	Body	Empathy	Mission	Movement	Conventional	Light
Understanding	Spirit	Social support	Culture	Relaxation	Complementary	Color
Belief	Family	Communication	Teamwork	Addictions	Culturally appropriate	Architecture
	Community					
Enhance awareness expectancy.	Enhance personal integration.	Enhance caring communication.	Enhance delivery process.	Enhance healthy habits.	Enhance medical care.	Enhance healing structure.

Modified from Jonas WB, Chez RA. Toward optimal healing environments in health care. *J Altern Complement Med.* 2004;10(suppl 1):S1-S6.

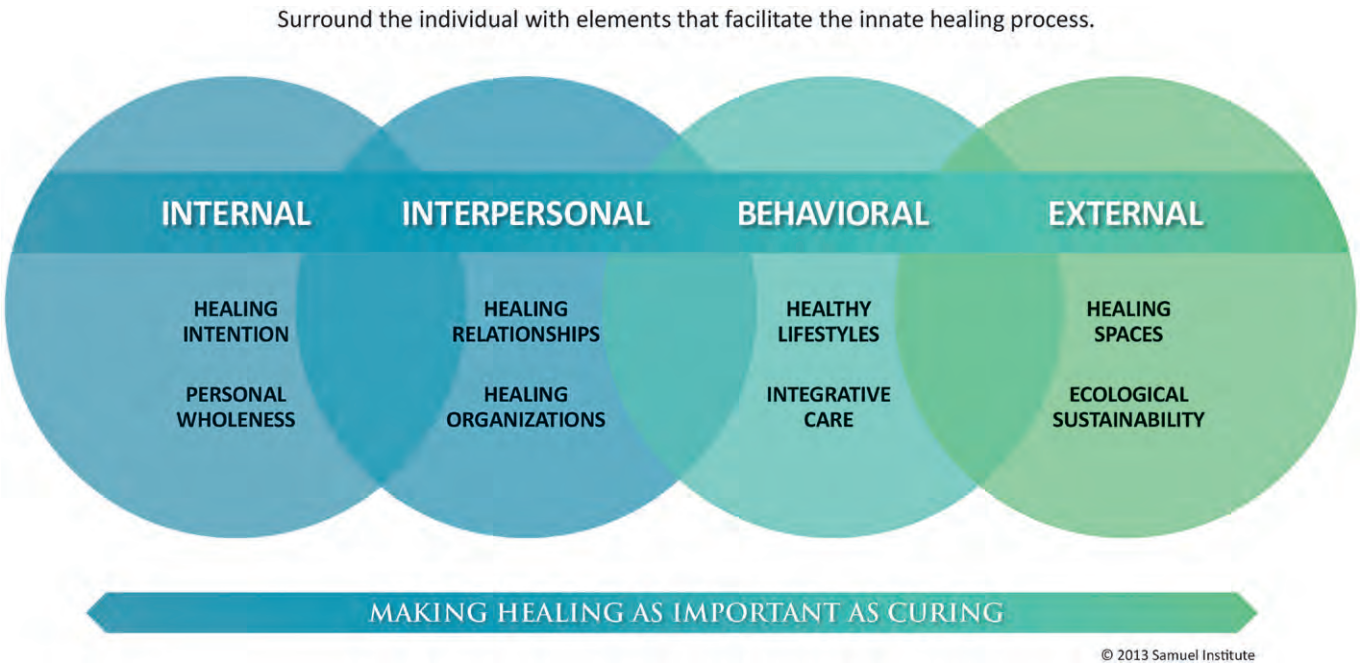

Figure 2-2 Optimal healing environments. (Used with permission from Samueli Institute, www.SamueliInstitute.org.)

and Jonas, 2004) Research on one of the most frequently prescribed drugs in primary care, selective serotonin reuptake inhibitors (SSRIs), shows that these work only about 6% to 9% better than placebos for mild to moderate depression (Kirsch et al., 2002; Turner et al., 2008). Both placebos and drugs work well and are often almost 60% effective. Therefore, if the drug only accounts for 9% of this effect, which factor accounts for the majority of the healing influence? Maybe researchers are not giving enough credit to the clinician and the nonspecific variables that surround the prescribing of the pill. Maybe it is simply the act of listening to people who are suffering and giving them a sense of understanding that there is something they can do to overcome the suffering. Maybe it is the interaction between two people before the medicine is prescribed that has the greatest healing effect. Psychiatrists gifted at developing a trusting relationship were found to have better effects with placebo in treating depression than their colleagues less talented at developing relationships who used active drugs (McKay et al., 2006). Acupuncture delivered with an enhanced clinical human encounter produces better effects than the same points treated by clinicians who do not form a therapeutic relationship (Kaptchuk et al., 2008; Kelley et al., 2009).

Family physicians do not need to wait for further research to create an OHE for patient care. Physicians already know that the factors summarized in Table 2-2 and Figure 2-2 help encourage the healthy unfolding of complex systems no matter what the disease or treatment. The most important part in influencing healing in others is focused on the left side of the table and starts with a self-reflective, internal process. Family physicians first need to understand the importance of continuously exploring their own awareness and health so they are prepared to do the same for their patients.

THE IMPORTANCE OF SELF-CARE

To care deeply for others, we must know how to care for ourselves. As Cassell (2004) says, "... virtually all the doctor's healing power flows from the doctor's self-mastery." True primary care, therefore, also includes what we do for

ourselves. Up to 60% of practicing physicians report symptoms of "burnout" (Shanafelt et al., 2003; Spickard et al., 2002) with a higher incidence in primary care (Shanafelt, et al., 2012). This is associated with emotional exhaustion, depersonalization (seeing patients as objects), reduced empathy, and the loss of meaning in work. (See Chapter 6, Care of the Self.)

The characteristics lost in burnout are important ingredients in facilitating health and healing in others. If the health team physician leader is "burning out," the health home will not be healthy. When physicians practice healthy lifestyle behaviors, they are more likely to educate patients on the importance of these behaviors (Lewis et al., 1991) and to become more motivating to their patients toward positive change (Frank et al., 2000; Lobelo et al., 2009). Family physicians benefit from a self-reflective inquiry about personal balance toward health. This behavior will constantly be challenged and will require attention and "mastery."

Most primary care physicians are attracted to the field to make a difference in people's lives through continuous healing relationships. When the demands of the working environment tax the sense of control to maintain these relationships, stress and potential burnout can ensue. One remedy for this is to use the patient encounter to allow *meaning* to flow through the work. The healing-oriented primary care approach recognizes each patient as a unique individual with specific needs in the physical, emotional, and spiritual domains and sets aside both mental space and physical time to deal with those needs. To be aware of these personal needs requires a mindful practice in which the physician is fully present in the moment with the patient, where each is able to reduce suffering in the other (Epstein, 1999). This "mindfulness" approach has been found to enhance well-being and physician attitudes in patient-centered care (Krasner et al., 2009) and reduce stress, anxiety, and depression in primary care clinicians (Fortney, et al., 2013). It requires that physicians create physical time in the health home to sit and listen to patient stories (Rakel, 2008).

INVESTING IN RELATIONSHIP

The medical home is just that, a "home" where someone feels welcome, known, and part of a community. The ongoing relationship with patients provides insight into the complexity of their health care needs and honors the interactions among multiple health perspectives. It allows the clinician to use evidence-based guidelines while realizing that variability is the norm. The best care for one individual may not be best for another. Patient-centered care recognizes that care should be focused on the needs of the individual patient, not simply on a disease state. Ideally, the goal should be "relationship centered," encouraging attention to the unique needs of the patient to be well. Thus, creating healing relationships is a core goal of an effective medical home (Chez and Jonas, 2005).

The evidence for the benefits of continuous, relationship-centered primary care is solid and growing (Neumann et al., 2010). It has been found to improve quality of care (Starfield, 1991), reduce expenditures on diagnostic testing (Epstein et al., 2005), reduce hospital admissions (Gill and Mainous, 1998), and lower total health care costs (De Maeseneer et al., 2003). Having continuous, ongoing relationships with patients is often cited as the most rewarding aspect of being a family physician (Fairhurst and May, 2006). A systematic review of controlled trials on effective "team care," in which relationship-centered factors are formalized in the care process, has demonstrated reduced mortality and morbidity, improved morale of health care workers, and reduced costs of health care (Safran et al., 2006). Patients with diabetes who are cared for by physicians who rate high in empathy have lower Hgb A1C and low-density lipoprotein cholesterol levels (Hojat et al., 2011).

One health care system that restructured its whole organization around establishing long-term, trusting, accountable relationships in the community is the Southcentral Foundation Alaska Native Health Care model (Eby, 2007). This was the main request of the leaders of native Alaskans when they were asked what they wanted most in their public-owned health care system. Above all else, they valued the relationship with their physician, someone who "listens to them and takes time to explain things and who is able to coordinate effectively their overall care" (Gottlieb, 2007). The system made this its primary objective. This focus not only delivered a better patient experience, but it also improved clinical outcomes. After transforming their health model in 1999, urgent care and emergency department utilization decreased by 40%, specialist utilization by 50%, and hospitalization days by 30%. Customer satisfaction surveys showed that 91% rated their overall care as "favorable" (Gottlieb et al., 2008).

EMPOWERMENT

The greatest amount of suffering, disability, and cost occurs when the individual becomes more dependent on tertiary health care. The goal of the primary health team is to reduce this need. This requires that physicians empower individuals, families, and communities to understand what they can do to reduce the risk of disease and move the acuity curve in Figure 2-3 to the left. This will increase control of health by the individual, family, and community, with less dependence on the health care industry. To understand how best to work toward this goal, it is important to understand the process of empowerment.

Empowerment does not mean that patients do what is asked of them; this is *compliance*. Noncompliance is two people working toward different goals. Empowerment is a way of interacting in which accurate information is provided in a manner understandable to the individual that both respects and promotes patients' ability to make decisions for themselves. A patient's decision making occurs in the "inner," personal environment, influenced by external issues such as culture, family, peer group, work, and payment for care. Anderson and Funnell (2009) describe this well in their research on empowerment and diabetes care, reporting that 98% of diabetes care is "patient directed." When a patient is told to act a certain way, it is successful less than 5% of the time.

Empowerment is both a process and an outcome. The *process* requires that a health care partner recognizes individuals' unique needs and helps them think critically to make informed decisions on which they choose to act. This

results in an *outcome* that individuals decide is best for them and their current situations. Health care practitioners cannot control their patients' decisions and thus cannot own the outcome. The clinician can recognize the psychosocial and emotional underpinnings that allow positive change to take place and then gradually and supportively work with the patient toward positive behaviors. As the health guide of the community, the relationship-centered health home requires the development of health teams to facilitate this change.

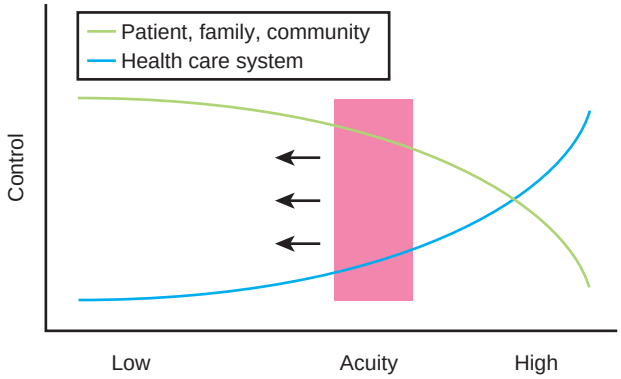

Figure 2-3 The Alaska Native Health Care model moved the slashed lines to the left, reducing dependence on the health care system and increasing control of the family. The goal is to flatten the curves to the right. The health care system should empower the family and community to maintain control of their health and make people less dependent on the "health rescue." (Modified from Gottlieb K, Sylvester I, Eby D. Transforming your practice: what matters most. *Fam Pract Manag.* 2008;15:32-38.)

Health Teams

Patient-centered, healing-focused care requires that primary care physicians evolve beyond "physician-centered care" that is restricted by the dwindling access of the one-on-one physician visit. The family physician of the future can be a leader in the creation of a team of health professionals who provide multiple paths to access care (Figure 2-4) (Grumbach and Bodenheimer, 2004). This may involve group visits, phone contact, e-mail, Facebook, Twitter, photo and video access, and other use of information technology. The goal should be a proactive, collaborative team effort that is not restricted to the in-office encounter and continuously moving toward meeting patient goals, not just expecting adherence to treatment guidelines (Nutting et al., 2009). Healing-oriented teams include the most appropriate clinicians for the health needs of the community. This process may be physician-led but not necessarily physician-dominant and may include nurses and nurse practitioners, physician assistants, psychologists and counselors, allied health practitioners, complementary and alternative practitioners, health coaches, and others to provide more effective care while reducing the threat of a physician shortage (Bodenheimer and Smith, 2013). Administrative office

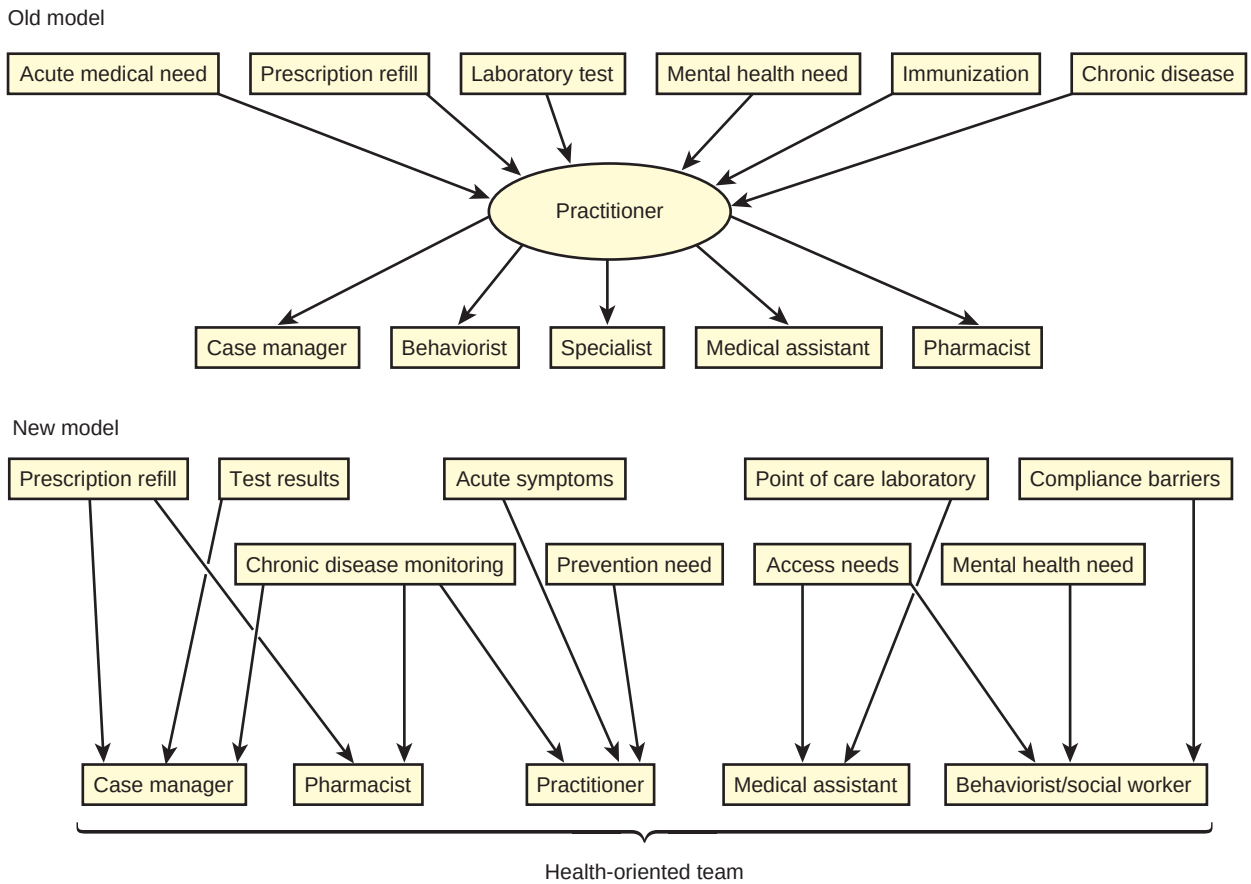

Figure 2-4 Traditional model versus new model of care showing multiple ways to access the health home (medical home).

Table 2-3 Defining Disciplinary Teams

Term	Definition
Multidisciplinary team	**Additive.** Composed of "more than two professionals from different health care disciplines who work with the same patient, set of patients, or clinical condition, but provide care independently of each other" (Choi and Pak, 2006) (interdisciplinary team building). For example, a patient may have visits with both a primary care practitioner (PCP) and physical therapist (PT). Although the PCP may view clinical notes or a report from the PT, the practitioners from the two disciplines usually do not interact.
Interdisciplinary team	**Interactive.** An ongoing and integrated care team of one patient, set of patients, or clinical condition. Team members develop collegial relationships with shared goals and joint decision making. They interact, supporting as well as questioning each other's opinions, and negotiate to develop health strategies based on the needs of the individual.
Transdisciplinary team	**Holistic.** Professionals learn from each other and in the process transcend traditional disciplinary boundaries, which may result in new knowledge. Often, the greater the difference between professions (epistemologic distance; e.g., engineering and humanities), the more likely insight will develop toward the creation of a new way to solve a problem.

Data from Choi BC, Pak AW. Multidisciplinarity, interdisciplinarity and transdisciplinarity in health research, services, education and policy. 1. Definitions, objectives, and evidence of effectiveness. *Clin Invest Med.* 2006;29:351-364 and Choi BC, Pak AW. Multidisciplinarity, interdisciplinarity and transdisciplinarity in health research, services, education and policy. 3. Discipline, inter-discipline distance, and selection of discipline. *Clin Invest Med.* 2008;31:E41-E48.

staff, with their frequent patient interactions, are also key members of the healing team, and, of course, the patient and his or her family, friends, caregivers, and community members frequently participate in important ways.

In 2003, the Robert Wood Johnson Foundation supported research to bring behavior change initiatives into primary care to address inactivity, unhealthy eating, smoking, and risky drinking (Cifuentes et al., 2005). Lessons learned from 17 practice-based research networks showed that health behavior change resources are enthusiastically received by practices and patients (Cohen et al., 2005; Woolf et al., 2005), and that practices that use multifaceted team-based interventions are more effective in promoting healthy behaviors than those providing isolated therapy (Goldstein et al., 2004; Prada, 2006; Solberg et al., 2000; Woolf et al., 2005).

When working within teams, it is important to understand the difference among multidisciplinary, interdisciplinary, and transdisciplinary team models (Table 2-3). Traditional *multidisciplinary* teams are often focused on disease states and are limited to specific organ systems. In multidisciplinary teams, clinicians work in isolation, with limited communication and collaboration. These models tend to focus on body parts or systems in isolation, not recognizing their interdependency. Developing a common goal of health facilitation allows professionals to come together to develop *interdisciplinary* teams that encourage insight toward new ways of problem solving not previously in the group's consciousness. When a new insight develops, the interdisciplinary team becomes a *transdisciplinary* team as its members develop novel ways to create (or promote) health that transcend the "siloed" model of care (Choi and Pak, 2006; Soklaridis et al., 2007).

Accountable care organizations (ACOs) are an example of *interdisciplinary* communication and coordination of care to eliminate waste while improving care for specific disease-based conditions such as congestive heart failure (Berwick and Hackbarth, 2012). Although ACOs will benefit from patient-centered medical homes, they continue to focus within a disease-care paradigm and thus are not an example of *transdisciplinary* care. *Transdisciplinary* care will require teams that partner with patients and help them achieve their health goals. This transcendence asks the patient, "What do you want your health for?" The answer will direct the energy of the team, and the disease will often improve as a consequence.

WHO SHOULD COMPRISE THE HEALTH TEAM?

The family physician knows the population of the community served and their specific health care needs. This insight will define the professionals who will be of most benefit for health creation (promotion). For example, obesity is a significant health threat in many locales. A team of professionals working together toward sustained optimal weight for patients might include a registered dietician, an exercise physiologist, and a psychologist or mind–body practitioner to understand the interplay between stress and eating. The process to develop a health-oriented team for musculoskeletal health (back pain) is summarized in Table 2-4.

The health team may look different from a disease team, but there will be obvious overlap. For example, a health home may include a nutritionist or health coach who works with patients who have diabetes. This team member can also provide counseling for prediabetic persons and overweight youths to prevent the expression of a disease that is influenced by lifestyle choices.

HEALTH TEAM MODELS

There are many ways to develop health-oriented teams. The approach will depend on the needs of patients, the population served, the availability of team members, the size of the clinic, strategic needs, and the support of administration and clinic staff. Teams can be initiated in all sizes of clinics, from large, complex institutions to small, rural settings, and may take many forms. For example, a team may include only the family physician and two health coaches or medical assistants. This "teamlet" model extends the office visit to include communication before, during, and after the visit (Bodenheimer and Laing, 2007). The teamlet uses these opportunities to address patient needs and develops appropriate strategies. The health team's common mission is working toward the greatest improvement in the patient's quality of life.

The team members do not need to share the same space as long as they maintain communication and build

Table 2-4 Health-Oriented Team Creation Worksheet (Example: Achieving Optimal Back Health)

Task	Action
Health need of my community	Achieving optimal back health
Identify professionals to address health need.	1. Manual practitioner 2. Physical therapist 3. Psychologist or "mindfulness" instructor 4. Health coach
Delineate the team-focused goal/mission.	To empower patients to learn how to achieve their ideal back function and health
Name the health-oriented program.	"Back to Health" program
Create relationships among team members.	Team members to meet initially to develop program goal or mission and methods of interacting; periodic meetings as needed for team building and interactions around patient issues
Agree on team communication method.	Fax or e-mail will be sent to the team for referrals, findings, and discussion.
Follow up and promote sustainability.	Patient will meet periodically with health coach or nurse at the medical home to sustain lifestyle behaviors.

intermember relationships. This helps clinicians learn of each other's interests and talents in relation to common goals, fostering mutual understanding, trust, and respect. Without the team concept, there will simply be separate therapies and professionals working in isolation, causing fragmentation of care.

The most important ingredient in effective teams is trust—trust that each team member will play his or her particular part in care delivery and process improvement (Sargeant et al., 2008). Changing to an effective team approach takes humility and time and requires constant fine tuning and quality improvement. Miller and Crabtree (2005) have developed a comprehensive model of team care operations and describe effective techniques to build effective team processes. However, the physician can begin in any domain that fits the readiness of the practice (see Table 2-4), and the effects will often spread to other domains. The following checklist provides some places to start in a practice assessment format.

The Health Home Checklist

- Create a "home" where those who enter feel known and welcome. Patients will remember how they *felt* in a health home longer than what they are told. This starts with how they are greeted when then come in.
- Create a common mission supported by all health home members; for example, "To invest in a continuous healing relationship for the well-being of the community we serve."
- Provide multiple ways to access care from the most appropriate health professional, including using technology to provide interaction outside the office encounter (see Figure 2-4).
- Provide a variety of encounter visits that complement the one-on-one office visit. These may include group visits, e-mail, video access, support groups, and health promotion or disease-focused programs.
- Create relationships through open communication with a team of health professionals who are configured specifically for each patient to positively influence lifestyle behaviors or address specific disease states and management needs.
- Provide a way for the consumers (patients) to have input into what health-related programs or services are implemented based on their perceived needs and explicit goals.
- Provide an opportunity to understand the most important areas that patients believe need to be addressed for their long-term health. (See eBox 2-1, health agreement document online.)
- Learn to provide rapid and evidence-based information on lifestyle and conventional and complementary medicine in each team encounter.
- Review the space of the practice and develop a plan to make it less stress-inducing and more comfortable and conducive to communication and operations for the patient and team members.
- Make sure the health home resonates with that which gives family physicians meaning and purpose in their work. This will translate across the medical home, encouraging team acceptance while reducing the risk of burnout.

Lessons from Early Adaptors

A national demonstration project was launched in 2006 to implement and study the patient-centered medical home model. The findings of this project confirmed that this can be done, but change is slow and should recognize the unique aspects of each individual health team and the needs of its community. A strategy that may be successful for one health home will be different for another (Crabtree et al., 2010). In fact, many of the challenges that were encountered in shifting a culture from a throughput disease model to one of patient empowerment and population management are similar to the challenges seen in facilitating health in complex systems (Bitton et al., 2012). The characteristics of effective PCMH were found to include:

Interpersonal autonomy. Physicians needed to learn to work with teams, and the teams needed to understand and identify with their new roles (Cronholm et al., 2013).

Uniqueness. Every site had its own underlying story that influenced the projects they would work on. The talents and expertise of the team often directed projects that resulted in the most success (Alexander et al., 2013).

Leadership engagement. Success requires commitment from system leaders to provide resources needed for sustainability (True et al., 2013).

Communication. Invest in a communication plan that may include regular meetings and access to patients and team members through electronic health records for ongoing coordination of care and interprofessional collaboration.

Health Agreement

Welcome to the Odana Atrium Clinic! Our focus is your health, but to succeed, we need your help. We may only spend a few hours together each year, setting the stage for how you can optimize health and well-being the rest of the time. We can guide you along the way, but all healing is really self-healing. You choose how you spend your time. We are here to walk the path with you, but it is your path!

Although it is vital to keep your parts working and to fix them as needed, we also want to focus on you as a *whole person*. That means paying attention to emotions, thoughts, beliefs, culture, relationships—all the things that make you who you are. If you do this, you will be sick less often, need fewer drugs and procedures, and have a better quality of life. Please join us in committing to your wellness.

I, _____, will do my best to promote my own health. I acknowledge that the following areas are beneficial to my well-being:

1. **Movement and exercise.** I will try to do some form of vigorous movement or exercise most days of the week.
2. **A healthy diet.** I will try to eat at least 7 servings *(1 serving size = the size of the palm of your hand)* of fresh fruits and vegetables daily. Whenever possible, I will use organic and locally produced food, including multicolored whole foods that were recently alive. I will try to limit foods that are processed or have many difficult-to-pronounce artificial ingredients.
3. **Rest.** I acknowledge that my body and mind need rest to heal and restore. I will try to get enough sleep each night, and I will take short naps during the day if needed.
4. **A healthy weight.** I will do my best to move toward and maintain a weight that is healthy for me.
5. **Avoiding harmful substances.** If there are substances that are harmful to me and that I would have trouble giving up, such as certain foods, caffeine, tobacco, alcohol, and drugs, I will seek help in reducing or giving them up.
6. **Healthy relationships.** I will focus on having healthy family ties, friendships, sexual connections, and other types of relationships. I understand that caring for others and being cared for are good for my community and me.
7. **Managing stress**. I understand that the body and mind are one. When one suffers, the other is also affected. I will mindfully pay attention to where and how I feel stress in my body and explore paths to ease.
8. **Connecting with nature.** I acknowledge that the environment influences my health, and I will do my best to help protect it. Being in nature is healing, and I will spend time exploring it.
9. **Spiritual connection.** Spirituality is something that I define for myself. I recognize that being helpful and kind to others is good for me. I will reflect on what gives my life meaning and purpose, and I will do my best to help it grow and share it with others.
10. **Maintaining balance.** I acknowledge that time for myself, with others, and for play is just as important as work and finances. I will do my best to find balance in my life.

I will do my best to practice these healthful lifestyle habits. I feel I should start with number(s) _____.

_____ _____

Health Partner **Date**

As your health care practitioner, I will help you work toward these goals. I will do my best to provide health care that is easily accessible, compassionate, continuous, and grounded in good science. I will do my best to assist your own capacity to heal.

_____ _____

Healthcare Practitioner **Date**

Modified from the Odana Atrium Clinic at the University of Wisconsin Department of Family Medicine, Wis.

Payment. It is difficult to sustain new payment models if there is no support for non–face-to-face work that is required to improve access and value. Be an advocate for policy change that pays for coordinated team-based care and the health outcomes the team has as their priority.

Patience. Creating patient-centered medical homes cannot be done in isolation because they are a foundational ingredient of a larger health care system that takes time to change. Celebrate each small step toward this cultural transformation.

Payment Models for the Health Home

In the past several years, it has become clear that a simple, office visit only, episode-based, disease treatment model alone will not allow for the optimal delivery of the patient-centered medical home. Although several elements of the Affordable Care Act favor the PCMH, transition to an effective payment model will be essential of those elements to work. Recently, the AAFP has embarked on a rethinking of how to align payment models for the "health home" (Family Medicine 2.0), examining everything from bundled capitated, per patient, per month models to blended models that still optimize preventive and postvisit care. Primary care is at the center of our health care delivery system and affects the functioning of both downstream care (tertiary, hospital, and emergency department care) and upstream care (prevention and population health). Family physicians can be the leaders in these efforts by pushing for the widespread adoption of global payment models as soon as possible even if they currently do not rely on those models for payment. The time for adequate investment in primary care has come.

Conclusion

Creating OHEs with health-oriented teams honors the concepts of the medical home as primary care physicians transition from medical care to health creation as a critical focus (see Table 2-2 and Figure 2-2). This is an exciting opportunity for professionals from varied disciplines to come together to work toward a common goal. The family physician's expertise in understanding the interplay of biopsychosocial systems makes this profession uniquely qualified to lead the implementation of these models of care.

The gift of primary care is the human connection that occurs within continuous healing relationships. Family physicians will succeed in providing efficient, cost-effective quality care if they invest in ingredients that are the most valuable yet most difficult to measure, the most important one being that nonquantifiable bond of intention, trust, and communication between the practitioner and patient in which both are transformed (Scott et al., 2008).

EVIDENCE-BASED SUMMARY

- Positive lifestyle behaviors have the largest effect on reducing morbidity and mortality for chronic disease (Khaw et al., 2008; McGinnis et al., 2002; Schroeder, 2007) (SOR: A).
- Team-based interventions are more effective in promoting healthy behaviors than are those that provide isolated therapy (Safran et al., 2006; Woolf et al., 2005) (SOR: B).
- Relationship-centered care improves quality of care and clinical outcomes (Starfield, 1991) (SOR: B).
- Relationship-centered care reduces health care costs (De Maeseneer et al., 2003; Epstein et al., 2005) (SOR: B).

Summary of Additional Online Content

The following content is available at www.expertconsult.com:
eBox 2-1 Health Agreement

References

The complete reference list is available online at www.expertconsult.com.

Web Resources

www.aafp.org/pcmh: Resources on the patient-centered medical home (PCMH) from the American Academy of Family Physicians.

http://www.pcpcc.org/about/medical-home: Patient-Centered Primary Care Collaborative site that includes a video to educate staff and colleagues about the PCMH.

samueliinstitute.org/our-research/optimal-healing-environments/ohe-framework: A graphic illustrating the components of an OHE.

samueliinstitute.org/our-services/assessment: A 360-degree assessment tool for making your clinic or health care setting an optimal healing environment.

www.transformed.com/Delta-Exchange: A community of clinicians, tools, and resources to help clinics transform to a PCMH (requires a monthly fee). Guides for creating an OHE in health care from the Samueli Institute.

www.transformed.com/mhiq/welcome.cfm: Module to calculate your medical home IQ. Gives a baseline practice assessment toward the creation of a medical home.

www.transformed.com/resources.cfm: Resources from TransforMED on transforming a medical practice to a medical home.

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3 Psychosocial Influences on Health

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CHAPTER OUTLINE

Key Points

- Factors that influence health include age, gender, and sexual orientation.
- Religious, ethnic, and cultural groups affect individual functioning.
- Individuals are affected by family composition, structure, and functioning.
- The health of an individual is influenced by work and school status.
- Individuals are affected by their social support network and significant others.
- Financial resources, including health insurance status, affect health status.
- Personal and family history of major loss, trauma, or illness should be integrated into the assessment of a patient's health status.
- Psychological functioning, including personality, defensive style, and current mental status, warrants evaluation.
- Self-control is a limited resource that can be replenished with healthy food, sleep, and practice.
- Data about the patient's physical environment, including home, neighborhood, and environmental hazards, are essential.
- The physician should elicit an account of recent stressors and changes in the patient's life.
- A collaborative physician–patient relationship that emphasizes physician listening is the foundation for sensitive psychosocial care.

- An overweight 11-year-old boy with abnormal lipids tells his family physician that his favorite activity is playing online video games.
- A middle-aged woman emphatically asserts that her blood pressure is elevated only when she has it taken in a medical setting.
- A single mother with a part-time job but no health insurance tells her doctor that she can only take medications that have low co-pays.

Psychosocial factors influence health. Assessing and treating patients in a manner that integrates psychosocial and biologic aspects of care is the essence of excellent family medicine and its greatest challenge. The following example is illustrative.

Mr. Ramirez is a 52-year-old man who lost his well-paying job as a software engineer several years ago. After 8 months of unemployment, he took a less satisfying job for less money. Mr. Ramirez has type II diabetes, diagnosed when he was 45 years old and well-controlled before he lost his job. He has taken diabetes education classes and can accurately describe what he must do to maintain good glucose control. Reluctantly, Mr. Ramirez acknowledges to his physician that he does not follow his diet as closely as he once did and more frequently eats fast food. He also misses the exercise facility at his former workplace and struggles with motivation to exercise. His marriage "isn't as good as it used to be," and he reports decreased interest in sex. When the physician asks him about feelings of depression, Mr. Ramirez says that he never thought he was a weak person, but he just does not enjoy things as he once did. His physician summarizes the changes Mr. Ramirez has experienced in the past few years and acknowledges the emotional toll of such stress. She briefly describes how stress and depression make diabetes more difficult to control and how she and Mr. Ramirez can collaboratively work on strategies to improve his health and quality of life.

This case highlights the following three imperatives for providing care that is appropriately responsive to psychosocial issues:

1. The physician sees the person first, conceptualizing symptoms and behaviors in his social and psychological context and responding with sensitivity to the patient's experience and priorities.
2. The physician understands the interactive nature of multiple biopsychosocial variables and communicates this effectively to the patient.

Table 3-1 Psychosocial Influences: Conceptual Models

Biopsychosocial model
Systems approach
Stress and coping model
Life span perspective
Ethnomedical cultural model

3. The physician fosters a supportive and empathic physician–patient relationship to provide the foundation for gathering information and intervening effectively.

As the case illustrates, biomedical factors may be only a small part of what patients bring to their physicians. The biomedical model, based on the assumptions of mind–body dualism, biologic reductionism, and linear causality, has resulted in miraculous achievements of high-technology medicine, but primary care physicians who restrict their attention to purely medical considerations are of limited use to their patients. Nevertheless, the shift from a biomedical to a biopsychosocial paradigm has been a major challenge to modern medicine.

In 1977, psychiatrist George Engel proposed a biopsychosocial model that included social and psychological variables as crucial determinants of disease and illness. According to his new framework, the subsystems of the body interact to produce successively more complex biologic systems, which are simultaneously affected by social and psychological factors. The organism is thus conceptualized in terms of complex interacting systems of biologic, psychological, and social forces, and neither disease nor illness is seen as understandable only in terms of smaller and smaller biologic components. Engel (1980) believed that systemic interactions of biopsychosocial factors were relevant to all disease processes and to the individual's experience of illness. Accordingly, understanding a person's response to a disease requires consideration of such interacting factors as the social and cultural environment, the individual's psychological resources, and the biochemistry and genetics of the disorder in the population (Brody, 1999).

In the following section, we present a number of conceptual models and perspectives that emphasize different but overlapping psychosocial dimensions that influence health (Table 3-1). These models can aid practicing physicians in thinking about their patients in psychosocial context and conceptualizing potentially helpful interventions. Subsequently, we elaborate on practical strategies for gathering and using psychosocial information in clinical practice and discuss a pragmatic approach to addressing psychosocial considerations in primary care. We conclude with brief discussions of evidence-based practice and how current challenges and trends in the health care system may affect the practice of family medicine.

Conceptual Models

THE BIOPSYCHOSOCIAL MODEL

As previously noted, the biopsychosocial model was proposed as a scientific paradigm by Engel (1977), who encouraged the clinician to observe biochemical and morphologic changes in relation to a patient's emotional patterns, life goals, attitudes toward illness, and social environment. Engel proposed that the brain and peripheral organs were linked in complex, mutually adjusting relationships, affected by changes in social as well as physical stimuli. Within this model, environmental and psychological stress is seen as potentially pathogenic for the individual. Emotions may serve as the organism's bridge between the meaning (or significance) of stressful events and the changes in physiologic function (Zegans, 1983). Engel urged physicians to evaluate the patient on biologic, psychological, and social factors to understand and manage clinical problems effectively (Wise, 1997). For example, a workplace accident could be seen as resulting from poorly designed equipment (social) and inattentiveness (psychological) brought about by low blood sugar (biologic). Similarly, the accident could result in damage to internal organs (biologic), distress (psychological), and lost income (social), any or all of which may become the focus of physician intervention.

Comprehensive evaluation of biopsychosocial dimensions would assess the following:

- Biologic factors, including genetics, medical history, and environmental factors that affect physiologic functioning (e.g., those causing cancer)
- Psychological factors, including affective, cognitive, and behavioral components, such as feelings, beliefs, expectations, personality, coping style, and health behaviors (e.g., exercise, diet, smoking) that contribute to patients' experience of health and illness
- Social factors, including access to health care, quality of available health care, social systems (e.g., family, school, work, church, government), social values, customs, and social support

Further discussion of biologic influences on health is beyond the scope of this chapter. Psychological and social factors known to affect health are discussed next.

Table 3-2 Five-Factor Model of Personality

1. Openness to experience: tendency to be curious and appreciative of a variety of experiences
2. Conscientiousness: proclivity to be self-disciplined, to plan, and to direct behavior toward achieving goals
3. Extraversion: preference for being around other people and to be enthusiastic and socially energetic
4. Agreeableness: inclination to be cooperative with others; strongly preferring harmony over disagreement
5. Neuroticism: propensity to experience negative emotions on an ongoing and regular basis

Psychological Factors

Numerous psychological factors affect health. We discuss here a common approach to personality, the five-factor model, and an essential psychological resource for healthy behavior, self-control. We also review key findings from the literature on the relationship between emotions and health.

The most prominent approach to personality at present is the five-factor model (Goldberg, 1993). The five broad personality domains of this model, for which OCEAN is an acronym, are openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism (Table 3-2). Research on the relationship of these factors to health

Table 3-3 Self-Control

Self-control is a limited resource, like a muscle. It can be replenished.
Self-control is used to:
- Regulate emotions
- Control thoughts
- Manage impulses
- Direct performance
- Make decisions

Self-control is replenished or strengthened through:
- Fuel (healthy food at regular intervals)
- Sleep
- Practice

People high in self-control tend to plan and adjust their schedules or environments to reduce demands on willpower (desired behaviors are more automatic, and temptations are minimized).

variables has generated several findings. Whereas conscientiousness has been associated with longevity among healthy individuals and better functional status in those with physical illnesses or impairments, neuroticism is consistently found to be negatively correlated with health (Bogg and Roberts, 2013; Goodwin and Friedman, 2006; Smith and Mackenzie, 2006). Agreeableness, extraversion, and openness to experience generally tend to have weaker associations with health.

Because personality style tends to be quite stable across the life span, physician focus on changing personality for health reasons is not a sensible pursuit. However, an understanding of a particular patient's personality can help guide the physician toward interventions that are more likely to be effective.

Because health behaviors are a major factor in the development of, management of, and morbidity from chronic illnesses, self-control or willpower is a critical psychological resource. Children with more self-control have been found to have better health as adults. Adults with more self-control have healthier behaviors. Research indicates that willpower operates like a muscle; it is a resource that people have in limited supply, and it can be exhausted (Baumeister and Tierney, 2011). Fortunately, it can also be replenished. Importantly, various demands for willpower draw from the same common resource. Willpower is used to control thoughts, regulate emotions, manage impulses (the task most commonly associated with willpower), and direct performance. Making decisions uses willpower. Numerous studies have demonstrated that tasks requiring willpower deplete the self-control resource, so that performance declines on subsequent tasks requiring willpower. Interestingly, when there are competing demands for the self-control resource, managing negative emotions predictably takes precedence over other demands. Given the multiple emotional and behavioral challenges associated with the management of chronic illness, a patient with excessive demands on the limited self-control resource is particularly vulnerable to worsening health. See Table 3-3 for a summary of key factors about self-control, including how it can be replenished.

The ongoing experience of chronic negative emotions (depression, anxiety, and anger) tends to be associated with poorer health. There is an extensive research literature linking negative affectivity and pessimism to adverse health outcomes (Peterson et al., 1988; Salovey et al., 2000). Although the experience of negative emotions is a natural part of the human experience, effective management of such emotions through cognitive strategies, active coping, and social support can be learned, and medications can be a helpful adjunct when negative emotional states are prolonged or severe.

Likewise, a large body of research indicates that positive emotional states are associated with better health and longevity. Happiness, optimism, and positive attitudes toward aging have been associated with 7 more years of life (Danner et al., 2001; Levy et al., 2002). Almost three decades of research have shown that an optimistic outlook has a positive effect on coping and on mental and physical health outcomes (Peterson and Steen, 2002). Family physicians have long recognized the importance of mobilizing and maintaining patient hopefulness through encouraging words that foster positive expectations of medical treatment. The demonstrated efficacy of placebos affirms the importance of this approach (Sobel, 1991).

Social Factors

A gradient between socioeconomic status (SES) and health is consistently found in epidemiologic studies (Marmot, 2004). Persons with less education and income tend to have poorer health than their better educated and richer counterparts. A recent analysis indicates that in the year 2000 in the United States, 245,000 deaths could be attributed to low education, 176,000 to racial segregation, 162,000 to low social support, and 133,000 to poverty (Galea et al., 2011). Interestingly, subjective SES (i.e., individuals' perceptions of where they view themselves on the social ladder) has an even stronger relationship to health than objective SES (Singh-Manoux et al., 2005). Negative affect, stress, pessimism, and a decreased sense of control are among the factors thought to contribute to the relationship between lower subjective SES and poorer health (Operario et al., 2004).

In general, social support reduces stress and contributes to more positive health outcomes. Social support refers to the process by which a social network provides psychological and material resources to enhance an individual's ability to cope with stress (Cohen, 2004). Both quantity and quality of support are important, and sources of support include spouses, lovers, friends, family, coworkers, and health care professionals. A person who has many friends but no confidant may have inadequate social support in a time of need. Some people report high levels of satisfaction with just a few close friends, but others require larger social networks.

There are several varieties of social support (Cohen, 2004). Emotional support involves the expression of caring, concern, and empathy toward the person and typically involves opportunities for the recipient to express emotions. Instrumental support involves providing some type of direct assistance, which might include financial resources, transportation, or help with daily tasks. Informational support involves giving advice or information relevant to an individual's situation.

Social support appears to undergird health by buffering the person against negative effects of stress, perhaps by affecting the cognitive appraisal of stress. When people

encounter a strong stressor, such as a major financial crisis, individuals with high levels of social support may appraise the situation as less stressful than will those with low levels of support. Social support may further buffer the stress by modifying people's response to a stressor as they turn to friends for advice, reassurance, or material aid. Social integration, or participating in a broad range of social relationships, benefits health and well-being by enhancing self-esteem and fostering positive health behaviors in people who believe that others count on them. Social integration is beneficial, whether or not an individual is experiencing stress (Cohen, 2004).

Relationships also can involve significant negative social exchange and be harmful to health; negative interactions in troubled marriages have adverse effects on cardiovascular, endocrine, and immune system function (Robles and Kiecolt-Glaser, 2003). Recent research has found specific links between negativity in relationships and cellular aging, such as shortening telomere length (Uchino et al., 2012).

Misconceptions

Polan (1993) identified and addressed two common misconceptions about the biopsychosocial model. First, contrary to popular belief, a physician who is "humanistic" is not necessarily practicing biopsychosocial medicine. A physician can be ethical and caring but still neglect scientific knowledge from the social and behavioral sciences and relevant data from the patient's life. For example, compassion by itself is of limited usefulness to a physician who needs an effective treatment plan for a patient with asthma who smokes. Interventions should be informed by knowledge of the social environment and the individual psychology of the patient.

The second misconception is that people can be reduced to distinct biologic, psychological, and social categories or that their problems can then be expressed as a set of scientific principles from which diagnosis and treatment can be neatly derived. In fact, use of the biopsychosocial model increases rather than decreases the level of complexity required to understand patient status, introducing multiple avenues for intervention. Interpreting the biopsychosocial model as a new opportunity for reductionist thinking diminishes its power to inform more holistic treatment. Borrell-Carrio and colleagues (2004) proposed a biopsychosocially oriented clinical practice based on self-awareness, active cultivation of trust, an emotional style characterized by empathic curiosity, self-calibration to reduce bias, cultivation of emotional sensitivity to assist with diagnosis and therapeutic relationships, use of informed intuition, and communication of clinical evidence to foster dialogue.

Another important misconception is that educating patients about important biologic, psychological, social, or environmental factors will necessarily change behavior. Much of human behavior is automatic, cued by environmental or situational factors. Health behaviors are frequently less a product of thoughtful choices than of nonconscious factors (Sheeran et al., 2013). Although intention and motivation affect adherence to treatment regimens and health behavior recommendations, multiple other factors (e.g., depletion of self-control, media and peer influences, physical environment) play important roles.

THE SYSTEMS APPROACH

Humans are infinitely complex. Adequately conceptualizing a person in health or illness requires a systems approach that encompasses this complexity. The concept of systems was first developed by von Bertalanffy (1968) to refer to the dynamic interrelationships of various components. A systems approach rejects the notion of linear causality in favor of multidimensional and multidirectional models.

The systems approach has strongly influenced conceptualizations of family functioning. Smilkstein (1978) developed one of the first applications of "family systems" thinking for family medicine. Physician attention is important in the systemic interactions of family members and the impact of crisis, coping styles, and resources on family functioning. He incorporated these components into the "family APGAR" (adaptation, partnership, growth, affection, and resolve), a simple instrument and mnemonic device for assessing the functioning of a family system in health and illness (not to be confused with the newborn Apgar score).

THE STRESS AND COPING MODEL

General relationships among life stresses, coping resources, and health outcomes are presented schematically in Figure 3-1. This approach represents another example of the application of a systems model. In this model, health outcomes are impacted by how life stresses affect the individual. The effect of stress is moderated by the individual's appraisal and coping responses, personality, and the person's available social resources. Although the complex synergistic interactions that characterize these relationships are beyond the scope of this chapter, the major variables provide a basis for considering physician interventions.

Definitions of Stress

Stress has been variously defined as an environmental event, a response to an event or circumstance, and a process. One approach defines stress in terms of life events—as a stimulus—circumstances or events that require the person to adapt produce feelings of tension. These stressors may be major catastrophic events (e.g., natural disaster), major life events (e.g., death of a loved one), or recurrent daily hassles (e.g., need to manage a chronic medical condition).

Stress can also be seen as a response. For example, a person with a social phobia feels stressed at a party, experiencing a psychological state of nervousness with associated physical symptoms of dry mouth, palpitations, and sweating. This physiologic and psychological response to a stressor is often called *strain*.

A third approach emphasizes stress as a process in which "environmental demands tax or exceed the adaptive capacity of an organism, resulting in psychological and biologic changes that may place persons at risk for disease" (Cohen et al., 1995). Within this approach, stress includes stressors and strains along with the relationship between the person and the environment. The process involves transactions between the person and the environment, with each affecting and being affected by the other (Sarafino, 1990). "Adaptive capacity" is operationalized in terms of resilience and vulnerability; within this model, the physician considers aspects of a person's psychological makeup

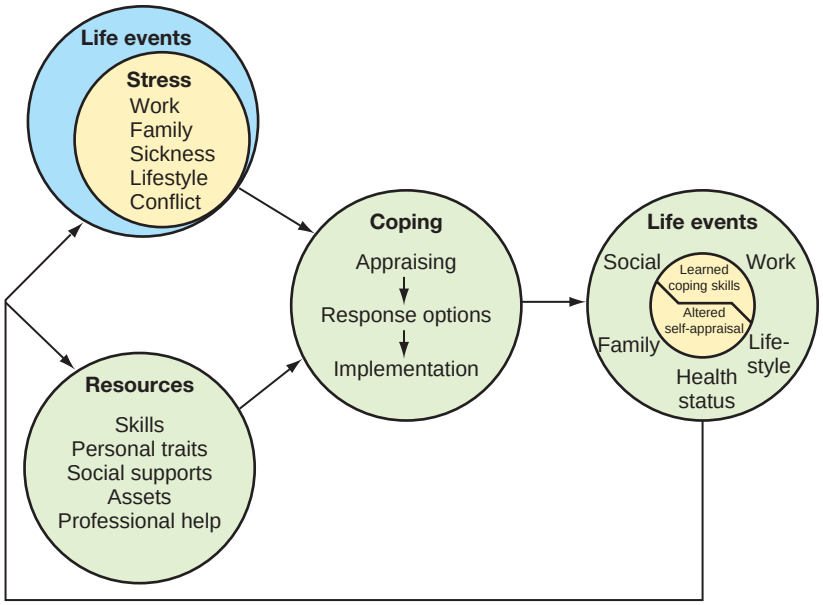

Figure 3-1 Stress, life events, and coping. (From Tunks E, Bellissimo A. *Behavioral Medicine: Concepts and Procedures*. Boston, Pergamon Press. Copyright 1991 Permagon Press.)

and social world that may render the patient more susceptible or more resilient (Steptoe, 1998).

Stress Appraisal and Coping

Every family physician sees patients under stress who present with a wide spectrum of stress-related symptoms and coping responses. How the individual interprets and copes with stress are as significant as the stressor itself. Cognitive appraisal of a stressor, rather than severity or duration alone, determines physiologic and behavioral responses (Epel et al., 1998).

Coping refers to how individuals manage the real or imagined discrepancy between environmental demands and their resources for addressing the stressful situation. According to Lazarus and Folkman (1984), adaptation to stress is mediated by appraisal (i.e., personal meaning of a stressor and one's sense of resources for dealing with it) and coping (i.e., thoughts and behaviors used to manage stress). Whereas with emotion-focused coping, a person directs energy to regulating internal feeling states, with problem-focused coping, a person directs attention to reducing the stressor or expanding resources for dealing with it (Sarafino, 1990). The effect of stressful life events on health is determined by many factors related to coping, including cognitive style, personality characteristics, and social and behavioral tendencies.

Personal Control

An individual's perception of the extent of his or her control in a stressful circumstance is a critical component of the appraisal process in coping. This includes control over the stressor as well as control over one's responses, whether problem-focused or emotion-focused. How a person deals with the loss of control precipitated by stressful life events can affect health outcomes.

Personal control can be defined as the feeling that one can make decisions and take effective action to produce desirable outcomes and avoid undesirable ones (Rodin, 1986). Mobilizing a strong sense of personal control can significantly reduce the impact of stressors on the individual, particularly when the response is appropriate to the circumstance. Sarafino (1990) classified personal control into the following five types:

1. Behavioral control involves the ability to take concrete action to reduce the impact of a stressor. For example, using a special breathing technique may help reduce pain.
2. Cognitive control involves the ability to use thought processes or strategies to modify the impact of a stressor. For example, focusing on a pleasant thought during suturing of a laceration may decrease the pain sensation.
3. Decisional control involves the opportunity to choose among alternative procedures or courses of action. For example, a victim of domestic violence may benefit from considering various options for when and how she will leave her abuser.
4. Informational control involves the opportunity to obtain knowledge about a stressful event, what will happen, why, and what consequences are likely. For example, a patient may feel less anxious about upcoming surgery upon learning more about managing discomfort from the procedure.
5. Retrospective control involves beliefs about causation of a stressful event after it has occurred. The attribution that the person makes about the adversity can affect future perspective and behavior. For example, attributing misfortune to factors that are temporary and specific leaves an individual feeling more optimistic than when misfortune is attributed to stable and global factors (Seligman, 1990).

Life stresses affect health outcomes. These effects are moderated not only by individual differences in genetics and pathophysiology but also by psychosocial factors. Psychosocial influences include appraisal and coping, personality traits, cognitive style, and such resources as social support.

THE LIFE SPAN PERSPECTIVE

The life span perspective emphasizes the importance of an individual's place on his or her personal developmental trajectory. Past development, current status, and anticipated developmental changes and challenges are taken into account. On the biologic level, changes in cellular functions occur from infancy through old age; decline in physical stamina is one manifestation of this dynamic change. On the psychological level, personality interacts with ongoing changes that occur across the life span (e.g., becoming a parent), and each developmental stage brings its own psychosocial challenges. Erikson's eight stages of development highlight the importance of trust issues in infancy, autonomy issues in early childhood, and issues of generativity and meaning in old age (Erickson, 1959). On the social level, family and peer relationships change throughout life, with significant implications for health, which may be either positive or negative. For example, the typical adolescent's shift toward greater reliance on peer relationships may lead to behaviors that endanger health, such as smoking or substance abuse. The death of a husband who has been physically abusive may lead to improved well-being for the surviving wife. The primary care physician needs to keep the life span model in mind and assist patients in addressing psychosocial factors that facilitate or block health and development.

THE ETHNOMEDICAL CULTURAL MODEL

Every encounter between a patient and a physician is a cross-cultural transaction. Each person brings to the physician–patient relationship a unique mix of culturally embedded attitudes, knowledge, and beliefs. Ethnicity, gender, religion, language, education, and personal history shape expectations and behavior on both sides of the relationship. A physician's cultural proficiency is instrumental in establishing rapport and gathering information for accurate and comprehensive diagnosis and treatment (Carrillo et al., 1999). The patient's acculturation status and cultural background are important to understand, and physicians should become familiar with the dominant cultural groups they serve.

The ethnomedical cultural model emphasizes cultural concepts relevant to health and illness (Kleinman et al., 1978), including patient beliefs and expectations about the body, illness, and treatment. Berlin and Fowkes (1983) operationalize this model in clinical encounters with their LEARN acronym, exhorting physicians to do the following:

- Listen with empathy a nd understanding to the patient's perception of the problem by eliciting the patient's explanatory model for the illness.
- Explain your perceptions or explanatory model in language the patient can understand.
- Acknowledge the differences and similarities between your explanatory model and that of the patient and discuss any significant discrepancies.
- Recommend treatment that you decide is optimal within your explanatory model.
- Negotiate treatment with the patient, seeking a compromise that is acceptable to the patient, is consistent with your ethical standards, and uses the patient's social network when necessary.

The ethnomedical cultural model highlights cross-cultural elements in all physician–patient interactions.

Integration of Psychosocial Issues in Clinical Practice

Wynne (2003) states, "In the 'real' world of health care, systems thinking is more needed than ever before, but its increased complexity challenges both clinicians and researchers to the depths of their resources." Knowledge, attitudes, beliefs, emotions, behaviors, relationships, and social/environmental factors interact to affect the experience of illness or well-being. Accordingly, physicians' ability to promote health and relieve suffering depends on their ability to engage effectively in this complex web of interrelationships. This is a daunting task that depends on fostering a quality relationship over time, gathering sufficient biopsychosocial data about each patient, and integrating data with theoretic understanding to inform interventions.

The challenge for even the most astute physician is to assess and address psychosocially important issues within the limited time available for each patient. In a 10- to 15-minute period, a detailed evaluation of all relevant psychosocial factors is an impractical goal. Using a pragmatic approach that balances this goal with time constraints, a physician can maintain awareness of psychosocial cues and information in all patient encounters while restricting direct inquiry, depending on the specific situation. A physician may not need to elicit a detailed psychosocial assessment with every patient who presents with an upper respiratory infection, but knowing if the patient smokes would be useful, leading to further inquiry and potential smoking intervention.

Following pragmatic considerations, a physician should work collaboratively with patients to identify problems of highest priority and to address less pressing issues in subsequent encounters. For example, in the case of domestic violence, immediate needs for patient safety must be addressed. Addressing long-standing issues, such as dysfunctional means of coping with stress, must be a secondary concern in the face of the primary need to achieve safety. Similarly, every physician learns to place high priority on patient complaints of chest pain, adjusting questioning depending on the patient's age, gender, family history of coronary heart disease, and patient medical history. Nevertheless, the physician must look for psychosocial clues, evaluate stressors, and be aware of factors that suggest an anxiety or somatization disorder. These secondary factors can be addressed in more depth when the physician is assured that a cardiac crisis is not imminent.

COLLECTION OF PSYCHOSOCIAL DATA

In family practice settings, the most common and natural approach to gathering psychosocial data is interviewing the patient over time. Freud suggested that the major

achievements of healthy development were the abilities "to work and to love," and this is often a good place to start. Where does this patient work, and how does he or she feel about the job, school, or household responsibilities? Who is "family" for this patient, and what is the nature of the support system? Detailed inquiries about work and love made in the context of the ongoing physician–patient relationship result in significant accretion of knowledge over time and make it easy to flag stressful changes in these important arenas.

Other important areas of inquiry include the patient's physical and social environment. Factors such as the quality of housing, neighborhood, food, and financial resources all affect patient safety, health care use, family stress, and physical health. Understanding the ethnic, religious, and political culture of a patient and family is important for guiding culturally appropriate care. Personal and family history, usually gathered gradually over time, can alert the physician to important family coping patterns, strengths, and liabilities. Of special importance is information on major personal family "dislocations," including losses, illness, and trauma. Knowledge of any traumatic encounters with previous health professionals or with previous medical procedures may help the physician anticipate and manage potential crisis situations.

Information from patient dialogue can be supplemented by standard measures such as health questionnaires (e.g., Short Form 36); screening inventories (e.g., Beck Depression Inventory); and stress, coping, and social support tools. Other means of gathering relevant data include informal interviews with family members, structured assessments (e.g., family APGAR), review of existing records (e.g., school records), consultation with nonmedical colleagues (e.g., psychologist, occupational therapist), observation of the patient's environment through home visits, and consultation with cultural informants and translators. Perhaps most important is the ongoing use of open-ended questions, so that important psychosocial data are elicited from the patient in the patient's own words.

INTERVENTIONS USING PSYCHOSOCIAL DATA

A comprehensive review of interventions addressing psychosocial influences in health is beyond the scope of this chapter and would require discussions of clinical psychology, social work, nursing, occupational therapy, and public health. Even in optimal circumstances, competency can be achieved only within a limited range. Realistically, family physicians should pursue basic proficiency in selected interventional strategies and additional training in areas of interest relevant to their specific practice needs and the population they serve. Here we discuss pragmatic interventions for practicing physicians based on the general model of stress, life events, coping, and health discussed earlier.

Because health outcomes are affected by stressful life events, coping (e.g., stress appraisal), and resources (e.g., personality, social support), addressing any of these dimensions can have a positive effect on functioning. As stress increases relative to available support and coping capacities, disequilibrium results. Put simply, interventions that decrease stress or enhance support tend to improve well-being. Physician attention to factors that exacerbate or mitigate is always valuable. For example, because a new medical diagnosis is stressful but a loving partnership is a source of support, assuring the presence of a loving family member when bad news is to be shared with a patient may lessen its negative impact. Some life events, such as the death of a supportive partner, affect several elements in the model, as the bereaved partner confronts a major loss (stress) without the person who had previously offered comfort in such times (decreased support). Not surprisingly, persons who are grieving are at higher risk for experiencing health problems (Rogers and Reich, 1988), and a focus on their support systems and coping strategies is almost always warranted.

Interventions that should be part of the standard repertoire for family physicians are those that do no harm, usually help, and use traditional skills. Specifically, physicians can work with patients directly to reduce stress, to enhance or mobilize social support resources, and to reinforce or model positive stress appraisal and coping. Direct approaches to stress reduction may include intervening in the patient's environment (e.g., arranging respite care for an older patient to relieve stress on his middle-aged daughter) and allaying a patient's unrealistic fears about an illness. Social support can be enhanced directly through the provision of more contact with the physician or indirectly through mobilizing the patient to increase contact with family or friends. Physicians can support positive coping through instilling hope, modeling optimism, and encouraging patients who adapt. Reminding patients of personal strengths previously used to confront crises is also helpful. The physician often can implement these strategies by asking questions that allow the patient to respond in a broader perspective (e.g., "What do you remember doing to help you cope with the death of your good friend several years ago?"). Especially when behavior change is indicated, collaborating in discussing options rather than giving advice is more likely to be effective. One collaborative approach that has demonstrated efficacy is motivational interviewing (Rollnick et al., 2008; Rubac et al., 2005).

In the provision of care within a biopsychosocial model, interdisciplinary teams, rather than solo practitioners, have the advantage, and physicians can have more positive impact on their patients' lives when they harness the wisdom of colleagues from other fields through referral or consultation. Depending on physician training, interest, and time, these basic categories of intervention can be supplemented by a wide range of psychosocial interventions, from family therapy to behavior modification.

IMPORTANT TIMES FOR PSYCHOSOCIAL INTERVENTIONS

Interventions that attend to psychosocial issues are especially important at specific times in the provision of family medical care. Natural transitions in the family life cycle, such as the birth of a child or the death of a spouse, call on the physician to provide empathic support, assess the patient's support system, normalize emotional reactions, and provide anticipatory guidance as patients confront changing family roles and functioning.

When adherence or lifestyle issues impinge on health, interventions that focus on biologic mechanisms alone are

likely to be ineffective. The health effects of substance abuse, domestic violence, poverty, or inactivity are often best addressed through attention to social environment and psychological concerns.

A dramatic change in patient symptoms also indicates consideration of psychosocial factors. A psychosocial crisis can provoke an exacerbation of a chronic condition (e.g., rheumatoid arthritis), a new manifestation of illness (e.g., myocardial infarction), or emotional-psychiatric symptoms (e.g., anxiety, trouble sleeping) best treated through stress reduction and symptomatic care.

A significant medical diagnosis may precipitate emotional distress or psychosocial upheaval and requires physician attention to the context of the patient's life. Effective physician intervention may involve anticipating the nature of the potential family crisis, including family members in discussions with the patient, and addressing family needs for support. Timely provision of accurate information can enhance a patient's sense of control. Direct support by the physician during the initial adjustment phase can minimize more serious emotional disruption.

Patients living with chronic illness require sensitive psychosocial care. Managing a chronic health problem challenges a person's ability to adhere to medical recommendations and to cope with other life stressors. Patients often cope in highly idiosyncratic ways. Pollin (1995) identified eight emotionally charged issues that patients with chronic illnesses inevitably confront: control, self-image, dependency, stigma, abandonment, anger, isolation, and death. These issues can often be effectively addressed within the physician–patient relationship and through judicious referral to support groups for chronically ill patients. As elaborated by Pollin, each issue can be met by an appropriate and helpful professional stance. In response to control issues, for example, professionals should help patients express their feelings of loss of control and identify areas where they may feel powerless. Normalizing the patient's feelings and fears is the first step in helping address control issues. The goal of intervening in regard to the issue of loss of control is to reinforce the patient's confidence in being able to cope with the demands of the medical condition.

Evidence-Based Practice

Increasingly, high-quality data are available that support the therapeutic efficiency of a variety of general and specific behavioral interventions relevant to primary care practice (Trask et al., 2002). A systematic review by Di Blasi and colleagues (2002) on the consequences of nonspecific effects of the physician–patient relationship found that providing information and emotional support contributed to recovery or improvement from physical illness. Because coping with stress and managing chronic illness often involve behavior change, physicians may use "motivational interviewing" approaches to assist these patients (Rollnick et al., 2008).

Much research demonstrates the efficacy of psychosocial interventions in diseases that have been historically viewed as purely medical, including cancer (Anderson et al., 2007; Edwards et al., 2008; Rehse and Pukrop, 2003; Spiegel et al., 1989) and diabetes (Bogner et al., 2007), and the efficacy of behavioral interventions such as exercise for cardiovascular disease (Taylor et al., 2004). Online resources are available to search for study results (see Web Resources at end of chapter).

Given the time constraints primary care physicians face and the expertise required to use behavioral interventions effectively, the physician should know behavioral health providers in the community and refer to them promptly and often. The evidence base for effective behavioral interventions in numerous psychiatric and psychosocial problems, as well as medical problems, continues to expand (e.g., mood and anxiety disorders, trauma victims). Highly effective treatments are underused when physicians underrefer to mental health professionals with specialized training and overrely on the use of psychotropic medicines alone. Unfortunately, even when guidelines are available that physicians could follow themselves, resistance to change impedes their implementation (Torrey et al., 2001).

KEY TREATMENT

- Providing information and emotional support contributes to the improvement and recovery from physical illness (SOR: A; Di Blasi et al., 2002).
- Negative emotions such as anger, anxiety, and depression are associated with poor health (SOR: B; Salovey et al., 2000).
- Positive emotions such as happiness, optimism, and a positive attitude have been shown to add 7 years to life (SOR: B; Danner et al., 2001; Levy et al., 2002).
- "Motivational interviewing" outperforms advice-giving in addressing a broad range of behavioral problems (SOR: A; Rubac et al., 2005).
- Exercise-based rehabilitation for patients with cardiovascular disease is associated with reduced cardiovascular- and all-cause mortality (SOR: A; Taylor et al., 2004).
- Treating depression in older patients with diabetes reduces mortality (SOR: A; Bogner et al., 2007).

The Patient-Centered Medical Home

Health care spending currently represents approximately 18% of the U.S. gross domestic product and is projected to surpass 20% within a decade (Sisko et al., 2009). There is ongoing concern about the number of uninsured and underinsured persons, although new legislation to expand insurance coverage took effect in 2014.

Numerous perspectives exist on how the health care system needs to change, but a consensus is emerging that focuses on the importance of primary care medicine and on managing chronic disease in the context of a high-quality physician–patient relationship (Bein, 2009). This consensus reflects the accumulating evidence that higher quality health care at lower cost is achieved when primary care is emphasized (Starfield et al., 2005).

The concept of the patient-centered medical home (PCMH) embodies this emerging emphasis. As discussed in Chapter 2, the numerous components of a PCMH (or "health home") include the use of an electronic health

record, better access and scheduling processes, use of evidence-based medicine, more point-of-care services (e.g., multidisciplinary teams, group visits), and ongoing emphasis on quality improvement. Some argue that incremental change in this regard is insufficient and that transformation of practices is necessary (Nutting et al., 2009). Such transformation would include a broad, population-based approach to preventive services and chronic care beyond a "single patient at a time" approach. However, even within such a model, services would need to be individualized based on the patient's goals and unique situation, including attention to the psychosocial factors that affect chronic disease prevention and management.

These trends represent an opportunity for family medicine to take a leadership role in health care reform, with an emphasis on psychosocial aspects. The PCMH philosophy is consistent with family medicine's long-standing emphasis on whole-person care in the context of a high-quality physician–patient relationship. Ideally, the family physician in a PCMH will address the psychosocial needs of patients in collaboration with ancillary providers as needed.

Conclusion

To practice in a way that sensitively integrates psychosocial concerns, a physician needs to have a solid knowledge base in the social and behavioral sciences (Cuff and Vanselow, 2004). This general knowledge base complements specific knowledge of self, patients, practice, and community. Self-knowledge entails an honest assessment of the physician's knowledge base, skills, and attitudes relevant to comprehensive care. Acknowledging limitations in dealing with psychosocial issues in primary care is vital and can serve as an impetus for further training and the development of collaborative relationships with other professionals. A responsible physician feigns neither knowledge nor empathy but relies on an interdisciplinary network of professional and community resources to complement personal limitations.

As Osler (1904) emphasized, knowing what kind of person has a disease is as important as knowing the disease. Knowledge of each patient is requisite to the provision of sensitive psychosocial care, with attention to life stresses, coping, personality, and social resources. Furthermore, the physician needs to know details about the population he or she serves, including demographic, socioeconomic, cultural, and epidemiologic dimensions. Addressing psychosocial issues in a practice that serves an ethnically diverse, indigent population presents different challenges than addressing the needs of an affluent population from a familiar ethnic and cultural background. Understanding the practice also entails knowing the health care economics and current systems of care, which inevitably introduce challenges to comprehensive care.

References

The complete reference list is available online at www.expertconsult.com.

Web Resources

www.aafp.org/pcmh This resource from the American Academy of Family Physicians provides ready access to information about the patient-centered medical home movement.

www.cdc.gov Centers for Disease Control and Prevention. Information related to the protection of health and enhancement of quality of life.

www.cfah.org/hbns Health Behavior News Service. Disseminates the results of peer-reviewed research in the broad area of behavior and health.

www.motivationalinterview.org This website offers extensive resources on the topic of motivational interviewing.

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4 Care of the Elderly Patient

MELISSA STILES and KATHLEEN WALSH

CHAPTER OUTLINE

Family physicians are responsible for the care of increasing numbers of elderly patients and their unique and complex primary care needs. Older patients often have comorbidities; "polypharmacy"; and psychological, social, and functional impairments. These can lead to variability in presentation of health problems and make diagnosis and treatment challenging for the family physician.

This chapter discusses common geriatric syndromes and outlines a process by which family physicians can effectively and efficiently care for elderly patients. The main goal is to assist elderly persons to maintain function and quality of life with self-respect, preserving their lifestyle as much as possible. The chapter addresses functional assessment, falls, elder abuse, pressure ulcers, rational drug prescribing, and incontinence; geriatric conditions such as dementia, delirium, and depression are discussed in other chapters.

Geriatric Assessment

Key Points

- A comprehensive geriatric assessment includes a systematic approach assessing medical, functional, psychological, and social domains.
- A medication review is an essential component of a geriatric assessment.
- A multidisciplinary approach is used to identify intervention and management strategies.
- A questionnaire targeted to the geriatric assessment domains will expedite the patient visit.
- The goals of the geriatric assessment are to maintain function and preserve quality of life.

Longer life spans and aging "baby boomers" will double the population of Americans age 65 years and older over the next 25 years. The dramatic increase in life expectancy in the United States is the result of improved medical care and prevention efforts. In 2006, persons 65 years or older numbered 37.3 million and represented 12.4% of the U.S. population, about one in every eight Americans. The population 65 years of age and older increased from 35 million in 2000 to about 40 million in 2010, a 15% increase, and will increase to 55 million in 2020, a 36% increase for that decade. According to the Centers for Disease Control and Prevention (CDC, 2007), by 2030 there will be about 71.5 million older persons, more than twice their number in 2000 and about 20% of the U.S. population (Table 4-1).

There has been a significant shift in the leading causes of death for all groups from infectious disease and acute illnesses to chronic diseases and degenerative illnesses. Of the elderly population, approximately 8% experience severe cognitive impairment, 20% have chronic disabilities and vision problems, and 33% have restrictions in mobility and hearing loss (Freedman et al., 2002). There are also the predictable age-related structural and physiologic changes that occur with aging. External factors such as diet, occupation, social support, and access to health care can significantly influence the extent and speed of the physiologic decline (Sarma and Peddigrew, 2008; Tourlouki et al., 2009).

America's aging population is also marked by a more racially and ethnically diverse group of individuals. Simultaneously, the health status of racial and ethnic minorities lags far behind that of nonminority populations. The burden of many chronic diseases and conditions, such as hypertension, diabetes, and cancer, varies widely by race and ethnicity. Data from the 1997 to 2009 National Health Interview Survey (NHIS) indicated that 70.2% of non-Hispanic white adults aged 65 years or older reported very good or excellent health compared with 57% of non-Hispanic blacks and 58.8% of Hispanics (CDC, 2009).

There is a strong economic incentive for action. The cost of providing health care for an older American is three to five times greater than the cost for someone younger than 65 years of age. As a result, by 2030, the nation's health care spending is projected to increase by 25% because of these demographic shifts (CDC, 2009).

A comprehensive geriatric assessment is a systematic approach to the collection of patient data. The approach varies greatly, from single-physician evaluation with referral as needed to full teams of professionals evaluating all patients. The geriatric assessment can assist in developing an individualized approach to each patient (Table 4-2). It is imperative to recognize the unique "blueprint" of what characterizes each elderly patient, including age, ethnicity, education, religious or spiritual beliefs, traditions, diet, interests and hobbies, daily routines, medical illness and

Table 4-1 Population by Age and Gender, 2010*

Age	Both Sexes		Male	Female
	Number	Percent	Number	Number
All ages	310, 233	100.0	152,753	157,459
55-59 years	19,517	6.3	9,450	10,067
60-64 years	16,758	5.4	8,024	8,733
65-69 years	12,261	4.0	5,747	6,514
70-74 years	9,202	3.0	4,191	5,011
75-79 years	7,282	2.5	3,159	4,123
80-84 years	5,733	1.8	2,302	3,431
85 years and older	5,751	1.9	1,893	3,859

*Numbers in thousands.
Data from U.S. Census Bureau. *2010 Statistics.* http://www.census.gov/compendia/statab/2012/tables/12s0009.pdf.

Table 4-2 Goals of Geriatric Assessment

1. Focus on preventive medicine rather than acute medicine.
2. Focus on improving or maintaining functional ability and not necessarily a "cure."
3. Provide a long-term solution for "difficult to manage" patients with multiple physicians, recurrent emergency department visits, and hospital admissions with poor follow-up.
4. Aid in the diagnosis of health-related problems.
5. Develop plans for treatment and follow-up care.
6. Establish plans for coordination of care.
7. Determine the need and site of long-term care as appropriate.
8. Determine optimal use of health care resources.
9. Prevent readmission into the hospital.

disabilities, language barriers, functional status, marital status, sexual orientation, family and social support, occupation, life experiences, and socioeconomic position.

The geriatric assessment can be divided into four categories: medical, functional, psychological, and social. Within each of these categories are a number of approaches, including use of office-based instruments that can aid in the collection of information and streamline the plan of care.

MEDICAL ASSESSMENT

The medical assessment includes a review of the patient's medical record, medication history (past and present), and a nutritional evaluation. On average, elderly patients have four to six diagnosable disorders, which may require the use of several medications. One disorder can affect another, and in turn a collective deterioration of both can lead to overall poor outcomes. Review of the patient's medical record should focus on conditions that are more common in elderly adults (geriatric syndromes) and in particular their risk factors.

Four shared risk factors—older age, baseline cognitive impairment, baseline functional impairment, and impaired mobility—have been identified within the five most common geriatric syndromes: pressure ulcers, incontinence, falls, functional decline, and delirium (Inouye et al., 2007). It is important that health care providers familiarize themselves with the common geriatric body area or system disorders that can directly influence these risk factors. Understanding the basic mechanisms involved in geriatric syndromes is essential to targeting therapeutic options.

During the medical assessment, the review of systems should be completed with special emphasis on sensory impairment, dentition, mood, memory, urinary symptoms, falls, nutrition, and pain. However, the U.S. Preventive Services Task Force (2013) recommends routine screening for visual and hearing impairment in older adults.

Hearing loss is the third most prevalent chronic condition in elderly people, after hypertension and arthritis, and its prevalence and severity increase with age. In persons age 65 to 75 years, the prevalence of hearing loss ranges from 20% to 40% (Cruikshanks et al., 1998; Rahko et al., 1985; Reuben et al., 1998), but in those older than age 75, it ranges from 40% to 66% (Ciurlia-Guy et al., 1993; Parving et al., 1997).

Screening for hearing loss can be accomplished using two office-based methods: the audioscope (objective) and a validated short questionnaire (subjective) (Ventry, 1982). The audioscope is a handheld instrument that functions as an otoscope and audiometer and can be used to visualize the ear canal and eardrum and remove cerumen if necessary. The audioscope is easy to use, with 87% to 96% sensitivity and 70% to 90% specificity (Abyad, 1997; Mulrow and Lichtenstein, 1991). The Hearing Handicap Inventory for the Elderly—Short Version (HHIE-S) is a subjective, 10-item, 5-minute questionnaire with an overall accuracy of 75% in identifying hearing loss (Mulrow et al., 1990).

A formal audiologic evaluation should be offered to any patient who fails a hearing screening. The evaluation can assist in determining the need for further testing or management, including hearing aid, medical treatment, or surgical intervention.

Review of the patient's current medication list, including over-the-counter (OTC) medications, as well as any drug allergies or previous adverse drug reactions (ADRs), is a necessary component of the geriatric assessment. ADRs (also called adverse drug events [ADEs]) are a significant public health issue, especially in the elderly population (Thomsen et al., 2007). Polypharmacy is defined as taking more than four medications and is an independent risk factor for both delirium and falls (Inouye, 2000; Moylan and Binder, 2007).

Patients or family members should be asked to bring in all the patient's prescription medications and supplements at the initial visit and periodically thereafter. Clinicians can make sure patients have the prescribed drugs, but possession of these drugs does not guarantee adherence. Patients should be asked to demonstrate their ability to read labels (often printed in small type), open containers (especially the child-resistant type), and recognize their medications. Pill boxes may be helpful in organizing the patient's medications by the week or month.

Nutritional evaluation is an integral part of the geriatric assessment. The type, quantity, and frequency of food eaten should be determined. Malnutrition and undernutrition can lead to health problems, including delayed healing and longer hospital stays. A reliable marker of nutritional problems is weight loss, specifically, more than 5% in the past month and 10% or greater in the last 6 months (Huffman, 2002). Clinicians should ask about any special diets (e.g., low carbohydrate, vegetarian, low salt) or self-prescribed "fad" diets. A nutritional screen can aid in further assessment of the patient's nutritional health and help guide

Directions: Read the statements below. Circle the number in the YES column if it applies to you or the person you are completing the questionnaire for. Add the circled numbers for the total.

	YES
I have an illness or condition that made me change the kind or amount of food I eat.	2
I eat fewer than two meals per day.	3
I eat few fruits or vegetables or milk products.	2
I have three or more drinks of beer, liquor, or wine almost every day.	2
I have tooth or mouth problems that make it hard for me to eat.	2
I don't always have enough money to buy the food I need.	4
I eat alone most of the time.	1
I take three or more different prescribed or over-the-counter drugs a day.	1
Without wanting to, I have lost or gained 10 lb in the last 6 months.	2
I am not always physically able to shop, cook, or feed myself.	2
TOTAL	

Total	
0–2	Good! Recheck your nutritional score in 6 months.
3–5	You are at moderate nutritional risk. See what can be done to improve your eating habits and lifestyle. Your office on aging, senior nutrition program, senior citizens center, or health department can help. Recheck your nutritional score in three months.
6 or more	You are at high nutritional risk. Bring this checklist next time you see your doctor, dietitian, or other qualified health or service professional. Talk with them about any problems you may have. Ask for help to improve your nutritional health.

Figure 4-1 Nutrition questionnaires such as this (Determine Your Nutritional Health) can help in the assessment of the elderly patient's nutritional health. (Courtesy Nutrition Screening Initiative, Washington, DC, 2007. The Nutrition Screening Initiative is funded in part by a grant from Ross Products Division of Abbott Laboratories, Inc.)

interventions (Figure 4-1). Additional questioning should include weight loss and change of fit in clothing, amount of money spent on food, and accessibility of grocers with a variety of fresh foods.

The ability to chew and swallow should also be evaluated. It may be impaired by xerostomia (dryness of mouth), which is common in elderly persons. Decreased taste or smell may reduce the pleasure of eating, so patients may eat less. Patients with decreased vision, arthritis, immobility, or tremors may have difficulty preparing meals and may injure or burn themselves when cooking. Patients worried about urinary incontinence may reduce their fluid intake and thus may eat less food.

FUNCTIONAL ASSESSMENT

A primary goal of the geriatric assessment is to identify interventions to help patients maintain function and stay at home in independent living situations. The functional assessment focuses on activities of daily living (ADLs) and risk screening for falls. The basic ADLs include eating, dressing, bathing, transferring, and toileting. The instrumental ADLs (IADLs) consist of shopping, managing money, driving, using the telephone, housekeeping, laundry, meal preparation, and managing medications (Katz, 1983). Home health and social services referral should be considered for patients who have difficulty with the ADLs. A simple method of screening patients for gait and mobility problems is to ask, "Have you fallen all the way to the ground in the past 12 months?" A positive screen should lead to a more thorough evaluation and consideration of a physical therapy referral (Ganz et al., 2007) (see "Falls Assessment" later in this chapter).

PSYCHOLOGICAL ASSESSMENT

The psychological assessment screens for cognitive impairment and depression, two conditions that significantly impact both the patient and the family. The most studied test to screen for cognition is the Mini-Mental State Examination, which is best for identifying patients with moderate or severe dementia. Depression can be readily screened with shorter versions of the original 30-item Yesavage Geriatric Depression Scale (GDS) (Yesavage et al., 1983). The five-item version of the GDS asks the following:

1. Are you basically satisfied with your life?
2. Do you often feel bored?
3. Do you often feel helpless?
4. Do you prefer to stay home rather than going out and doing new things?
5. Do you feel pretty worthless the way you are now?

A score of greater than two positive answers is positive (97% sensitivity, 85% specificity) (Rinalde et al., 2003). The Yale Depression Screen ("Do you often feel sad or

depressed?") is a validated one-item GDS screening tool (Mahoney et al., 1994).

SOCIAL ASSESSMENT

It is important to assess the patient's living situation and social support when performing a geriatric assessment. The living situation should be evaluated for potential hazards, especially if the patient is identified as being at risk of falling. The social assessment also includes questions about financial stressors and caregiver concerns. Advance planning is a key component of the assessment and includes clarifying the patient's values and setting goals for care in case of future incapacity, including identifying the patient's "power of attorney" for health care.

SUMMARY

A geriatric assessment can identify frequent problems, thus leading to earlier interventions for the common medical and social concerns of the elderly population. It is important to remember, however, that patients may underreport medical problems because they worry about losing their independence. Patients may also be reluctant to repeat their health concerns to their primary care physician because they fear being perceived as having an emotional or psychiatric illness. Often, older patients rationalize their symptoms as being a "normal" component of aging.

The key to a successful geriatric assessment is to establish trust and effective communication between the patient and the physician. Allotting for adequate time during appointments and, if needed, scheduling frequent office visits are essential to the gathering of information. Inquiring about recent socioeconomic changes, functional losses, or life transitions is also important. The physician should obtain the patient's medical records before the first visit. A questionnaire targeted to the geriatric assessment domains should be completed by the patient, with family assistance if needed (Figure 4-2). Language, education, social support, economic status, and cultural and ethnic factors play a vital role in the patient's health care outcome. A multidisciplinary approach is used in interventions and management. Preserving function and maintaining quality of life are the primary goals of the geriatric assessment (Miller et al., 2000).

Falls

Key Points

- Falls result in significant morbidity, mortality, and functional decline.
- Patients should be asked about their history of falls and balance issues.
- Medication review is a key component of falls assessment.
- Multifactorial interventions can reduce the rate of falls.
- Exercise programs that focus on strength and balance training are most effective in preventing falls.

EPIDEMIOLOGY

Falls result in significant morbidity and mortality as well as an increased rate of nursing home placement. Each year, approximately 30% of persons older than age 65 years fall at least once, and the incidence increases with age. Up to 10% of falls result in serious injury. Falls are the leading cause of injury-related deaths in people older than 65 years (CDC, 2013). In the United States, hip fractures currently account for more than 300,000 hospitalizations, with a 1-year mortality rate of up to 33% (Sattin, 1992; Tinetti et al., 1988). By 2050, it is estimated that the worldwide number of hip fractures will rise to 6.26 million. Direct medical costs related to falls in adults age 65 years of age or older exceeded $19 billion in 2000 (Stevens et al., 2006).

Falls also cause functional limitations by both direct injury and indirect psychological consequences. Postfall anxiety leads to loss of self-confidence in ambulation and self-imposed limitations in activity. Postfall anxiety syndrome can also result in depression, social isolation, and increased risk of falls from deconditioning. Because the cause of falls is often multifactorial, the assessment and interventions target several areas (Nevitt et al., 1989).

RISK FACTORS

The multiple risk factors for falling can be categorized as intrinsic or extrinsic. Intrinsic risk factors include age-related physiologic changes and diseases that affect the risk of falling (Table 4-3). Extrinsic risk factors include medications and environmental obstacles. The risk of falling increases significantly in people with multiple risk factors. A prospective study found that 19% of older patients with one risk factor have a fall in a given year compared with 60% of older patients with three risk factors (Tinetti et al., 1988).

Taking four or more prescription drugs is itself a risk factor for falling. Also, several medication classes have a higher potential to cause falls, including tricyclic antidepressants, neuroleptic agents, serotonin reuptake inhibitors, benzodiazepines, and class 1A antiarrhythmic medications. Narcotic analgesics, antihistamines, and anticonvulsants are also associated with increased risk for falls (Ensrud et al., 2002; Rubenstein and Josephson, 2002).

Physical restraints have been used in an attempt to reduce falling. Although the focus here is on community-dwelling elderly persons, it is worth noting that use of physical restraints in nursing home and hospital settings does not reduce the risk of falling and is instead associated with an increased risk of injury (Neufeld et al., 1999). Since the 1980s, the use of physical restraints has been appropriately and dramatically reduced.

SCREENING

At present, no one screening test can be recommended to identify potential fallers (Gates et al., 2008). The two best predictors of falls are a history of falls and a reported abnormality in gait or balance (Ganz et al., 2007). "Have you had any falls in the past year?" is a simple screening question that can be answered by the patient or caregiver in a previsit

GERIATRIC HEALTH QUESTIONNAIRE

Date: _____ Birthdate: _____ Hosp #: _____

Name: _____ Address: _____

INSTRUCTIONS: PLEASE CIRCLE ANSWERS.

1. **General health**: In general, would you say your health is:
   Excellent / Very good / Good / Fair / Poor

   How much bodily pain have you had during the past 4 weeks?
   None / Very mild / Mild / Moderate / Severe / Very severe

2. **Activities of daily living**: Are you (I) independent (can do by myself); (A) require assistance (need help from another person); or (D) dependent (cannot do at all) with each of the following tasks?

Walking	I	A	D	Using telephone	I	A	D
Dressing	I	A	D	Shopping	I	A	D
Bathing	I	A	D	Preparing meals	I	A	D
Eating	I	A	D	Housework	I	A	D
Toileting	I	A	D	Taking medications	I	A	D
Driving	I	A	D	Managing finances	I	A	D

3. **Geriatric review of systems**:

a.	Do you have difficulty driving, watching TV, or reading because of poor eyesight?	Yes / No
b.	Can you hear normal conversational voice?	Yes / No
	Do you use hearing aids?	Yes / No
c.	Do you have problems with your memory?	Yes / No
d.	Do you often feel sad or depressed?	Yes / No
e.	Have you unintentionally lost weight in the past 6 months?	Yes / No
f.	Do you have trouble with control of your bladder?	Yes / No
	Do you have trouble with control of your bowels?	Yes / No
g.	How many falls have you had in the past year? _____	
h.	Do you drink alcohol?	Yes / No
	If yes, how many drinks per week? _____	

4. Do you live with anyone? Yes / No
   If yes, who? Spouse / Child / Other / Relative / Friend
   Who would help you in an emergency? _____
   Who would help you with health care decisions if you were not able to communicate your wishes?
   _____

5. How many medicines do you take, including prescribed, over the counter, and vitamins? _____
   What is your system for taking your medications? Pill box / Family help / List or chart / None

6. Are you sexually active? Yes / No

7. Has anyone intentionally tried to harm you? Yes / No

8. Have you had a shot to prevent pneumonia? Yes / No

9. Please draw the face of a clock with all the numbers and the hands set to indicate 10 minutes after 11 o'clock.

Memory: 3 item recall after 1 minute (pen, dog, watch) # recalled _____
Patient signature_____ Date _____
Reviewing physician _____ Date _____

Figure 4-2 Geriatric health questionnaires assist in gathering pertinent information regarding the functioning of the elderly patient. (From Jogerst GJ, Wilbur JK. Care of the elderly. In Rakel RE, ed. *Principles of Family Practice,* 7th ed. Philadelphia: WB Saunders; 2007:67-105.)

Table 4-3 Intrinsic Risk Factors for Falls

Age-related changes in vision, hearing, or proprioception
Decreased blood pressure response to postural changes
Delayed compensatory muscle response to postural changes
Age older than 80 years
Cognitive impairment
Depression
Functional impairment
History of falls
Visual impairment
Gait or balance impairment
Use of assistive device
Arthritis
Leg weakness

Table 4-4 Initial Evaluation of Falls

History	Circumstances of fall Presence of risk factors Medical conditions Medication review Functional abilities
Physical examination	Postural blood pressure CV examination focusing on rhythm and murmurs Visual acuity Neurological examination: strength, proprioception, cognition Musculoskeletal examination: ROM, joint abnormalities Gait and balance assessment
Diagnostic studies	None required routinely

CV, Cardiovascular; *ROM,* range of motion.

questionnaire. For patients who have not fallen, the pretest probability of a fall in the upcoming year ranges from 19% to 36%. Also, asking the patient, "Have you noticed any problems with gait, balance, or mobility?" is another simple screening question. Answering "yes" to either screening question warrants further assessment (Tinetti, 2003).

FALLS ASSESSMENT

Falls assessment should include a multifactorial evaluation beginning with the circumstances surrounding the fall(s), associated symptoms, risk factor assessment, and medication history (Table 4-4). The physician should ask about the environment (e.g., indoors or outdoors, dark or well lighted, time of day), environmental obstacles (e.g., throw rugs, door thresholds, stairs), and footwear worn at the time. The history should also include questions about prodromal symptoms (e.g., lightheadedness, dizziness) if there was a loss of consciousness or other symptoms of arrhythmias (i.e., palpitations). If available, information should be obtained from a witness. The evaluation should also include questions about risk factors, functional abilities, and medication history (American Geriatrics Society [AGS] et al., 2010).

Postural blood pressure and pulse are important assessments in the examination. Up to 30% of older persons have orthostatic hypotension, and although some may be asymptomatic, others become lightheaded and dizzy (Luukinen et al., 1999). The musculoskeletal examination should focus on range of motion in the legs, inflammatory or degenerative conditions of the leg joints, kyphosis, and abnormalities of the feet. The neurologic examination should include proprioception, coordination, muscle strength, and cognition. The cardiovascular examination should focus on detecting potential causes of falls (e.g., arrhythmias, aortic stenosis). Visual acuity and hearing should be assessed. Disturbances in gait and balance can be identified through the patient or caregiver's direct report or a simple office-based assessment, such as the "get up and go" test (Podsiadlo and Richardson, 1991). This test may be scored, timed, or used as an overall assessment of the patient's gait, stability, balance, and strength. The patient is asked to stand from a seated position, walk about 10 feet (3 m), turn around, walk back, and sit down again. If the patient needs to push off the chair or rock back-and-forth several times to arise, leg strength is diminished. The task should be completed within 10 seconds. Gait abnormalities, such as poor step height, decreased stride length, and shuffling, may be observed. A wide-based stance and slow, multiple-point turning may reveal poor balance.

Laboratory evaluation and imaging are based on the history and clinical findings. If an underlying metabolic abnormality is suspected (e.g., diabetes, anemia, dehydration), appropriate blood tests may assist in the diagnosis. If a patient is suspected of having syncope, cardiac rhythm monitoring (e.g., Holter or event monitor) is appropriate. An echocardiogram may be necessary for evaluation of a murmur. Neuroimaging with magnetic resonance imaging (MRI) or computed tomography (CT) is indicated for the evaluation of focal findings on neurologic examination.

MANAGEMENT

Evidence has demonstrated that a multifactorial approach and intervention strategy is needed to reduce the rate of falling in older patients (Figure 4-3). Because one of the most modifiable risk factors is medication use, medication review is a key component of management (Hanlon et al., 1997). The review should focus on decreasing the dose or discontinuing sedating medications. If orthostasis is present, adjustment of diuretics and antihypertensive medications should be considered. The role of vitamin D in fall prevention is questionable. Although it probably does not decrease the risk of falls, except in patients with low levels of vitamin D, supplementation should be started in patients with osteopenia or osteoporosis (Gillespie et al., 2012).

Supervised exercise programs should be considered for patients at high risk for falls; exercise can reduce the physical risk factors (Rose, 2008). Specifically, programs that focus on two of three exercise components (strengthening, balance training, and aerobic or endurance training) for a minimum of 12 weeks have shown the most benefit (Costello and Edelstein, 2008). Finally, home hazard evaluation and intervention is an essential component in the assessment of falls in elderly (AGS, 2010; Gillespie et al., 2012).

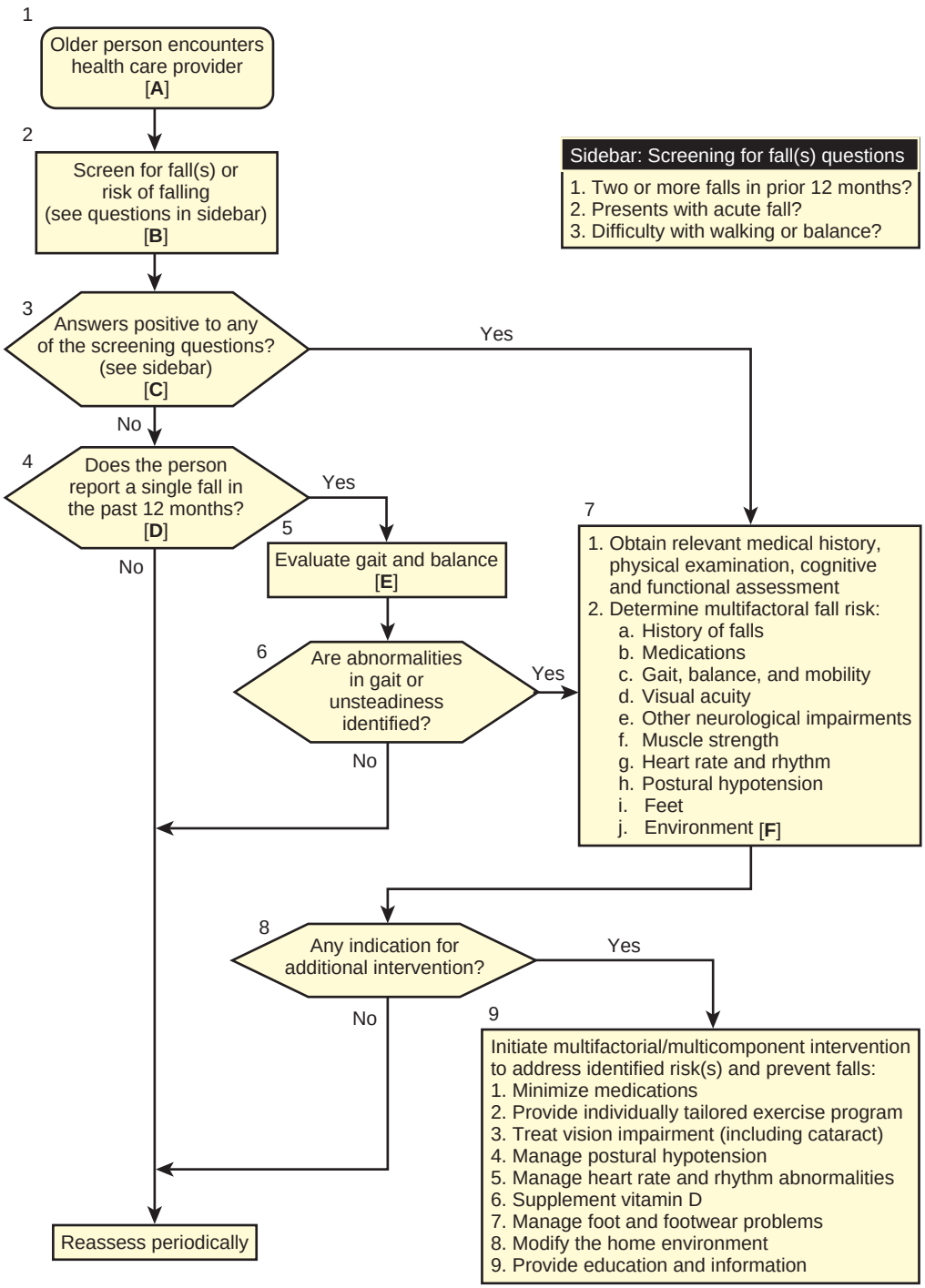

Figure 4-3 Practice guideline for the prevention of falls in older persons. (From American Geriatrics Society, British Geriatrics Society, and American Academy of Orthopedic Surgeons Panel on Falls Prevention: Guideline for the prevention of falls in older persons. *J Am Geriatr Soc.* 2001;49:664-672.)

KEY TREATMENT

- Risk factor assessment and multifactorial intervention reduce the rate of falls (SOR: A; Gillespie et al., 2012).
- Exercise programs that target more than two components reduce the rate of falls (SOR: A; Gillespie et al., 2012).
- Community-living elderly patients who have fallen or who have risk factors for falling should have their homes assessed for safety by occupational therapists (SOR: A; Gillespie et al., 2012).
- All older individuals should be asked at least once yearly about falls (SOR: C; AGS et al., 2010; Tinetti, 2003).

Elder Abuse

Key Points

- Elder abuse is underreported.
- Direct questioning for elder abuse is recommended.
- Physicians should recognize the physical and behavioral signs of abuse.
- A positive screening result for elder abuse should be followed by a safety assessment.
- Physician reporting requirements regarding elder abuse vary by state.

Elder abuse is a significant public health issue that physicians need to identify and address in both outpatient and inpatient settings. The prevalence of elder abuse is difficult to determine because its definition varies across U.S. states and other countries, and research is still limited in this area (Erlingsson, 2007). In a systematic review of international literature, estimates ranged from 3.2% to 27.5% based on population studies. More than 6% of the general population had reported abuse in the prior month (Cooper et al., 2008).

In the United States, the number of people age 65 years and older who have been victims of elder abuse ranges between 1 and 2 million. In 2000, adult protective services (APS) departments received approximately 470,000 reports. Of the types of abuse, elder "self-neglect" is most often reported. A prospective, population-based cohort study found that elder self-neglect was associated with a 5.82 times increased risk for mortality in the year after a report of self-neglect (Dong et al., 2009). From incidence studies, it is estimated that for every case reported, about five go underreported (National Elder Abuse Incidence Study, 1998). Underreporting stems from both patient issues (familial secrecy, denial, fear, shame) and provider issues (lack of awareness) (Kahan and Paris, 2003). Primary care physicians have the opportunity to detect early signs of elder abuse in patients with whom they have well-established relationships (Stiles et al., 2002).

DEFINITION

The National Center on Elder Abuse (2013) defines elder abuse as "a term referring to any knowing, intentional, or negligent act by a caregiver or any other person that causes harm or a serious risk of harm to a vulnerable adult." Although terms vary across states, elder abuse can be generally categorized into several types: physical abuse, emotional abuse, sexual abuse, exploitation, neglect, self-neglect, and abandonment (Table 4-5). Elder abuse is also classified by its setting. Domestic abuse occurs in the home of the victim. Institutional abuse occurs in a nursing home, hospital, assisted living center, or group home.

RISK FACTORS

Awareness of risk factors for abuse can increase the chance of identification and early intervention. Although research is ongoing, several characteristics of both the victim and the abuser should trigger further screening questions. Risk factors associated with the victim include shared living situations, history of dementia, and social isolation. Perpetrator risk factors include a history of mental illness (specifically depression), alcohol abuse, and financial dependency (Lachs and Pillemer, 2004).

Table 4-5 National Center on Elder Abuse Definitions

Physical abuse	Inflicting or threatening to inflict physical pain or injury on a vulnerable elder or depriving him or her of a basic need
Emotional abuse	Inflicting mental pain, anguish, or distress on an elder person through verbal or nonverbal acts
Sexual abuse	Nonconsensual sexual contact of any kind
Exploitation	Illegal taking, misuse, or concealment of funds, property, or assets of a vulnerable elder
Neglect	Refusal or failure by those responsible to provide food, shelter, health care, or protection for a vulnerable elder
Abandonment	Desertion of a vulnerable elder by anyone who has assumed the responsibility for care or custody of that person
Self-neglect	Characterized as the behavior of an elderly person that threatens his or her own health or safety

From National Center on Elder Abuse. http://www.ncea.aoa.gov/faq/index.aspx.

Table 4-6 Screening Questions for Elder Abuse

Are you afraid of anyone at home?
Are you alone a lot?
Has anyone at home ever hurt you?
Has anyone taken anything that was yours without asking?
Does anyone at home make you uncomfortable or afraid?
Has anyone ever forced you to sign a document that you did not understand?
Are you kept isolated from friends or relatives?

SCREENING

There is no consensus that asymptomatic patients should be screened for elder abuse. The American Medical Association (AMA, 1992) suggests that all outpatients be screened for family violence, but the U.S. Preventive Services Task Force (2013) concluded that there was insufficient evidence for or against screening for older adults or their caregivers for elder abuse. Patients should be screened if there is a suspicion of elder abuse. The questions should be open ended, nonthreatening, and asked in a variety of ways to assess for the different forms of elder abuse (Table 4-6). A positive response should be followed by more direct questions as to the nature of the abuse. Direct questioning by physicians has been shown to increase reporting (Oswald et al., 2004).

CLINICAL MANIFESTATIONS

Certain behavioral and physical signs should raise suspicion for elder abuse. Behavioral signs in the caregiver

Table 4-7 Physical Signs of Elder Abuse

General	Weight loss, dehydration, and poor hygiene
HEENT	Traumatic alopecia; poor oral hygiene; absent hearing aids, dentures, or eyeglasses; subconjunctival or vitreous hemorrhage
Skin	Hematomas, welts, burns, bites, bruises, pressure sores
Genitorectal	Inguinal rash, fecal impaction
Musculoskeletal	Fractures, contractures

HEENT, Head, ears, eyes, nose, throat.

include answering for the patient, insisting on being present for the entire visit, failing to offer assistance, and displaying indifference or anger. Behavioral signs in an elderly patient include poor eye contact, hesitation to talk openly, or fearfulness toward the caregiver. Other indicators of possible abuse include confusion, paranoia, anxiety, anger, and low self-esteem. Physical signs that may signal neglect include poor hygiene, malnutrition, dehydration, pressure ulcers, and injuries (Table 4-7). Medication nonadherence may also be a warning sign of abuse.

ASSESSMENT

In suspected cases of abuse, the assessment includes a thorough history; physical examination; and functional, cognitive, and mental health assessments. The patient and the caregiver should be interviewed alone and separately (Abbey, 2009). Documentation begins with the description of the abusive or neglectful event, using the patient's words whenever possible. The duration, frequency, and severity of the abuse should be recorded. If injuries are present, a detailed description of the injuries and photographs, if available, should be documented. Whereas assessment of functional dependence can be helpful in recommending resources, evaluation of cognitive impairment is important in assessing both risk and capacity. The assessment should also include a mental health screening, with particular attention to depression, anxiety, insomnia, and alcohol abuse.

The elderly patient's caregiver should be assessed for caregiver stress and for risk factors for elder abuse, including alcohol abuse, depression, and financial dependency.

MANAGEMENT

Because the cause of elder abuse is often multifactorial, management involves a multidisciplinary approach with social workers and legal, financial, and APS representatives. The immediate management is determined by the safety and capacity assessments. Is the patient in any immediate danger? If so, acute hospitalization, safe home placement, and a protective court order may be indicated. If the patient lacks capacity, the physician should work with APS on options, including guardianship, financial management resources, and order of protection if indicated. In other cases, management should focus on using community resources to maintain the patient in the least restrictive environment. The emphasis is to decrease social isolation and caregiver stress. Interventions can include respite care, home health or custodial services, counseling, and drug or alcohol rehabilitation.

REPORTING REQUIREMENT

All 50 states have laws authorizing APS departments to intervene in cases of elder abuse. It is important for primary care physicians to know their state's requirements on mandatory reporting for elder abuse and which type of abuse (e.g., physical, emotional, sexual, financial) requires reporting. Higher rates of abuse have been documented in states that require public education regarding elder abuse and states that require mandatory reporting (Jogerst et al., 2003). Mandatory reporting laws in 42 states are controversial because they conflict with a competent elder's autonomy and with the physician–patient relationship. In such cases, physicians should explain their legal obligation to report and emphasize that the goal of reporting is to develop a care plan to assist the patient.

KEY TREATMENT

- Direct questioning by physicians for elder abuse increases the rate of reporting (Oswald et al., 2004) (SOR: B).
- Older individuals should be screened for elder abuse (AMA, 1992) (SOR: C).

Pressure Ulcers

Key Points

- Preventive measures can reduce the incidence of pressure ulcers in elderly patients.
- Classification is only one aspect of wound assessment.
- Assessment of pressure ulcers includes identification of risk factors.
- Pain assessment is an essential component of management.
- Risk factor modification is the key to management of pressure ulcers.

Pressure ulcers are a common and serious public health issue, especially in the elderly population. The reported incidence is as high as 22% in the nursing home population and ranges from 4.7% to 9% up to 32% in the hospitalized population (Allman, 1997; Allman et al., 1995; Coleman et al., 2002; Kaltenthaler et al., 2001). The treatment costs related to pressure ulcers exceed an estimated $5 billion annually in the United States (Xakellis et al., 1995). Prevention is paramount and can reduce the incidence of pressure ulcers by 50%. A thorough assessment of the wound and potential risk factors is the key to management.

CLASSIFICATION

Wound assessment begins with classification, as initially proposed in 1989 by the National Pressure Ulcer Advisory Panel (NPUAP) and then adopted for the Agency for Health

Care Policy and Research (AHCPR) Pressure Ulcer Clinical Practice Guidelines (1992 and 1994). The NPUAP revised the stage I classification in 1998 and added two stages in 2007, suspected deep tissue injury and unstageable. The six classifications are as follows:

Suspected deep tissue injury: Purple or maroon, localized area of discolored skin or blood-filled blister caused by damage to underlying soft tissue from pressure and shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, and warmer or cooler compared with adjacent tissue.

Stage I: Intact skin with nonblanchable redness of a localized area, usually over a bony prominence. Darkly pigmented skin may not have visible blanching; its color may differ from the surrounding area. The area may be painful, firm, soft, and warmer or cooler compared with adjacent tissue. Stage I may be difficult to detect in individuals with dark skin tones.

Stage II: Partial-thickness skin loss involving the epidermis, the dermis, or both. The ulcer is superficial and presents clinically as an abrasion, blister, or shallow crater, without slough.

Stage III: Full-thickness skin loss involving damage or necrosis of subcutaneous tissue that may extend down to, but not through, underlying fascia. The ulcer presents clinically as a deep crater with or without undermining of adjacent tissue.

Stage IV: Full-thickness skin loss with extensive destruction, tissue necrosis, or damage to muscle, bone, or supporting structures (e.g., tendons, joint capsules). Slough or eschar may be present on some parts of the wound bed, often with undermining and tunneling.

Unstageable: Full-thickness tissue loss in which the base of the ulcer is covered with slough (yellow, tan, gray, green, or brown) or eschar in the wound bed.

A wound cannot be accurately staged if eschar or slough is present. The staging system is useful only for initial classification because wounds do not heal predictably (Ferrell, 1997). Thus, it is important to include other factors when describing the wound to help assess treatment over time. These factors include size, type of exudate, and a description of the predominant tissue type. Size can be assessed by measuring the two largest diameters at right angles. The type and amount of exudate should be recorded. Exudate types include serous (clear or amber), sanguineous (bloody), or purulent (thick, yellow, or odiferous). The predominant tissue types are epithelial, granulation, necrotic, and eschar (AHCPR, 1992; Ferrell, 1997; Maklebust, 1997; NPUAP, 2007).

RISK FACTORS

An understanding of risk factors for pressure sore development is the key to prevention and management. Risk factors can be divided into extrinsic and intrinsic categories (Table 4-8).

Table 4-8 Risk Factors for Pressure Sore Development

Extrinsic Factors	Intrinsic Factors
Pressure	Age
Shearing forces	Impaired mobility
Friction	Malnutrition
Moisture	Sensory impairment

Extrinsic Risk Factors

Extrinsic factors include direct pressure, shearing forces, friction, and moisture. Direct pressure results in hypoperfusion of the affected tissue, which can lead to hypoxia; acidosis; and, if prolonged, tissue death and necrosis. Pressure sores most frequently occur over bony prominences below the waist, including the sacrum, greater trochanter, malleolus, heel, ischial tuberosity, and fibular head. Of note, the heels are the second most common site for pressure ulcer development. As the prevalence of pressure ulcers at other sites has decreased or remained the same, the prevalence of heel pressure ulcers has increased.

Shearing forces result from traction on the skin, which causes a relative displacement of the underlying structures. This usually occurs when patients are positioned in bed more than 30 degrees or seated and then slide down. In these patients, the underlying sacrum is at risk for pressure sore development. Friction between the skin and a stationary source such as bedclothes or sheets is another factor. Care must be taken to avoid friction, especially during transfers in and out of bed. Excessive moisture can lead to skin maceration and subsequent skin breakdown. Common causes include incontinence, diarrhea, and excessive perspiration (AHCPR, 1994; Patterson and Bennett, 1995).

Intrinsic Risk Factors

Intrinsic risk factors for pressure ulcer development include age, conditions that impair mobility, malnutrition, and sensory impairment. Skin changes associated with aging (e.g., epidermal thinning, diminished vascularity) increase the susceptibility of older persons to shearing forces, pressure, and friction. Immobility can cause infrequent position changes, thus exposing an older person to prolonged pressure. Malnutrition, specifically an inadequate intake of calories or protein, has been associated with the development of pressure sores (Thomas, 2001). The AHCPR (1994) defines clinically significant malnutrition as a serum albumin level of less than 3.5 mg/dL, a total lymphocyte count of less than 1800 cells/mm^3, or body weight less than 80% of ideal weight. Supplementation of micronutrients involved in skin healing, such as ascorbic acid and zinc, has not been shown to prevent pressure sores or improve rates of healing. Sensory impairment, such as in diabetic neuropathy, can prevent an individual from responding appropriately to pressure-related discomfort (Patterson and Bennett, 1995; Reddy et al., 2006; Thomas, 1997, 2001).

Risk Factor Assessment Tools

The AHCPR's guidelines recommend that individuals with limited mobility be assessed on admission to hospitals, nursing homes, and home care programs for risk factors for pressure sore development. The most common assessment tool is the Braden scale (Pancorbo-Hidalgo et al., 2006). Risk factor identification and subsequent intervention are integral components of pressure sore prevention and management.

Table 4-9 Pressure Sore Risk Factor Modification

Implement	Avoid
Support devices to reduce pressure	Donut-type devices
Frequent repositioning	Massage over bony prominences
Positioning devices such as pillows	Raising head of bed above 30 degrees
Lifting devices such as a trapeze	Dragging the patient during transfers

MANAGEMENT

The principles of pressure sore management include modification of risk factors, nutritional support, maintaining a wound environment optimal for healing, and pain control.

Risk Factor Modification

The primary goal is to reduce pressure, shear, and friction over high-risk bony prominences (Table 4-9). This can be accomplished by frequent turning and repositioning while the patient is in bed (every 2 hours); frequent repositioning while sitting (every hour); and use of a support device to lower surface pressure, such as a foam, static air, alternating air, gel, or water mattress. Positioning devices such as pillows or foam wedges should be used to keep bony prominences (e.g., knees, ankles) from touching each other and high-risk areas from contacting the bed (e.g., heels). Donut-type devices should be avoided because the tissue within the ring can become necrotic from increased venous congestion.

Massage should be avoided over bony prominences because it can lead to deep tissue trauma. When positioning on the side, avoid pressure directly on the trochanter. To decrease the effect of shear forces, maintain the head of the bed at the lowest degree of elevation. To decrease the effect of friction lubricants, use protective films, dressings, or padding. Also, lifting devices such as a trapeze can be used to assist patients with limited mobility in transfers and repositioning (AHCPR, 1994; Bergstrom, 1997; Bluestein and Javaher, 2008; Reddy et al., 2006; Remsburg and Bennett, 1997).

Nutritional Support

Nutritional support emphasizing adequate protein and calorie intake is another key component of pressure sore management. Protein intake should be 1.0 to 1.5 g/kg/day. Caloric intake should be 30 to 35 kcal/kg/day. Some experts recommend supplementation with vitamin C and zinc, although evidence that either enhances wound healing is limited (AHCPR, 1994; Langer et al., 2003; Reddy et al., 2006; Thomas, 2001).

Debridement

Wound healing requires a moist environment, free of necrotic tissue and infection, which allows for granulation and reepithelialization. Debridement is often needed to remove necrotic tissue, slough, and eschar, which can be accomplished by sharp, mechanical, enzymatic, or autolytic techniques. The technique used depends on the patient's condition, location, clinical urgency, and overall goals for patient care. Debridement is not recommended for heel ulcers that have stable, dry eschar without edema or signs of infection (AHCPR, 1994; NPUAP, 2007).

Sharp debridement is appropriate for removing areas of thick eschar and necrotic tissue in extensive ulcers. Care must be taken to control pain when using this technique. Also, surgical debridement may cause transient bacteremia, and prophylactic antibiotics may be needed for high-risk patients.

Mechanical debridement includes wet-to-dry dressings; hydrotherapy; wound irrigation; and dextranomers, which are small beads of highly hydrophilic dextran polymers (e.g., Debrisan). Wet-to-dry dressings may be painful when changed and need be discontinued when the wound bed is clean to avoid desiccation (Ovington, 2001). Hydrotherapy is appropriate for pressure sores with thick exudate or necrotic tissue. Care must be taken not to place the wound too close to the jets. Irrigation pressures need to be high enough to adequately cleanse the wound but not too high to potentially cause tissue trauma. Safe and effective pressures are between 4 and 15 pounds per square inch (psi). Examples of safe irrigation devices include 35-mL syringe with 19-gauge needle or angiocatheter, water-jet device at the lowest setting, and saline squeeze bottle (250 mL) with irrigation cap.

Enzymatic debridement is accomplished by products that have proteolytic enzymes such as papain and urea (e.g., Accuzyme, Panafil) and collagenase. Typically used once daily, these products may damage healthy tissue and should not be used if infection is present. Thus, special care is needed in application, and use should be limited to short periods (<2 weeks).

Autolytic debridement involves the use of occlusive synthetic dressings that allow enzymes normally present within wounds to self-digest necrotic tissue. Occlusive dressings should not be used if the wound is infected or if there is a moderate amount of exudate (AHCPR, 1994; Cervo et al., 2000; Goode and Thomas, 1997).

Infection Control

In the majority of cases, infection can be prevented by adequate debridement and cleansing. Wounds should be cleansed daily and with dressing changes. Normal saline is the most appropriate solution for cleansing. Avoid skin cleansers and antiseptics that are cytotoxic, such as povidone–iodine, hydrogen peroxide, and acetic acid. Signs of a wound infection include delayed healing, increasing wound size, purulent exudate, pain, and foul odor. Initially, consider a trial of topical antibiotics, such as silver sulfadiazine cream (Silvadene), for 2 weeks. Superficial cultures of the wound are not helpful because they detect only the surface colonization. Ideally, bacterial tissue cultures should be performed to guide antibiotic coverage. Systemic antibiotics are reserved for patients with cellulitis, osteomyelitis, bacteremia, or sepsis (AHCPR, 1994).

Dressing Selection

Wound dressings provide a physiologically moist wound environment shown to enhance healing, reduce pain, debride necrotic tissue, and decrease infection rates in pressure sores. Dressing selection depends on the stage,

Table 4-10 Wound Dressing Properties

Wound Dressings	Absorbent Quality*	Debriding Action	Frequency of Dressing Change	Stage
Polyurethane films	None	None	Every 7 days or less	I, II
Amorphous hydrogels	Minimal to moderate	Autolysis	Every 7 days or less	II, III, IV
Hydrogel sheets	Minimal to moderate	Autolysis	Every 7 days or less	II, III
Hydrocolloids	Minimal to large	Autolysis	Every 7 days or less	II, III, IV
Polyurethane foams	Minimal to moderate	None	Every 7 days or less	II, III, IV
Foamed gels	Minimal to large	Autolysis	Every 7 days of less	II, III, IV
Alginates	Minimal to large	Autolysis	Daily to every 3 days	II, III, IV
Hydrocolloid–alginate	Minimal to large	Autolysis	Every 3 to 5 days	III, IV

*None, minimal, moderate, or large.

amount of exudate, size, site, and condition of surrounding skin. No moist-dressing type has proved superior to the others (Bouza et al., 2005). The main categories of modern dressings are polyurethane films, hydrocolloids, amorphous hydrogels, hydrogel sheets, polyurethane foams, foamed gels, alginates, and hydrocolloid–alginate combinations (Table 4-10).

For deep, stage III and stage IV pressure sores, packing is often needed to eliminate dead space. This can be accomplished with saline-moistened gauze, calcium alginates, gels, and dextranomers. After packing, the wound is covered with an occlusive or semiocclusive dressing. If excessive exudate is present, the dressing must have absorptive properties to control exudate without drying the wound bed. Examples include saline-moistened gauze, alginates, and combination hydrocolloid–alginate dressings.

Pressure sores should be evaluated weekly by a health care professional. Reevaluation of the treatment plan should be considered if there are not signs of healing within 2 weeks of treatment (Ferrell, 1997; Goode and Thomas, 1997).

Pain Control

The overall management of a patient with a pressure sore includes pain assessment and control. Patients should be assessed for pain related to the pressure sore. Management includes the appropriate use of analgesics and eliminating or modifying the source of the pain. This can be accomplished by repositioning, using support surfaces, and using wound dressings shown to reduce pain. Pain should be anticipated before dressing changes and debridement. Appropriate analgesia should be provided as needed.

Adjunctive Therapy

Numerous modalities have been attempted to expedite the wound healing process, but their role remains unclear. Examples include electrical stimulation, hyperbaric oxygen, ultrasonography, and hydrotherapy (Baba-Akbari et al., 2006; Kranke et al., 2004; Olyaee Manesh et al., 2006). Negative-pressure wound therapy has shown promise in the management of stage III and IV pressure ulcer (Banwell and Teot, 2003; Mendez-Eastman, 2004). Further research is needed to establish efficacy of adjunctive therapy for wound healing.

KEY TREATMENT

- Assess all support surfaces and patient factors for increased pressure and modify appropriately (AHCPR, 1994, Reddy et al., 2006) (SOR: A).
- Assess and manage the patient's nutritional status (AHCPR, 1994; Langer et al., 2003; Thomas, 2001) (SOR: B).
- Assess all patients for pain related to the pressure ulcer treatment or its treatment (AHCPR, 1994; NPUAP, 2007) (SOR: C).

Rational Drug Prescribing for Elderly Patients

Key Points

- Adverse drug events result in significant morbidity and a high rate of hospital admissions.
- Medications should be adjusted for the individual patient's renal function.
- Medication lists of elderly patients should be periodically reviewed, focusing on indications and side effects.
- One drug should not be used to treat the side effects of another medication.
- Pharmacists' recommendations should be incorporated in a rational drug-prescribing plan.
- The primary care physician plays an important role in addressing an array of pharmaceutical issues and concerns for elderly patients, including polypharmacy, adverse drug reactions, adherence, and undertreatment of certain conditions.

Medication use is common in the elderly population and increases with age. A population-based survey showed that 44% of men and 57% of women older than age 65 years used five or more medications weekly (Kaufmann et al., 2002). Although persons older than 65 years represent only 13% of the general population, they account for more than 30% of U.S. drug expenditures, totaling more than $73 billion in 2006 (Medical Expenditure Panel Survey, 2006). Polypharmacy is a major risk factor for ADEs. Up to 10% of emergency department visits and 10%

Table 4-11 Pharmacokinetic Changes in Older Persons

Absorption generally does not change
Longer half-life of lipophilic drugs
Increased amount of water soluble and free (active) drug
Decreased excretion

to 17% of hospital admissions are the result of ADEs (Hayes et al., 2007).

PHARMACOKINETICS AND PHARMACODYNAMICS

Knowledge of the physiologic changes that occur with aging is essential when prescribing medications to elderly patients. Changes in pharmacokinetics and pharmacodynamics can result in increased or decreased amounts of medication and drug-drug interactions (Table 4-11).

Pharmacokinetics refers to the body's response to the drug and includes absorption, distribution, metabolism, and elimination (excretion). Age-related gastrointestinal and skin changes have minimal effect on drug absorption, except for drugs that require active gastrointestinal transport (vitamins, minerals), which decreases with aging. The volume of distribution (Vd) is determined by degree of plasma protein binding and body composition. The changes in protein binding are not clinically significant, unless a condition (e.g., acute illness, malnutrition) is causing a marked decline in albumin. Water composition and lean body mass decrease with aging. Fat composition increases, resulting in a larger Vd of lipid-soluble drugs, such as benzodiazepines. Although liver function tests are unchanged, liver size and blood flow are somewhat reduced. The clinical significance is difficult to determine because there is such wide interindividual variation in hepatic metabolism. Drug elimination is mainly affected by a decrease in creatinine clearance. Also, decreased muscle mass causes a decrease in serum creatinine. Because serum creatinine may appear normal even when significant renal impairment exists, it is important to calculate clearance and adjust medication dosages accordingly (Cusak, 2004). The Cockcroft-Gault (1976) formula can be used to estimate creatinine clearance (eCcr).

$$\text{Cr clearance} = (140 - \text{Age [yr]}) \times (\text{Actual body weight [kg]}) / (72 \times \text{Serum Cr [mg/dL]})$$

For women, multiply the result by 0.85. Of note, this formula is less accurate in extremely ill patients and those with moderate to severe renal insufficiency.

Pharmacodynamics refers to the end-organ response to a drug. Although not as well understood as pharmacokinetic changes, pharmacodynamic changes can lead to changes in receptor binding, a decrease in receptor number, and altered translation of response to a receptor. One clinical example involves β-adrenergic blockers and β-adrenergic agonists. With aging, there is a reduction in β-adrenergic activity in the cardiovascular and respiratory systems that can result in less responsiveness to β-blockers and β-agonists (Cooney and Pascuzzi, 2009).

COMMON PRESCRIBING ISSUES

Prescribing problems that can lead to ADEs include a failure to monitor medications appropriately, to prescribe clinically indicated medications, to educate patients, or to maintain continuity (Higashi et al., 2004). One well-researched problem is the use of inappropriate medications in elderly patients. In 1991, based on ADEs in the nursing home, an expert panel developed a list of drugs that should generally be avoided in the elderly population (Beers et al., 1991). The Beers criteria were updated in 2002 to include ambulatory and nursing facility populations (Fick et al., 2003/2004) and further updated in 2012 (AGS, 2012). Medications on the list are generally ineffective in elderly patients, have a higher risk for ADEs, or have safer alternatives (Table 4-12). The list also includes recommendations regarding medication dosages that generally should not be exceeded and medications to avoid in certain comorbid conditions. It is important to note that this list is only a guideline; if a patient has been taking one of the medications without adverse effects, it may not need to be discontinued.

On the other end of the spectrum is failure to prescribe clinically appropriate medications. Common oversights include a failure to prescribe a β-blocker for a patient with congestive heart failure or with a history of a myocardial infarction, aspirin in a patient with known coronary heart disease, or angiotensin-converting enzyme inhibitors for a patient with diabetes and proteinuria (Rosen et al., 2004; Sloane et al., 2004).

PRINCIPLES OF PRESCRIBING

With patients seeing multiple providers across different clinical settings, it is essential that the medication list remain updated. In one prospective observational study, 74% of patients were taking at least one medication of which their primary physician was unaware (Bikowski et al., 2001).

At least once yearly, ask your older patients to bring in all their medications, including over-the-counter medications. Use a checklist to review each medication (Table 4-13). With each medication, first and foremost, review the indication. Educating the patient about the indication can decrease ADEs and increase adherence (Garcia, 2006). Is the medication effective? Medications are often started for good clinical reasons but never revisited as to their efficacy. Are there side effects? Medications should be discontinued if there are intolerable side effects, and always consider an ADE as a cause of any new patient symptom. Avoid the "prescribing cascade," in which medications are started to treat an ADE. Does the medication require any laboratory monitoring? This may include direct drug levels (e.g., digoxin) or monitoring for side effects (e.g., electrolytes in patient taking hydrochlorothiazide).

Is the patient taking the medication? Medication nonadherence is a common and complex issue with both physician and patient factors. Depending on the definition, "nonadherence" ranges from 14% to 70% (DeSmet et al., 2007). Adherence is associated with the number of medications, cost, frequency of dosing, and patient's knowledge of the condition. It is important to obtain the patient's

Table 4-12 Drugs to Avoid or Limit in the General Elderly Population

Pharmacologic Agents	Comments
Drug Classes to Avoid	
Antihistamines	Nonsedating antihistamines (e.g., fexofenadine, loratadine) are considered safer
Antispasmodics	May result in anticholinergic side effects, sedation, and generalized weakness
Barbiturates	Highly addictive with many side effects; numerous other agents for sedation are preferred
GI antispasmodic drugs (e.g., dicyclomine, hyoscyamine)	Highly anticholinergic
Long-acting benzodiazepines (e.g., chlordiazepoxide, diazepam)	Short- or medium-acting agents are preferred; start with smaller doses
Muscle relaxants	May result in anticholinergic side effects, sedation, and generalized weakness
Specific Drugs to Avoid	
Amitriptyline	Highly anticholinergic; use newer antidepressants or less anticholinergic tricyclics
Chlorpropamide	Long half-life leads to increased risk of hypoglycemia; newer insulin secretagogues are preferred
Dipyridamole	May cause dizziness and hypotension
Disopyramide	Anticholinergic and negative inotropic properties
Doxepin	Highly anticholinergic; use newer antidepressants or less anticholinergic tricyclics
Indomethacin	Compared with other NSAIDs, risk of CNS, GI, and renal side effects is greater
Meperidine	Active metabolite normeperidine may accumulate and cause CNS stimulation and seizures
Meprobamate	Highly addictive; may worsen depression; other anxiolytics preferred
Methyldopa	Common side effects include depression, sedation, and edema; multiple antihypertensive options are available
Pentazocine	Mixed narcotic agonist–antagonist with potent CNS effects
Phenylbutazone	May cause severe bone marrow suppression; other NSAIDs are preferred
Propoxyphene	Weak narcotic pain reliever (probably no better than acetaminophen alone) but has same side profile as other narcotics
Reserpine	CNS side effects include sedation and depression; multiple antihypertensive options are available
Ticlopidine	More toxic effects than aspirin or clopidogrel
Trimethobenzamide	May cause extrapyramidal side effects; numerous alternative antiemetics are available
Drugs to Limit	
Digoxin	Limit to <0.125 mg/day in most elderly patients
Ferrous sulfate	Limit to <325 mg/day in most elderly patients
Spironolactone	>50 mg; avoid in patients with heart failure or creatinine clearance <30 mL/min

CNS, Central nervous system; *GI,* gastrointestinal; *NSAID,* nonsteroidal antiinflammatory drug.
Data from American Geriatrics Society 2012 Beers Criteria Update Expert Panel. American Geriatrics Society updated Beers criteria for potentially inappropriate medication use in older adults. *J Am Geriatr Soc.* 2012;60:616-631. http://www.americangeriatrics.org/files/documents/beers/2012BeersCriteria_JAGS.pdf.

Table 4-13 Medication Checklist

Is there a clear indication for this medication?
Is it working?
Are there side effects?
Is the patient taking the medication routinely?
Does the medication need laboratory monitoring?
Is it still needed?

perspective and concerns about medications in a nonjudgmental manner (Erice Medication Errors Research Group, 2009). Methods to increase adherence have focused on educational interventions and external cognitive aids. For short-term therapies, written information, counseling about the medication's indication and potential side effects, and personal phone calls increased adherence. The same effect was not seen for patients taking long-term medications (Haynes et al., 2008; McDonald et al., 2002).

Finally, the checklist should include asking if the medication is still needed. Has the patient's condition changed to where you can stop unnecessary drugs, such as preventive medications in a hospice patient?

Continuity of pharmacists is as important as continuity of physicians in decreasing medication errors. Encourage patients to use one pharmacy and inform the pharmacist of any medication changes. Seeking input from the pharmacist can reduce inappropriate prescribing (Garcia, 2006). With inpatient settings, pharmacists obtain more accurate medication histories from patients, reducing the rate and severity of ADEs (Carter et al., 2006; Reeder and Mutnick, 2008). Simplify the medication regimen by using once-daily dosing and generic drugs, if possible. Discontinue medications that have no indication or benefit (Carlson, 1996). When initiating medications, start one at a time at the lowest dose possible (Table 4-14).

The decision to prescribe a drug depends on many factors besides age, including the patient's functional status, comorbidities, other medications, and personal preferences and values. Physicians must be extremely vigilant in prescribing, especially for frail, elderly patients, carefully weighing the risks and benefits of any new medication. Periodic review of patients' medication list is essential for

Table 4-14 Principles of Prescribing

Periodically update and review the medication list.
Work with the community pharmacist.
Educate the patient about his or her medications.
Consider an adverse drug event as a cause of any new patient symptom.
Simplify the medication regimen.
Start one medication at a time.

monitoring adverse effects, potentially inappropriate drugs, drug–drug interactions, and drug–disease interactions.

KEY TREATMENT

- Current methods of improving medication adherence for chronic health problems are not predictably effective (Haynes et al., 2008; McDonald et al., 2002) (SOR: B).
- Certain drugs should be avoided or limited in the elderly patient (AGS, 2012) (SOR: C).
- Obtain local pharmacists' recommendations to reduce inappropriate prescribing and ADEs (Garcia, 2006) (SOR: B).
- Reviewing a medication list regularly can reduce polypharmacy and inappropriate prescribing (SOR: B).

Urinary Incontinence

Key Points

- Incontinence is a common medical problem in the elderly population, affecting up to 30% of women and 15% of men.
- Older women are more likely to have urge and stress incontinence, and older men are more likely to experience overflow and urge incontinence.
- Acute episodes of incontinence are more likely the result of underlying medical conditions (e.g., infection, hyperglycemia) or new medications (e.g., diuretics).
- Specific health risks, including depression and falls, have been linked to urinary incontinence in elderly patients.
- History, physical examination, urinalysis, and postvoid residual assessment are the key elements in categorization of incontinence.
- In the majority of patients, incontinence can be diagnosed and treated by the primary care provider.
- Treatment options for incontinence include behavior modification, pelvic floor exercises, pharmacologic agents, vaginal pessaries, urethral inserts, condom catheters, penile clamps, and surgical procedures.
- Systemic hormone replacement therapy may exacerbate incontinence.

Urinary incontinence, defined as involuntary leakage of urine, affects 25% to 30% of all adults in their lifetime. Although women report incontinence more often than men, both sexes are affected equally after the age of 80 years. The estimated prevalence of urinary incontinence in people older than 65 years of age ranges from 35% in community-dwelling individuals to more than 60% for those who reside in long-term care facilities (Goode et al., 2008; Song and Bae, 2007; Tennstedt et al., 2008). Incontinence not only increases in prevalence with age but also is considered part of a geriatric syndrome. Within the younger population, a specific condition of the lower urinary tract or its neurologic control is often the cause of urinary incontinence. In older persons, however, incontinence is often secondary to physiologic age-related changes, comorbidities, medications, and functional impairments.

Women spend almost $750 annually out of pocket for incontinence management, have significantly decreased quality of life, and are willing to pay almost $1400 per year for a cure. The annual costs of incontinence care are greater than annual direct costs for breast, ovarian, cervical, and uterine cancer treatments combined (Subak et al., 2006, 2008; Wilson et al., 2001).

Urinary incontinence is associated with increased morbidity and mortality. Studies have demonstrated an association between urinary incontinence and worsening in overall function. Health-related quality of life measurements have been found to decline in individuals with urinary incontinence (DuBeau et al., 2009; Ko et al., 2005; Teunissen et al., 2006). This decline has been seen in those living independently, in assisted living facilities, and in long-term care environments (DuBeau et al., 2006).

Specific health risks linked to urinary incontinence include depression, social isolation, urinary tract infections (UTIs), pressure ulcers, falls and fractures, decreased sexual activity, sleep deprivation, and increased caregiver stress (Brown et al., 2000; Griebling, 2006; Ory et al., 1986; Spector, 1994). Urinary incontinence is also found to be a common reason for institutionalization of elderly patients (Holroyd-Leduc et al., 2004).

AGE-RELATED CHANGES IN URINARY SYSTEM

Specific age-related changes in the urinary system can directly influence urinary continence. The pelvic floor muscles can lose tone and predispose women to uterine, bladder, and rectal prolapse, causing secondary urge incontinence. Overall bladder capacity also tends to decrease, limiting total volume and therefore increasing urge to urinate. Prostatic hypertrophy predisposes older men to increases in postvoid residual volumes. Older incontinent persons may also experience increased involuntary bladder contractions, exacerbating the problem.

PRESENTATION

Urinary incontinence presentations can be divided into acute ("transient") or chronic. Sudden onset of incontinence by potentially reversible and treatable conditions is referred to as acute urinary incontinence. Conditions contributing to acute incontinence include lower urinary tract conditions, stool impaction, delirium, fluid imbalance, impaired mobility, and medications (Table 4-15). These conditions not only precipitate acute urinary incontinence but can also contribute to chronic incontinence.

Chronic incontinence can be divided into five types: urge, stress, overflow, functional, and mixed (Table 4-16).

Table 4-15 Medications That Can Cause or Contribute to Geriatric Urinary Incontinence

Class	Mechanism of Action
Pain relievers	Urinary retention, fecal impaction, sedation, delirium, overflow incontinence
Opioids	
Antiinflammatories; COX-2 inhibitors	Increase fluid retention, nocturnal diuresis, functional incontinence
Skeletal muscle relaxants	Inhibit bladder contractions causing retention and overflow incontinence
Psychotherapeutics	Urinary retention, overflow incontinence
Antidepressants, antipsychotics	Sedation, delirium, immobility causing functional and overflow incontinence
sedatives and hypnotics	
Pain relievers	Increased fluid retention, nocturnal diuresis and functional incontinence
NSAIDS, COX-2 inhibitors	Bladder relaxation, fecal impaction, sedation, retention, overflow incontinence
Opioids	
Skeletal muscle relaxants	Inhibit bladder contractions, overflow incontinence
Others	Inhibit bladder contractions, sedation, retention, and overflow incontinence
Anticholinergics, antihistamines	Lead to diuretic effect, depressed central inhibition, urge and overflow incontinence
Alcohol, caffeine	

COX, Cyclooxygenase; *NSAID*, nonsteroidal antiinflammatory drug.

Urge Incontinence

Urge incontinence is the most common type of incontinence identified in older ambulatory patients. It is defined as an abrupt, urgent sensation to urinate and results in loss of urine, with both large and small amounts. Urinary frequency and nocturia are often associated with urge incontinence. Detrusor overactivity is also associated, caused by age-related smooth muscle changes, central inhibitory pathway lesions, history of pelvic irradiation, and bladder sensory or motor innervation deficits. Urge incontinence with an elevated postvoid residual volume can occur when detrusor overactivity and impaired detrusor contractility occur simultaneously. Urinary frequency and retention are common in these patients, particularly those receiving anticholinergic medications.

Stress Incontinence

Stress incontinence is the unintentional loss of urine. It is most often associated with weakening of the pelvic floor muscles and subsequent hypermobility of the bladder outlet and urethra. Stress incontinence occurs with physical movement or activity, such as coughing, sneezing, laughing, or heavy lifting. Stress incontinence is often seen in older women with previous vaginal deliveries or pelvic surgery. It is also associated with lack of estrogen in the menopausal woman. Obesity can exacerbate the symptoms of stress incontinence.

Overflow Incontinence

Symptoms of overflow incontinence include a weak urine stream, dribbling, urinary hesitancy, frequency, and nocturia. These symptoms may overlap with other types of incontinence, influencing the diagnosis. The etiology of overflow incontinence includes detrusor muscle weakness, bladder outlet obstruction, or both. Medications such as narcotics, anticholinergics, and α-adrenergic blockers can contribute to overflow incontinence.

Functional Incontinence

Functional incontinence refers to leakage of urine caused by factors not directly associated with the bladder. Cognitive impairment (e.g., dementia), mobility disorders (e.g., Parkinson's disease), and inaccessible bathrooms are the most common contributing factors in functional incontinence. Factors may be temporary, as in a patient with a lower extremity fracture who is not able to transfer independently on and off the toilet.

Mixed Incontinence

Mixed urinary incontinence is the combination of two types of incontinence simultaneously, typically stress and urge incontinence. Mixed incontinence is the most common type in women, and the causes of the two forms may or may not be related. Detrusor hyperactivity with impaired contractility is a form of mixed incontinence specific to older adults. Symptoms include urinary frequency and urgency caused by uninhibited contractions of the detrusor smooth muscle. When patients try to void, the bladder does not contract sufficiently, and emptying is incomplete, leading to overflow incontinence.

EVALUATION

The initial step in the clinical evaluation is the identification of patients with urinary incontinence. Many older patients do not complain about incontinence to their health care providers because they are embarrassed or believe their symptoms are just part of normal aging. Direct questioning during the review of systems can help identify urinary incontinence: Do you have trouble with your bladder? Do you lose urine when you do not want to? Do you find that you have to wear pads or adult diapers for protection? (Fantl et al., 1996; Kane et al., 2004).

A thorough history and physical examination are important in the clinical evaluation of older patients with urinary incontinence. The main objectives of the workup are to diagnose and treat reversible causes, establish the principal type of urinary incontinence to help guide treatment, identify patients who may need subspecialty referral, and improve overall quality of life for the patient. After urinary incontinence has been identified, the evaluation should continue with a detailed incontinence history, including the type of leakage, frequency, duration, inciting factors, previous treatments, and overall treatment goals. The physical examination should include abdominal, genitopelvic, rectal, and neurologic evaluation. Health care providers need to be aware of the specific "red flags" to refer a patient for further urologic, gynecologic, or urodynamic evaluation (Table 4-17).

A urinalysis should be obtained in all patients to assess for UTIs, hematuria, or other medical conditions that may be associated with urinary incontinence. Persistent hematuria should prompt additional evaluation, including upper

Table 4-16 Basic Types, Causes, and Treatments of Persistent Urinary Incontinence

Types	Symptoms	History	Common Causes	Primary Treatment
Stress	Involuntary loss of urine with increases in intraabdominal pressure (e.g., cough laugh, exercise)	Patient can usually predict which activities cause leakage of urine	Urethral hypermobility Sphincteric dysfunction Radical prostatectomy	Scheduled voiding Pelvic muscle exercises (Kegel) Females: pessary, tampon during exercise; surgical bladder neck suspension or sling; urethral bulking agent Males: condom catheter, penile clamp; synthetic sling, artificial urinary sphincter
Urge	Leakage of urine because of inability to delay voiding after sensation of bladder fullness is perceived	Loss of urine may vary from minimal to complete emptying of bladder (if full) Urinary frequency and nocturia are common	Detrusor overactivity Neurologic disorders Spinal cord injury	Bladder training (including pelvic muscle exercises) Antimuscarinic therapy Topical estrogen (for severe vaginal atrophy or atrophic vaginitis)
Mixed	Combination of urge and stress symptoms	Variable; patient will usually identify which symptom is more bothersome	Combination of above causes	One or a combination of above, targeting most bothersome symptom(s) first
Overflow	Leakage of urine resulting from mechanical forces on an overdistended bladder, or from other effects of urinary retention on bladder and sphincter function	Usually does not occur unless bladder emptying is impaired Usually see postvoid residual volumes >200-300 mL	Detrusor failure Neurologic disorders Spinal cord injury Diabetes Anatomic obstruction	Bladder retraining; Surgical removal of obstruction Intermittent catheterization Indwelling catheterization
Functional	Urinary accidents associated with inability to toilet because of impairment of cognitive or physical functioning, psychological unwillingness, or environmental barriers	Physical or cognitive impairment May have lower urinary tract deficits	Mobility Impairment Cognitive Impairment	Behavioral interventions with toileting assistance Environmental adaptations Undergarments and pads

urinary tract imaging and cystoscopy. A postvoid residual volume (with ultrasound or catheterization) helps to exclude overflow incontinence. In clinical practice, a postvoid volume of less than 50 mL is regarded as normal, and in general, residual volumes greater than 200 mL are considered abnormal (Fantl et al., 1996).

Voiding (bladder) diaries can provide valuable information for the clinician and patient. The diary includes documentation of each urination episode and any associated symptoms of incontinence for three 24-hour periods. If possible, the patient can also record the amount of fluid intake and output (Abrams and Klevmark, 1996). Several patterns of abnormality can emerge from the voiding diary. For example, frequent small volumes can occur in patients with overactive bladder syndrome, detrusor overactivity, and some painful bladder conditions (e.g., cancer). Frequent large-volume voids are associated with polyuria, as seen in patients with excessive fluid intake and conditions causing polyuria (e.g., diabetes, hypercalcemia). Obstructive sleep apnea, physiologic aging, congestive heart failure, and medications can all cause nocturnal polyuria (Bryan and Chapple, 2004). A simple office tool that can help detect stress incontinence is the cough test. The patient is asked to produce a forceful cough with a comfortably full bladder to determine any urine leakage and potential stress incontinence.

TREATMENT

Several therapeutic options exist to help manage the different types of urinary incontinence. Many older adults prefer to start with conservative therapies such as behavioral modification techniques before considering medications or surgery. In many cases, several small behavioral changes together may lead to significant improvement in symptoms.

Behavioral Interventions

Particular beverages can aggravate the lower urinary tract symptoms in older adults. Alcohol, caffeine, and highly acidic citrus fruits and drinks are considered direct bladder irritants and may worsen incontinence symptoms. Alcohol has diuretic properties, causing increased urinary frequency. Weight loss may be beneficial for some patients, in particular women with stress incontinence. Nocturia is a common complaint for many elderly patients with multifactorial causes (Sugaya et al., 2008). Minimizing late-afternoon and evening fluid intake may decrease nocturnal episodes for some patients. Reduced production of antidiuretic hormone has been seen in patients with obstructive sleep apnea. Treatment of the sleep apnea may help reduce nocturia symptoms (Kujuba and Aboseif, 2008).

In older patients with symptoms of urinary urgency, timed voiding is often suggested. Many patients experience symptoms only when the bladder is full, so voiding more frequently will reduce the amount of bladder distention and the sense of urinary urgency. Older patients with cognitive or mobility impairments will often need assisted-toileting programs. Providing physical assistance in going to the toilet on a regular basis can reduce incontinence episodes (van Houten et al., 2007). Some patients benefit from bladder retraining, in which they are taught to delay voiding

Table 4-17 "Red Flag" Criteria to Refer an Older Patient with Incontinence to a Subspecialist

Significant uterine, bladder, or rectal prolapse
Surgery or radiation involving the lower urinary tract within the past 6 months
Two or more symptomatic urinary infections within the past 6 months
Greater than 5 red blood cells per high-power field on repeated urinalysis in the absence of infection
Postvoid residual volume >200 mL
Marked prostatic enlargement, prominent asymmetry, or induration of the lobes
Persistent symptoms after appropriate trials of behavioral or drug therapy

at progressively longer intervals (Wallace et al., 2004). Bladder retraining can take months and has the most benefit for patients with urge incontinence and those with mixed incontinence when combined with pelvic floor exercises (Teunissen et al., 2004). The patient is encouraged to focus on the sensations in the pelvis, complete pelvic floor contractions, and wait until the urgency sensation subsides before proceeding to the toilet.

Pelvic floor muscle (Kegel) exercises remain one of the mainstays of behavioral therapy in the treatment of urinary incontinence. The exercises involve repetitive contractions and relaxations of the pelvic floor muscles. They have been found effective in stress, urge, and mixed incontinence (Hay-Smith and Dumoulin, 2006). A simply way to teach women to identify and isolate the pelvic floor muscles is by having the patient squeeze the examiner's finger during vaginal examination. Squeezing the examiner's finger by contracting the anal sphincter during a rectal examination can help both men and women isolate the pelvic floor muscles.

Management with Devices

There are two main device options for women with primarily stress incontinence: pessaries and urethral inserts. Pessaries come in many different forms and sizes and have been used for hundreds of years for the treatment of pelvic organ prolapse and urinary incontinence in women. The support offered by the pessary helps in correcting the angles and contacts between adjacent organs, thus minimizing bladder irritation and spontaneous contractions that lead to incontinence. Women need to have pessaries fitted individually by a health care provider. Routine cleaning and care by either the patient or, in many cases, a health care provider is required. Urethral inserts are short silicone single-use tubes. The tube is placed in the urethra by the woman and held in place by a mineral oil–filled bulbous sheath that is located in the bladder neck. In a 2-year follow-up study of 150 women using the insert, mild urethral trauma (6.7%) and UTIs (31.3%) occurred (Sirls et al., 2002). The urethral insert has not seen as widespread use as the pessary.

Men with incontinence have a few device options, including condom catheters and body-worn urinal and penile clamps. A condom catheter is a well-known external collection device and is much safer than indwelling catheters, which have been associated with UTIs and patient discomfort (Saint et al., 2006). Several condom catheter brands and sizes are available, and most are latex free.

Another similar device is the body-worn urinal. Body-worn urinals consist of a rubber cone (into which the penis fits) and a flange (with a central hole through which the penis passes) that fits around the base of the penis. Body-worn urinals are secured in place by straps or specially designed support underwear as opposed to adhesive. The final male-specific option is the penile clamp. It is a device that is applied to the pendulous part of the penis, preventing urinary leakage, and is used primarily for stress incontinence. The clamps carry a risk of penile edema, urethral erosion, pain, and skin breakdown. Use over a short period of time and by cognitively intact men provides for an excellent discreet device option for male incontinence (Saint et al., 2006).

Absorbent Pads. Many older adults with urinary incontinence use some type of pad or undergarment to help with their urinary incontinence. Although these products play an important role in the management of incontinence symptoms, patients should be encouraged to seek other types of treatment if appropriate. The cost of these products can be significant and is not covered by Medicare or most other insurance plans. However, it is important to realize that these absorbent products can help older adults maintain their functional independence and participate in their preferred activities.

Pharmacologic Therapies

Various medications have been used to treat the different forms of urinary incontinence. However, most current medications are used for urge or mixed incontinence because there is little evidence that adrenergic agonists help stress incontinence (Alhasso et al., 2005) (Table 4-18). The anticholinergic, antimuscarinic medications prescribed for urge incontinence work by blocking cholinergic receptors in the bladder, which in turn diminishes bladder contractility. This class of medications is effective but has adverse side effects (e.g., dry mouth, constipation) related to the cross-reactivity with muscarinic receptors in the salivary glands and colon (Alhasso et al., 2006). Additional side effects include dry eyes, blurry vision, and risk of urinary retention. Anticholinergics can also worsen cognitive function in elderly patients or cause drug-induced delirium, mimicking dementia. Newer medications (e.g., Sanctura) that are theoretically more uroselective and preferentially bind to the muscarinic receptors in the bladder may be associated with fewer adverse side effects. Incontinence medications should not be prescribed to those patients with untreated closed-angle glaucoma and in memory-impaired patients already taking cholinesterase inhibitors to prevent further deterioration of memory function. The anticholinergic agents and cholinesterase inhibitors work in direct opposition and, if taken together, can lead to rapid loss of cognitive function (Sink et al., 2008).

α-Adrenergic antagonists are helpful in treating urge incontinence in men with benign prostatic hypertrophy (BPH). Hypotension is a common side effect with traditional α agents. The newer agents (e.g., Tamsulosin) have fewer adverse side effects and should be used in older men who have low blood pressure or episodes of dizziness. The

Table 4-18 Drug Treatment for Urinary Incontinence

Generic Drugs (Trade Name)	Dosages	Mechanisms of Action	Type of Incontinence
Antimuscarinic			
Darifenacin (Enablex)	7.5-15 mg QD	Lesson involuntary bladder contractions and increasing bladder capacity	Urge or mixed
Oxybutynin (Ditropan) (Ditropan XL) (Oxytrol) transdermal	2.5-5 mg TID 5-30 mg QD (extended-release XL) 3.9- mg patch Q4 days	Lesson involuntary bladder contractions and increasing bladder capacity	Urge or mixed
Solifenacin (Vesicare)	5-10 mg QD	Lesson involuntary bladder contractions and increasing bladder capacity	Urge or mixed
Tolterodine (Detrol) (Detrol XL)	1-2 mg BID 2-4 mg QD (extended-release XL)	Lesson involuntary bladder contractions and increasing bladder capacity	Urge or mixed
Trospium (Sanctura) (Santura XR)	20 mg BID 60 mg QD (extended-release XR)	Lesson involuntary bladder contractions and increasing bladder capacity	Urge or mixed
Estrogen			
Topical estrogen Topical cream Vaginal ring Vaginal tablets	0.5-1.0 g/day for 2 wk; then twice weekly One ring Q3 months One 25-μg tablet QD for 2 wk; then twice weekly	Strengthen periurethral tissues Increase periurethral blood flow	Urge associated with severe vaginal atrophy or atrophic vaginitis
Cholinergic Agonists			
Bethanechol (Urecholine)	10-30 mg TID	Stimulates bladder contraction	Overflow incontinence with atonic bladder
α-Adrenergic Antagonists			
Alfuzosin (UroXatral) Tamsulosin (Flomax) Terazosin (Hytrin)	10 mg QD 0.4 mg QD 1 to 10 mg QHS	Relax smooth muscle or urethra and prostate capsule	Urge and symptoms associated with BPH

BID, Twice daily; *BPH,* benign prostatic hypertrophy; *Q,* every; *QD,* every day, *QHS,* every night at bedtime; *TID,* three times daily.

addition of an antimuscarinic drug can be considered in men who are still symptomatic on α-antagonist therapy. For long-term treatment of overflow incontinence in men, 5α-reductase inhibitors alone or in combination have been shown to reduce the voiding symptoms from BPH as well as the incidence of urinary retention (McConnell et al., 2003).

Currently, no medications are approved by the Food and Drug Administration for the treatment of stress incontinence. Estrogen has been prescribed in the past for stress incontinence because it was thought to improve urethral thickness and vascularity and sensitize α-adrenergic receptors in the bladder neck musculature. However, a Cochrane review failed to demonstrate improvement in stress incontinence while patients were taking estrogen, and the incontinence may actually worsen with oral agents. Conversely, combination estrogen–progestin oral hormone therapy has been associated with increased frequency of incontinence. Topical estrogen in the same Cochrane review was mildly effective when prescribed for older women with urge incontinence related to atrophic vaginitis or severe vaginal atrophy (Cody et al., 2009; Grady et al., 2001; Rossouw et al., 2002).

Surgical Treatment

The sling procedure is the primary form of open surgical treatment in women with stress incontinence. Several variations of the procedure exist with relation to the exact location of the sling and the nature of the graft material used to make the sling. The principal function of the sling is to increase the outlet resistance and thus prevent urine leakage during periods of increased intraabdominal pressure. Initial success rates for the sling procedure range from 80% to 90% but decrease with time. Some women respond to other forms of therapy or elect to undergo another sling procedure (Anger et al., 2007).

Periurethral injection of bulking agents can be an effective treatment is some elderly women with stress incontinence. The procedure is minimally invasive and can be performed in the outpatient setting with rapid recovery and immediate results. To date, there is limited evidence that this can relieve stress incontinence in women (Keegan et al., 2007). One disadvantage is that treatment usually needs to be repeated with time. Injection therapy may be particularly useful in elderly women who are unable to undergo the more invasive sling procedure or who are

symptomatic after a previous sling procedure. Older men with mild postprostatectomy stress incontinence may benefit from periurethral injection of bulking agents (Fantl et al., 1996).

KEY TREATMENT

- Pelvic floor exercises help with all types of urinary incontinence in women (Hay-Smith and Dumoulin, 2006) (SOR: A).
- Anticholinergic drugs are effective for overactive bladder syndrome but are associated with common side effects (Alhasso et al., 2006) (SOR: A).
- There is limited evidence that periurethral injection helps women with stress incontinence (Keegan et al., 2007) (SOR: A).

References

The complete reference list is available online at www.expertconsult.com.

Web Resources

www.aoa.gov The Administration on Aging offers comprehensive information about "seniors," including aging statistics and government programs.

www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=hsahcpr&part=A5124 The Agency for Health Care Policy and Research's treatment of pressure ulcers guideline.

www.ncea.aoa.gov/NCEAroot/Main_Site/Index.aspx The National Center on Elder Abuse provides information on the prevention, diagnosis, and management of elder abuse, including available resources for physicians, patients, and families.

www.npuap.org The National Pressure Ulcer Advisory Panel provides up-to-date information on the prevention and management of pressure ulcers.

Podcasts

www.fammed.wisc.edu/our-department/media/615/geriatric-assessment An overview of geriatric assessment in the office.

www.youtube.com/user/WIFamilyMedicine#p/u/4%20%3/xIMJ1aVvch8 An overview of the assessment and management of elder abuse.

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5 Care of the Dying Patient

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CHAPTER OUTLINE

Medical education and our professional attitude regarding patient care are oriented primarily toward sustaining life and curing disease. This is reasonable because not long ago, the major causes of death were infectious diseases, which usually attacked young people, who died before experiencing life. With the advent of antibiotics, it was possible to triumph over these diseases and prevent untimely death. Patients had a high probability of complete recovery. It is no surprise, therefore, that the medical profession emphasized preserving life at all costs and became preoccupied with the advancing technology that made such triumphs possible. Today, most people no longer die of acute illness but rather from chronic disease for which there is no cure. This calls for medicine to focus on improving the *quality* rather than the *quantity* of life and to recognize that the relief from suffering is superior to attempts to cure when there is limited likelihood of success. Patients with chronic diseases and those who are terminally ill benefit most from supportive therapy.

In previous centuries, it was assumed that life should be lived so that one would be able to "die well," but contemporary American culture has refused to accept death as a normal occurrence. Children and young adults have been conditioned to consider death from the viewpoint of the observer or disinterested third party. An individual's attitude toward his or her own death depends largely on experiences in dealing with the deaths of relatives or friends. Rather than a time of despair, sickness may be used as an opportunity for reflection. For some patients, it may be the first time they have faced their own mortality. Too often, however, this natural personal encounter has been depersonalized by removing the dying patient to an institutional setting.

Care of a terminally ill patient typically focuses on the disease, neglecting the patient as a whole person. The value of treatment must be interpreted on the basis of its net value to the individual. When additional treatments no longer provide benefits, the patient needs someone who provides personalized care with attention to the patient's emotional as well as physical comfort. The dying person often is isolated physically and emotionally from familiar surroundings and placed in a social setting that gives very low priority to an individual's personality, fears, and past experiences. Informed physicians, family, and friends can do much to help the terminal patient die with integrity and dignity. However, if dying is really to be accepted as a normal component of the life cycle, reintegration of the dying patient into the routine course of living is necessary.

The concept of quality care does not always demand that death be regarded as an enemy to be fought with every weapon at a physician's disposal. The technology of today makes it possible to keep people alive indefinitely, often without consideration for their quality of life. An obsession with quantity of life can adversely affect its quality; at times, a graceful death with dignity is preferable to lingering torment (LORAN Commission, 1989). Many people consider quality of life more important than quantity and want to leave while they still have something to say about it. The goal is to "respect the experience of living while supporting the process of dying" (Berlinger et al., 2013, p. 13).

The Physician's Attitude

Fewer than 10% of people die suddenly; more than 90% experience a protracted, life-threatening illness (Emanuel et al., 2003). Terminal illness is more taxing on the physician than sudden and unexpected death. Not surprisingly, an empathic family physician with a long patient relationship may be uncomfortable in dealing with the patient's impending death. Physicians are most uncomfortable when they feel helpless. Unfortunately, this leads to withdrawal from the patient who is terminally ill because the physician inappropriately feels helpless and impotent, when in fact a great deal of comfort and help can be provided. "Even the busiest doctor owes [the patient] courtesy and compassion" (Lieberman, 2013, p. 136).

While expressing concern and compassion for a terminal patient, the family physician still must maintain composure and objectivity to remain effective. Osler (1904) referred to this as "calm equanimity" and added, "Our equanimity is chiefly exercised in enabling us to bear with composure the

misfortunes of our neighbors" (p. 8). Medicine long has emphasized the need for physicians to remain objective and deal with problems factually; if a physician is unable to do so effectively, attempts to hide emotion may lead the physician to adopt a facade that appears unsympathetic and insensitive to the patient's needs. A son reported that "with the worsening of my father's condition, the physician stopped being friendly and warm; his visits became rare and brief; his manner became quite detached, almost angry" (Seravalli, 1988, p. 1729).

Physicians sometimes lose enthusiasm for care when an illness has been recognized as incurable. If this occurs, interaction with the patient diminishes at the very time emotional support is needed most. Time-motion studies indicate that nurses and other ward personnel also spend less time with terminally ill patients when giving baths and providing routine care. Using videotape surveillance of terminally ill patients' rooms in a university hospital, Sulmasy and Rahn (2001) found that the average patient spent more than 10 hours alone while awake per day. Because abandonment is a major fear of terminally ill patients, we must remain aware of the need to reduce the time patients spend without human interaction by physicians, nurses, or family.

Compassion fatigue is a form of emotional exhaustion and diminished empathy more common in health professionals caring for dying patients. Symptoms parallel those of posttraumatic stress disorder—that is, hyperarousal in the form of disturbed sleep and irritability, avoidance of the patient, and intrusive thoughts or dreams relating to the provider's work with dying patients (Kearney et al., 2009).

During the terminal stages of a fatal illness, it is vital to the dying patient that the family physician maintain a warm and caring relationship and, through the strength of the doctor–patient bond, provide support for the patient.

A physician who is uncomfortable discussing impending death can discourage conversation in many subtle ways. Hospital rounds are made rapidly, perhaps in a superficial, lighthearted manner, never pausing long enough to give the patient an opportunity to express fears and concerns. Comments such as "everything will be all right" effectively close lines of communication with an intelligent patient who is fully aware of the seriousness of the situation. When the physician tells a patient, "Don't worry," the patient interprets this as, "Don't bother me." Patients are unlikely to initiate discussions regarding their fears of death or feelings of helplessness under such circumstances and remain silent or avoid these issues unless they think the physician is interested and will listen. The physician easily can squelch such conversation, but a slight indication of willingness to discuss the problems disturbing the patient often results in frank conversations, which relieve much of the patient's anxiety and reveal concerns that can be shared only with the physician.

THE "RIGHT TIME" TO DIE

Simpson (1976) described the "how dare you die on me" syndrome in which the patient has the "effrontery" to die before medical and nursing staff have used all the treatments in their repertoire. The patient is supposed to die "at the right time"—neither before all potential effective therapies have been tried nor too long after all palliative procedures have been used. Health professionals often need to believe that everything possible was done for the patient before death. These attitudes have developed because the health care process too often focuses more on professional expectations than patient needs.

We might consider what we have done to a patient who dies in the isolation of a laminar flow room without having been able to touch another person's hand during his last few weeks of life. Such treatment is a *false-positive,* a treatment inappropriate to the real needs of the patient (Saunders, 1976).

However, it is impossible for physicians to provide adequate support during this difficult time unless they have come to grips with their own mortality. Studies by the Group for the Advancement of Psychiatry have revealed that physicians are afraid of death in greater proportion than patient control participants (Aring, 1971). What better defense against death than to make one's full-time vocation fighting it?

Patients are often more willing to accept death than the physicians who treat them, and many fear that they will receive more aggressive treatment than they want. Based on interviews with seriously ill patients, 60% preferred that treatment focus on comfort even if it meant shortening their lives. The other 40% wanted life-extending care. Of those preferring comfort care, only 41% reported that treatment matched their wishes (Teno et al., 2002). In another study, more than half of physicians interviewed admitted they had provided overly aggressive care to patients (Solomon et al., 1993).

Many, if not most, patients will choose toxic chemotherapy even if there is only a slight chance of cure or even if it would prolong their life by only a few months. The concern is that they may choose this route on the advice of their physician even though they will be miserable for those remaining months. It is important to have a straightforward discussion with the patient about the quality and quantity of life with and without chemotherapy. More than 20% of Medicare patients with metastatic cancer had a new chemotherapy treatment regimen started in the 2 weeks before death (Earle et al., 2004).

Unfortunately, chemotherapy is better compensated than are discussions as to its need and potential side effects. It is no surprise that oncologists prefer third- or fourth-line chemotherapy to discussing hospice care. One patient received intrathecal chemotherapy 6 days before his death at a cost of $3400 (Harrington and Smith, 2008).

Communication

WHEN TO TELL THE PATIENT

The issue today is not so much whether to tell patients they have a terminal illness but rather how to share this information with them—because most patients know the nature of their disease process to some degree. Because they know their patients well, family physicians should be able to gauge patients' desire to be told and their capacity to withstand the shock of disclosure. When a terminal state of cancer is inevitable, most patients prefer to discuss such issues with their family physician rather than with their oncologist.

Key Points

- Abandonment is a major fear of dying patients, who spend an average of 10 awake hours alone per day.
- Listening and allowing patients to express their fears and concerns is of great therapeutic benefit.
- Touch and sitting with the patient convey support and compassion.
- Frequent assessment of the patient and family's desire for information must be accompanied by honest answers.
- Patients should be allowed as much control as possible to avoid fear of the unknown.
- When cure is not possible, much benefit can be derived from attention to daily symptom control.
- Avoid giving false hope but remember that hope and humor can be therapeutic.

Patients who have end-of-life conversations with their family physician have lower health care costs during the final week of life. Better communication results in better quality of life and quality of death as well as lower cost (Zhang et al., 2009). End-of-life care is often fragmented among providers, leading to a lack of continuity of care and impeding the ability to provide high-quality, interdisciplinary care. A family conference to discuss a plan of care, which would include the patient if he or she were still capable of participating, is often initiated after the patient's functional decline (Berlinger et al., 2013). Enhanced communication among patients, families, and providers is crucial to high-quality end-of-life care (National Institutes of Health, 2004).

A frank discussion of death or how long the patient is expected to live may not be necessary or even indicated. A good understanding between the physician and patient may make open disclosure unnecessary. The physician's role may be primarily one of supporting patients during the progressive, terminal course of their illness. However, the physician who is uncomfortable with the subject of death should not use such a situation as an excuse to avoid discussing the issue. The family physician's primary responsibility is to take the time to evaluate the situation, make sure the patient's true desires have been assessed correctly, and provide whatever support is needed based on the patient's concepts and needs rather than those of the physician (Table 5-1). An institution's policies should recognize that, on occasion, a health care professional may choose to withdraw from a patient on religious or other moral grounds as a conscientious objection. The institutions should accommodate for this request without compromising standards of professional care and the rights of the patients. The physician should maintain the duty of care until the patient is transferred to another professional (Berlinger et al., 2013).

A physician who can deal with death honestly is able to focus more attention on the patient and can determine the patient's level of awareness by listening and observing nonverbal cues. Clues to the patient's wish to discuss the condition may simply be a deep sigh, a tear, or a shaky voice. The physician must be alert during busy hospital rounds for these or similar signs. The physician can pause to sit and encourage conversation if time permits or return later when more time is available. Whenever possible, however, the response should be at that moment because the patient is more likely to communicate freely in a spontaneous situation. Physicians who are uncomfortable in this situation may insulate themselves from the issue during hospital rounds by checking the bedside monitoring equipment or otherwise directing attention away from the patient, effectively ignoring overt as well as subtle clues to the patient's needs.

Table 5-1 Useful Questions in Determining a Terminally Ill Patient's Needs and Wishes

What do you fear most?
What would you like to accomplish in the time left?
What is your highest priority?
How can I help you achieve this?
What has been most difficult about this illness for you?
How is your family (e.g., wife, husband, child) dealing with your illness?
Is religion important to you?

Talking with patients about their death can be difficult, but end-of-life discussions with patients do not result in greater emotional or psychological stress. On the contrary, worse outcomes are found in those who do not have these conversations. Such discussions result in less aggressive medical care near death and earlier hospice referrals. Wright and colleagues (2008) showed that quality of life deteriorates with a greater number of aggressive end-of-life interventions and improves with longer hospice care. Even if a patient has a short hospice stay of hours to days, the patient may still benefit from a higher quality of life because of better symptom management and spiritual support for both the patient and the family (Waldrop et al., 2009). A key benefit of hospice is bereavement support for the patient's family up to 13 months after the patient has died. When the patient is ready to discuss her or his impending death, the physician and patient are probably past the most difficult stage, and the physician needs merely to listen, accept the patient's feelings, and respond to questions honestly. Most patients raise questions that indicate how much they wish to know, provided the physician gives them the opportunity. The most supportive and facilitative act the physician can provide is to sit and ask the patient, "Do you have any questions?" When asked in a sincere manner, patients who are ready to talk about their death will take advantage of the opportunity, but they may be reluctant under other, more hurried circumstances.

Patients usually will indicate their desire to discuss their prognosis, as well as when they want to avoid the subject and focus on other topics. Even patients who fully accept their terminal process cannot remain constantly focused on that subject and must attend to more satisfying issues. Physicians should honor and respond to this need, just as they would respond to a desire to discuss pain or other problems.

What physicians say to dying patients is not nearly as important as their willingness to listen. One of the most comforting steps physicians can take in caring for the dying is to allow them to talk about their fears, frustrations, hopes,

needs, and desires. *Talking about problems can be very therapeutic.* Patients who are permitted to examine and discuss their feelings about death and dying are grateful for the opportunity and usually become less anxious, experience less pain, and accept their situation more easily. If they are denied this opportunity, especially when the terminal process is obvious, they may be convinced that the time remaining is too terrible to be discussed, and their anxiety will be significantly increased. Often, terminally ill patients are more fearful of the manner in which death will occur (e.g., painful, alone and abandoned, weak and helpless) than they are of death itself.

Do all patients want to be told of their fatal illness, however? Surveys indicate that 80% to 90% of patients say they wish to be told, but many physicians prefer not to tell a patient that he or she is dying. Ward (1974) found that family physicians are more likely to discuss a fatal diagnosis with women than with men (22% vs. 7.5%) and more often with patients in the upper social class than the lower social class (24% vs. 5% for men; 30% vs. 26% for women). Physicians often wait until the patient is close to death before initiating end-of-life discussions with patients and their families. Patients with cancer often receive a more comprehensive discussion about end-of-life issues than patients with noncancer diagnoses (Abarshi et al., 2011). Promoting earlier discussion about end-of-life decisions helps patients and their families to better prepare for the changes to come. Medical students must be trained more adequately to assist their future patients with how to cope with the dying process. Allowing space to patients and family is beneficial for all participants in the discussion, combined with communication that includes active listening tailored to each patient's needs (Mazzi et al., 2013).

Most physicians tell a patient that he or she has terminal cancer if the patient asks a direct question but otherwise evade the issue and discuss it openly only with the family. In many cases, this is the most appropriate course of action; some patients clearly indicate that they cannot and do not wish to face the fact that they have an incurable disease. It is essential, however, that the physician evaluate the true nature of the patient's desire in the matter and neither avoid the issue when the patient wishes to discuss it nor force a discussion on an unwilling individual. "When the task of telling a patient about an onerous diagnosis is too easy, the doctor has become callous. When it is too difficult, he needs to examine his own guilt or anxiety" (Weisman and Brettell, 1978, p. 251).

Patients should be given adequate time to absorb the knowledge of the terminal nature of their illness and the opportunity to react appropriately before death intervenes. This is not possible if the physician procrastinates or rationalizes that it is better not to inform the patient. The process should not be allowed to advance to such a final a stage that inadequate time remains for individuals to react appropriately and put their affairs in order.

HOW TO TELL THE PATIENT

There is no need to answer questions the patient has not yet asked. One way to approach the subject is to ask patients what they think the problem is or how sick they think they really are. The response may be straightforward ("I think I have cancer"), or the patient may indicate a wish to avoid the issue by saying, "I hope it's nothing serious." The patient's condition can be revealed gradually or in stages, such as telling the patient after surgery that there is a suspicion of cancer but that further information will have to wait for the pathology report. The physician should observe the patient's response to this initial suspicion and, based on that reaction, choose a method for presenting subsequent information. Tumulty (1973) supported the concept of *gradualism* in informing a patient and the family of the terminal nature of the illness: "The total truth is revealed in small doses as the illness unfolds, affording the family the opportunity to get its feet under itself before another blow falls. ... The patient and the family need to be eased into the truth ... not slugged with it" (pp. 180-181).

Such a gradual disclosure is likely to lead to acceptance, but a harsh, sudden, or abrupt disclosure is likely to result in denial or severe depression. If the patient appears reluctant to accept the information, do not push the issue; merely make sure that openings for discussion are made available periodically and further information is provided when the patient is ready.

One statement is never appropriate: "There is nothing more that we can do." Such statements tell patients they are being abandoned and increase their feelings of isolation and vulnerability. There is *always* something the family physician can do to provide compassionate, comforting care to the patient and family even if it is only sitting at the bedside so the patient does not feel abandoned. *Distress* can take many forms: physical, emotional, and spiritual, as well as anticipating symptoms that may arise, such as pain, constipation, anxiety, depression, and nausea. Family physicians also can help by stopping or avoiding treatments and diagnostic procedures that hold little promise of improving the patient's quality of life, such as taking vital signs or turning patients in bed when they are trying to sleep. If a test will not lead to a change in treatment, the test is not indicated.

Delivering "Bad News"

When giving "bad news" to a patient, do so privately and without interruption (see eTable 5-1). Use language the patient can understand, allow the patient to be emotional, offer to help break the news to the patient's family and employer, and be sure that care providers know what the patient has been told (Field and Cassel, 1997).

Health care professionals caring for patients at the end of life should assess the patient's readiness to engage in the discussion and appreciate their level of understanding about the situation and how much they want to know. When physicians know the patient's preferences, they can tailor the discussion appropriately, checking periodically for the patient's level of comprehension and desire for more information. It is best to provide small amounts of information at a time, frequently assessing the patient's desire to continue. Also, besides comprehension, what are the patient's expectations?

When sharing information regarding a fatal diagnosis with a patient, eye contact, touch, and personal closeness are important. If possible, sit with the patient and hold his or her hand or touch the forearm. Such gestures convey a sense of support, closeness, and compassion, reinforcing

eTable 5-1 Delivering "Bad News" to Patients

- Choose a private, quiet place.
- Avoid delivering bad news over the telephone because there is no way to know what the reaction is or if a support system is available.
- Allow adequate uninterrupted time; turn off cell phone or beeper.
- Have a family member or friend (another "set of ears") present because the patient may hear nothing after the word "cancer."
- If the family is present, acknowledge everyone and ask their relationship to the patient.
- Ask the patient and family what they already know and determine how much they want to know.
- Be honest but not blunt and assure continued honesty.
- Present information in a few sentences and ensure understanding by those present.
- Watch your body language; convey concern; sit, touch, and look the patient in the eye.
- Let the news sink in; give the information and then pause and wait for a reaction. Encourage the patient to express his or her feelings, fears, and desires.
- Assure the patient that treatment will allow as normal a lifestyle as possible.
- Assure the patient that you will do everything possible to make his or her days pain free and comfortable and that you will be available and will provide continued support.
- Schedule a follow-up visit with family members soon to answer questions and correct misconceptions.
- Communication is an ongoing process determined by the patient's coping mechanisms and desire to know more.
- Do not underestimate the amount of information the patient wants. Talk less about diagnosis and treatment and more about the disease's impact on the patient and family.
- Do not avoid discussing prognosis; lack of information increases anxiety.

Table 5-2 Positive Language to Use with Dying Patients

I will keep you as comfortable as possible.
I will focus on maintaining your quality of life.
I want to help you live meaningfully in the time you have left.
I will do everything I can to help you maintain your independence.
Maintaining your independence and dignity will be my top priority.
I will do my best to fulfill your wish to remain at home.

Modified from Stone MJ. Goals of care at the end of life. *Proc (Bayl Univ Med Cent).* 2001;14;134-137.

verbal assurance that the patient will not be abandoned during the difficult time remaining. Be positive whenever possible (Table 5-2).

Sitting with the patient on the bed or at the bedside rather than standing puts the physician on the same level and conveys in a clear, nonverbal manner a willingness to talk and listen. In one study, physicians visited with hospitalized patients for exactly 3 minutes. Half the visits they sat down, and the other half they remained standing, a little removed from the bed. "Every one of the patients [with whom] the physician had sat down thought the physician had stayed at least 10 minutes. None of the ones [with whom] the physician remained standing estimated that it was as long" (Kübler-Ross, 1975, p. 20).

PROGNOSTICATING

One of the most difficult tasks in medicine is predicting how long someone with a terminal illness will live. People enjoy repeating stories of patients who survived long after the date their doctor predicted. In most cases, however, physicians tend to be overly optimistic, and short estimates are more accurate than longer ones (Evans and McCarthy, 1985).

In fact, physicians overestimate survival more than 60% of the time and underestimate it only 17% of the time (Christakis and Lamont, 2000). In addition to physicians overestimating prognosis, many patients believe their treatment at the end of their life (e.g., radiation) is intended to be curative, when in reality it is palliative. The better that physicians know their patients, the more they overestimate survival, probably hoping the best for patients they know well. The longer the physician has been in practice, the more accurate the prognosis. Most patients want optimistic physicians, but at some point, this optimism may delay palliative treatment.

Attempts have been made to develop indexes (e.g., Karnofsky score) to assist the physician in making objective estimates that correlate with actual survival. However, no accurate method is currently available, largely because of the multiple variables that influence when a patient dies. A good policy is to provide a conservative estimate. It is better to have the patient and family proud that they "beat the odds" or exceeded the physician's prediction than to have the patient die earlier than anticipated.

CONSPIRACY OF SILENCE

Honesty with the terminal patient will provide the greatest benefits. However, the physician frequently is torn between patient and family, with the patient saying, "Don't tell my wife because she can't handle it," while the wife is saying, "Don't tell my husband because he can't handle it." Although the wishes and desires of the family must be considered when deciding how to care for a dying patient, the physician's primary obligation is to the patient. The method of management must be based on the physician's knowledge of the patient and insight into the patient's desires, feelings, and approach to life. Despite all efforts at deception, the patient knows or will soon learn about his or her condition.

By cooperating with the family in a conspiracy of silence, information that really belongs to the patient is withheld. Only if the physician believes that the patient is not yet ready to cope with the information or sincerely wishes not to be told should the information be withheld; however, this is more often the exception than the rule. One patient said, "I knew it was cancer from the moment they started lying to me" (Lamerton, 1976, p. 28). Simpson (1976) described a 63-year-old woman whose family insisted she knew nothing of her inoperable gastric carcinoma. When visited by the physician, "She gave a dry chuckle: 'Only a little ulcer ... and my relatives down from Wales to see me for the first time in 15 years, and the priest here at 6 in the morning?'" (p. 193). When such a charade continues, terminally ill patients become increasingly more isolated because they are unable to communicate their concerns and fears honestly and openly with those closest to them. The elaborate schemes some families and physicians develop to "protect" the patient lead to great tension within the family, as everyone attempts to perpetuate the lie while continuing to interact with the patient.

Similarly, failure to provide the information to the patient's family can lead to a decrease in the quality of their relationship in the time remaining because the patient's tensions and fears are not understood by family members and friends. Dunphy (1976) described a patient with terminal cancer who asked that his wife not be told. He then quickly planned a world cruise, which they had wanted to take for some time. The wife, unaware of the reason for the hasty departure, was unhappy and complaining throughout the trip, while the husband saw himself as a silent martyr, trying to provide a final measure of happiness for his wife. Only after returning home and reminiscing on this miserable cruise did he tell his wife the truth and the reason for the precipitous departure. Had she been told earlier, their final days together could have been a pleasant and memorable experience. At a time when the terminally ill patient most needs closeness, a lie may serve to push them apart.

Denial

Most patients tend to deny the reality of their situation after being made aware of the terminal nature of their illness. Denial is one way of coping with or protecting oneself against overwhelming anxiety, which otherwise could be incapacitating. This reaction is more marked in a patient who is told abruptly without adequate preparation. Although denial is noted primarily when the patient first learns of impending death, it can appear in different degrees

at different times. Even patients who have accepted the terminal nature of their illness will need to use denial periodically to avoid feelings of hopelessness. The mental burden of impending death is too heavy to carry all the time, and periodic relief is necessary to carry on customary activities and enjoy the limited time left. As Aring (1971) noted, La Rochefoucauld said, "Neither the sun nor death can be looked at steadily."

Patients who avoid asking about their illness or prognosis when the physician offers every opportunity usually are experiencing denial. Excessive denial usually means that the patient subconsciously knows the truth but wants to avoid facing it consciously. Even when repeatedly given the accurate diagnosis, some patients deny ever having been told. This denial provides constant emotional protection until the patient is ready to face the truth.

"Watch with Me"

The greatest fear of the dying patient is that of suffering alone and being deserted. There is less fear of a painful death than of the loneliness and alienation that may accompany it. A patient particularly dreads being abandoned by the physician in the face of death and may need increasing levels of professional support as the illness progresses. This is particularly true if family and friends are not able to cope with the deteriorating condition and begin to avoid contact, thus contributing further to the patient's feelings of loneliness and abandonment. If the patient believes that no one is available to discuss the situation openly and honestly, despair is likely to ensue. The patient's fear of the unknown is easier to cope with if his or her apprehension can be shared with a caring physician who provides comfort, support, encouragement, and even a modicum of hope.

Each new problem of the dying patient should be viewed as a nuisance requiring relief or removal and approached with the vigor that one would devote to an acute, short-term illness. When a fresh complaint arises, the patient should be reexamined and attempts made to relieve the symptom so the patient will not feel unworthy of further attention. If everyday nuisances can be controlled or lessened, the patient will believe that there is sincere concern for making her or his remaining life pleasant. The physician should give attention to details such as improving the taste of food by fixing or replacing dentures or stimulating the patient's appetite, eliminating foul odors, and suggesting occupational therapy to avoid boredom.

The physician should take advantage of every opportunity to touch and examine the patient rather than standing apart. Gentle palpation of areas of pain or merely taking a pulse can convey a sense of concern and warmth and provide comfort for an apprehensive and lonely patient. The physician and other health professionals can provide much support merely through conversation. The tendency to withdraw and reduce conversation contributes to the patient's sense of loneliness. Silence is an enemy of dying patients and increases their separation from society. Conversation is a social bond that affirms life and reduces anxiety by providing a means of catharsis. Saunders (1976) summed up the needs of a dying patient with the words of one patient: "Watch with me," asking that he not be abandoned in his final days. The readiness to listen and personal, caring contact are comforts that cannot be matched by modern "wonder drugs" and procedures.

When dying patients notice that people are avoiding them, they may interpret it as rejection because their condition has not improved or as the loss of love from family and friends, which is particularly traumatic because it tends to negate long-cherished relationships; the joys of a rewarding life can suddenly lose their value. The dying patient's contentment depends on maintaining warm relationships with loved ones as well as continuing other satisfying interpersonal relationships, including with the physician. If physicians and others withdraw from interaction with the terminally ill patient, much of the motivation for living disappears and is replaced by despair or terminal depression. The following plea to fellow health professionals is from a young student nurse who was terminally ill (Kübler-Ross, 1975):

I know you feel insecure, don't know what to say, don't know what to do. But please believe me, if you care, you can't go wrong. Just admit that you care. ... All I want to know is that there will be someone to hold my hand when I need it. I am afraid. Death may get to be a routine to you, but it is new to me. You may not see me as unique! .. If only we could be honest, both admit of our fears, touch one another. If you really care, would you lose so much of your valuable professionalism if you even cried with me? Just person to person? Then, it might not be so hard to die—in a hospital—with friends close by (p. 26).

Patient Control

We need to provide options to patients so they can actively participate in their care and feel a sense of control.

Terminally ill patients have a need to believe that they are still in control of their affairs as much as possible even though they have lost control of their bodies. They should be given the freedom to make choices and assume responsibility over as many aspects of their existence as possible. For many individuals, this is an essential part of living, and its loss may destroy their motivation to live. A terminally ill patient should be helped to focus on and cope with the realities of daily living because these problems remain very real and can serve as a diversion from constant preoccupation with the prospect of death. When patients have understanding and insight into the treatment and believe they still have some control over the decision-making process regarding their lives, they are more likely to cooperate with prescribed treatment regimens.

It is often fear of the unknown that makes a patient suspicious and resistant to therapy. Patients also should be given the opportunity to settle their affairs. Studies have shown that 40% of terminally ill patients are most concerned about being a burden to their family and friends and that 40% of the families of cancer patients become impoverished

as a result of providing care for a family member (Emanuel et al., 2003). Concentration on financial business and putting the house in order is a pragmatic approach to active participation in the decision-making process. Some patients may have a burning desire to complete a cherished project, reconcile an estranged relationship, or visit particular places before they die. Positive motivation can be maintained by assisting them to focus on and deal with these issues.

A sense of control is more possible for the patient if pain is controlled and the patient is made comfortable. Sleep should not be forced with medication because some patients resist going to sleep, fearing they may never awaken, and others frequently have terrifying dreams.

The Importance of Hope

Hope is one of the essential ingredients of human existence, without which life is dark, cold, and frustrating. It maintains strength and gives substance to courage. In the presence of hope, suffering of all sorts still has some positive qualities. In its absence, suffering is a completely negative experience (Tumulty, 1973).

Hope allows patients to face the shortness of their lives constructively. Twycross (1986) defined hope as having "an expectation greater than zero of achieving a desired goal." Hope can also be defined as the patient believing in what is still possible. Anything that contributes to a sense of meaning or purpose in life fosters hope. Thus, belief in God or a higher being provides hope and may give a sense of meaning to suffering for some patients.

The physician should not raise false hopes or be overaggressive in treating a terminal illness to help the patient maintain hope. Some patients find it best to plan for a little time and hope for more. A false sense of hope may deflect the patient and family from finding final meaning and value in their remaining lives together.

Even patients with advanced cancer can maintain a positive outlook on life. The physician can help direct a patient toward an achievable goal, such as pain relief, support for the family from a hospice service, or making a trip to visit relatives.

Even laughter can contribute to hope. One patient said, "I may not have much control over the nearness of death, but I do have the power to joke about it." Also, recalling uplifting moments such as vacations or looking at old photograph albums can support hope. Memories of the past can serve to enrich the present (Herth, 1990).

Whereas having one's individuality accepted, honored, and acknowledged fosters hope, devaluation of personhood and a feeling of abandonment and isolation interfere with hope. Hope is also hindered by uncontrollable pain and discomfort. The continuation of pain after attempts to control it have failed contributes to the loss of hope (Herth, 1990).

Even when death is near, the patient can hope for a measure of happiness during the amount of time he or she has remaining. The physician can support the patient's hope for a good quality of life in the remaining time, for spiritual healing, and for a final phase of life that has integrity and dignity.

Hope is a potent force for patients to deal with their illness and to have a confiding relationship with a physician, spouse, or close friend, which can also help prevent depression. Every physician–patient encounter should leave the dying patient emotionally more able to deal with end-of-life issues. Always promote the patient's sense of hope (Ngo-Metzger et al., 2008).

DISCUSSING RELIGIOUS AND SPIRITUAL ISSUES

As patients approach the end of life and grapple with their mortality, their spiritual and religious concerns may be awakened or intensified. Although some physicians may be uncomfortable discussing a patient's spiritual and religious concerns, they can listen respectfully without judgment or discussion of religious views. Patients who believe that the physician really understands their concerns no longer feel isolated or alone in their final days (Low et al., 2002).

One way to approach this issue is to ask the patient, "Is faith or religion important to you in this illness?" In a study of patients with advanced cancer, 88% reported that religion and spirituality were important factors in adjusting to their illness (Balboni et al., 2007). Although religious coping can offer patients a sense of meaning and comfort when facing a life-threatening illness, it is somewhat surprising that a high level of religiousness is associated with preference for aggressive end-of-life care such as mechanical ventilation. These patients may have a greater trust that God will heal them through the treatment even when near death (Phelps et al., 2009).

Prolonging Living or Prolonging Dying?

It has been a long time since pneumonia was accepted as "the old man's friend." As one organic system after another slowed to a halt, the aged person was released from nausea, pain, delirium, and the degradation of lingering deterioration by finally developing pneumonia and dying. The family doctor merely showed concern and support; before antibiotics, there was not much to do but stand by and "let nature take its course." With improved medical care, however, a dying process that might have taken only a few days in previous years now may drag out for months (Veatch, 1972). Modern technology allows improved medical care to be taken to unrealistic extremes; one person was kept alive in a vegetative state for more than 37 years (LORAN Commission, 1989).

Protraction of the dying process is a modern epidemic. Some physicians seem to forget that their primary responsibility is to relieve suffering, not prolong it. Greater clinical skill often is required to provide daily supportive care than to cure acute illness. Tenderness and caring must be included in the protocols of terminally ill patients so that the ravaged patient is allowed to die peacefully, without tubing and respirators. Patients should be allowed "to experience those waning moments unencumbered by high-tech devices that serve only to impede their capacity for human interaction. Here it is the patient's comfort, not the

caregiver's need 'to do something,' that should prevail" (LORAN Commission, 1989, p. 29).

In some situations, therapeutic restraint is necessary to permit a patient to die with dignity. When a cure is no longer possible, care should focus on the comfort of patient and family. At St. Christopher's Hospice in London, feeding is provided by human hands instead of nasogastric or intravenous tubes; "even if the patient does not get enough physical nourishment, he or she gets what is more important—the personal nourishment of someone who cares enough to sit by the bed several hours each day" (Nelson and Rohricht, 1984, p. 174).

Management of Symptoms

When fewer therapeutic options are available, the physician's involvement should increase. Even when no cure is possible, much can still be done to relieve pain and suffering. The family physician can help alleviate the fear, symptoms, and family stress that often make this a distressing time, keeping the patient as comfortable as possible and avoiding any impression of abandonment. A good death means being free of pain and unpleasant symptoms yet having the ability to make clear decisions and prepare for death.

Care of a dying patient can be one of the most rewarding aspects of the family physician's practice. Too often, however, the physician's discomfort with this stage of life contributes to the isolation and discouragement of the terminally ill patient. Unwarranted fears of respiratory depression, addiction, or tolerance prevent the prescribing of adequate amounts of analgesics. The resulting uncontrolled pain makes those final weeks a nightmare for all. Families may disintegrate as a result of the sleepless nights, fears, and guilt that come from trying to cope with uncontrolled symptoms.

Table 5-3 shows symptoms most often encountered in seriously ill hospitalized patients; some are predictable, and all are manageable to some extent. Rarely is a single symptom present, and most patients have two or more. Symptom severity can be decreased if anticipated and treated early. Eliciting and addressing the patient's concerns about anticipated suffering can often be as important as managing the symptoms. Good control of pain, nausea, and dyspnea can enable patients to die in the place of their choosing with comfort and dignity. A study of patients in inpatient palliative care units showed that the quality of dying was associated with adequate symptom management and communication of the expected outcome to the family members (Choi et al., 2013).

The keys to symptom control, as in all areas of medicine, are a careful history and physical examination to determine the various causes of discomfort, as well as a broad knowledge of the therapeutic agents available.

Table 5-3 Common Symptoms in Seriously Ill Hospitalized Patients

	Percentage of Total Patients	
Symptom	**At Any Time**	**Severe and Frequent**
Pain	51	23
Dyspnea	49	23
Anxiety	47	16
Depression	45	14
Nausea	34	6

From Expert Consult—Cecil Medicine, after Desbiens NA, Mueller-Rizner N, Connors AF Jr, et al., for the SUPPORT Investigators. The symptom burden of seriously ill hospitalized patients. *J Pain Symptom Manage.* 1999;17:248-255.

PAIN CONTROL

Key Points

- Analgesics should be given regularly and in adequate doses. When titrated appropriately, analgesics do not cause addiction or respiratory depression.
- Oral morphine is the drug of choice for severe pain.
- Nonsteroidal antiinflammatory drugs (NSAIDs) are recommended for bone or joint pain, antidepressants or anticonvulsants for neuropathic pain, anticholinergics for cramping abdominal pain or bladder spasms, and antipsychotics for restlessness and confusion.
- Prevention and treatment of constipation is required for all patients receiving opioids.

Pain can be physical, psychological, emotional, or spiritual. It can also be a combination of chronic, somatic, visceral, and neuropathic pain. *Somatic* and *visceral* pain account for about two thirds of patients with pain and respond to conventional opioids. About 35% of patients have some degree of *neuropathic* pain, a shooting or stabbing, electric shock–like pain. *Chronic* pain is influenced by memories of past pain and the anticipation of future pain. The fear of worsening pain may distort the patient's perception of current discomfort. Frustration and anxiety may accentuate the pain. All these factors can lower the patient's pain threshold and greatly magnify even minor disturbances (Twycross, 1993).

Failure to treat the whole person often results in inadequate pain control for patients with terminal cancer. Fatigue, insomnia, anxiety, boredom, and anger all contribute to a lower threshold for pain. Rest, sleep, diversion, and companionship all help to increase the patient's tolerance for pain.

Analgesics should be given in adequate amounts to provide comfort. Giving analgesic doses both regularly and on an as-needed basis is ideal for pain management. Using only as-needed doses for moderate to severe pain is suboptimal because it contributes to a lower pain threshold and a need for increasing doses to relieve the pain. When medication is given regularly in adequate doses, the anxiety and fear that accentuate pain are avoided, and lower doses of the drug are effective because the patient no longer fears recurrent or "breakthrough" pain.

Nonpharmacologic Techniques

Nonpharmacologic pain management techniques include transcutaneous electrical nerve stimulation (TENS), exercise, heat, cold, acupuncture, cognitive therapies (relaxation, imagery, hypnosis, biofeedback), behavioral therapy,

Table 5-4 Guidelines for Dosing Data for Opioid Analgesics (see Table 5-5)

1	Evaluate pain for all patients using a 0-10 scale: A. Mild pain: 1-3 B. Moderate pain: 4-7 C. Severe pain: 8-10
2	For chronic moderate or severe pain, do the following: A. Give baseline medication around the clock. B. Order 10% of the total daily dose for PRN administration given every 1 to 2 hours for the PO route or every 30 to 60 minutes for the SC or IV route. C. For continuous infusion, PRN administration can be the hourly rate every 15 minutes or 10% of the total daily dose every 30 to 60 minutes. D. Adjust the baseline upward daily in an amount roughly equivalent to the total amount used for PRN. E. Negotiate with the patient the target level of relief, usually achieving a level at least <4.
3	In general, the PO route is preferable, then the transcutaneous, SC, and IV routes.
4	When converting from one opioid to another, some experts recommend reducing the equianalgesic dose by one third to half and then titrating as in guideline 2.
5	Elderly patients or those with severe renal or liver disease should start on half of the usual initial dose.
6	If parenteral medication is needed for mild to moderate pain, use half of the usual starting dose of morphine or an equivalent.
7	Refer to the *Physicians' Desk Reference* for additional fentanyl guidelines.
8	Naloxone (Narcan) should be used only in emergencies: Dilute 0.4 mg of naloxone with 9 mL of normal saline; give 0.1 mg (2.5 mL) by slow IVP until effect; and monitor patient every 15 minutes. It may be necessary to repeat naloxone again in 30 to 60 minutes.
9	Short-acting preparations should be used in the initial period and postoperatively. Switch to long-acting preparations when the pain is chronic and after the total daily dose is determined.

IV, Intravenous; *IVP,* intravenous push; *PO,* oral; *PRN,* as needed; *SC,* subcutaneous.
Adapted from Quill T, Holloway R, Shah M, et al. *Primer of Palliative Care.* 5th ed. Glenview, IL: American Academy of Hospice and Palliative Medicine; 2010.

psychotherapy, music therapy, and massage. Cold works especially well for neuropathic pain; heat works well for muscle spasm.

Opioids

A symptom-oriented history and careful examination may reveal a number of different sources of pain. Oral candidiasis, decubitus ulcers, constipation, and infected wounds all have specific remedies. Most patients with pain from cancer (and many with pain from non-neoplastic illnesses) require an opioid analgesic. Opioids are often the safest analgesics available, usually causing only temporary sedation and an increased need for laxatives. Opioid toxicity may manifest as myoclonus or nightmares; the patient may exhibit spontaneous jerking or pull the hand away when touched, which can be misinterpreted by others, making them reluctant to touch the patient. Morphine taken orally gives good relief for cancer pain but has some unwanted side effects, mainly constipation and nausea.

High doses of opioids may be necessary to obtain initial pain control in a patient with severe pain. Psychological dependence is rarely a problem in patients who receive appropriate opioid doses for chronic, severe cancer pain. When medication is given before the recurrence of pain, craving for medication does not occur. Physical dependence does occur with routine use, but withdrawal symptoms can be avoided by reducing a dose no more than 20% in any 2-day period.

In the past, physicians feared scrutiny by the U.S. Drug Enforcement Administration for using high doses of morphine to control pain. However, failure to use adequate doses of morphine may be a greater concern now because a physician was successfully sued for undertreatment of pain in a terminally ill patient. The proper combination of pain medications can relieve pain without clouding the mind or suppressing the spirit.

Concerns about addiction, respiratory depression, and tolerance usually are unwarranted in patients with severe pain (Twycross, 1993). If the dose is titrated carefully, the patient's pain (or dyspnea) usually can be controlled completely. Patients can still be alert and mentally clear even when they receive hundreds of milligrams of oral morphine every 4 hours (Bruera et al., 1990).

A number of effective oral opioid preparations are available (Tables 5-4 and 5-5). Start with oral morphine solution 2 mg every hour as needed for pain. If four or more doses are given in 24 hours, divide the total milligrams into every-4-hour doses the following day. Use breakthrough doses every hour as needed between scheduled doses. Do the same for each subsequent day. Titrate the morphine dose upward until analgesia lasts the full 4 hours even if large doses are required. Hydromorphone is a good alternative.

The particular drug used is less important than the method of administration. To *prevent* pain and end the cycle of uncontrolled pain followed by oversedation, an oral narcotic should be administered on a regular schedule around the clock. "Breakthrough" doses equal to about half the regular 4-hour dose can be used as needed for breakthrough pain.

Long-acting drugs such as methadone (half-life 48 to 72 hours) can be prescribed every 8 to 12 hours but are often unsuitable for booster doses. They accumulate over several days and are difficult to titrate, especially in patients who have fluctuating levels of pain or deteriorating renal or hepatic function. Methadone is a synthetic that has no cross-allergenicity with morphine. It is available in oral and injectable forms and has been successfully used via other

Table 5-5 Dosing Data for Opioid Analgesics

Medication	Equianalgesic Dose (for chronic dosing) IM/IV	PO	Usual Starting Doses Adult > 50 kg; for opioid-naïve patients (◆ ½ dose for elderly or severe renal or liver disease) Parenteral	PO	Comments	Half-Life (hours)	Duration (hours)
Morphine	10 mg	30 mg	2.5-5 mg SC/IV q3-4h (◆ *1.23-2.5 mg)*	5-15 mg q3-4h (IR or oral solution) (◆ *2.5-7.5 mg)*	IR tablets (15, 30 mg) oral sol. (2 mg/ml, 4 mg/ml) Conc. (20 mg/ml) can give buccally Morphine ER tablets (15, 30, 60, 100, 200 mg) q8-12h Kadian ER pellets (10, 20, 30, 50, 60, 80, 100, 200 mg) q12-24h Avinza ER pellets (30, 60, 90, 120 mg) q24h Rectal suppositories (5, 10, 20, 30 mg) Not recommended in renal failure.	1.5-2	3-7
Oxycodone	Not available	20 mg	Not available	5-10 mg q3-4h (◆ *2.5 mg)*	OxyIR capsule (5 mg); IR tablet (5, 10, 15, 0, 30 mg); Conc. sol (20 mg/ml) Oxycontin (10, 15, 20, 30, 40, 60, 80 mg)—due to high cost and potential for abuse, use only if failure or contraindication to morphine ER. Combos available with APAP or ibuprofen (generally not recommended). Not enough literature regarding dosing in renal failure. Use caution.	3-4	4-6
Hydromorphone	1.5 mg	7.5 mg	0.2-0.6 mg SC/IV q2-3h (◆ *0.2 mg)*	1-2 mg q3-4h (◆ *0.5-1 mg)*	Tablet (2, 4, 8 mg); oral liquid (1 mg/ml); Suppository (3 mg) Use carefully in renal failure.	2-3	4-5
Methadone (see text for dosing conversions)	½ oral dose 2 mg PO methadone = 1 mg parenteral methadone	24 hour oral morphine / Oral morphine: methadone ratio < 30 mg — 2:1 31-99 mg — 4:1 100-299 mg — 8:1 200-499 mg — 12:1 500-999 mg — 15:1 1000-1200 mg — 20:1 > 1200 mg — Consider consult	1.25-2.5 mg q8h (◆ *1.25 mg)*	2.5-5 mg q8h (◆ *1.25-2.5 mg)*	Tablet (5, 10 mg); solution (1 mg/ml, 2 mg/ml, and concentrated 10 mg/ml) Usually q12h or q8h; long variable T1/2 Acceptable with renal disease; small dose change makes big difference. Tends to accumulate with higher doses; always advise "hold for sedation." Because of long half-life, do not use methadone pm unless experienced. When converting from oral to parenteral, cut dose in half for safety. When converting from parenteral to oral, keep dose the same.	15-190 (N.B. Huge variation)	6-12

Continued on following page

Table 5-5 Dosing Data for Opioid Analgesics (Continued)

Medication	Equianalgesic Dose (for chronic dosing) IM/IV	PO		Usual Starting Doses Adult > 50 kg; for opioid-naïve patients (◆ ½ dose for elderly or severe renal or liver disease) Parenteral	PO	Comments	Half-Life (hours)	Duration (hours)
Fentanyl (see text for dosing conversions)	100 mcg single dose (T1/2 and duration of parenteral doses variable)	24 hr oral MS dose 30-59 mg 60-134 mg 135-224 mg 225-314 mg 315-404 mg	Initial patch dose 12.5 mcg/h 25 mcg/h 50 mcg/h 75 mcg/h 100 mcg/h	25-50 mcg IM/IV q1-3h *(◆ 12.5-25 mcg)*	Transdermal path 12.5mcg/h q72h *(Use with caution in opioid-naïve and unstable patients because of 12-hour delay in onset and offset)*	Transdermal patch (12.5, 25, 50, 75, 100 mcg) N.B.: Incomplete cross-tolerance already accounted for in conversion to fentanyl; when converting to other opioid from fentanyl, generally reduce the equianalgesic amount by 50% (see text, PDR). Acceptable with renal disease; monitor carefully if using long term. IV: very short acting; associated with chest wall rigidity. Oral lozenge (200 mcg start) and buccal tablet (100 mcg start) indicated for breakthrough cancer pain only (see PDR and package insert).	7 (Lozenge) 12-22 (Buccal) 13-22 (Transdermal)	60+ min (Lozenge) 120+ min (Buccal) *(Both not well studied)* 48-72 (Transdermal)
Meperidine	75-100 mg	300 mg		75 mg SC/IM q2-3h *(◆ 25-50 mg)* Generally not recommended	Not recommended	Not recommended for standard analgesia. May be useful for shivering and procedural analgesia/sedation. Toxic metabolites accumulate with repeated doses and with renal or hepatic disease. Contraindicated with MAOIs.	3-4	2-4
Codeine	130 mg	200 mg		15-30 mg IM/SC q4h *(◆ 7.5-15 mg)* IV contraindicated	30-60 mg q3-4h *(◆ 15-30mg)*	Tablet (15, 30, 60 mg); elixir 12 mg and 120 mg APAP/5 ml Tylenol #3 (30 mg with 300 mg APAP); Tylenol #4 (60 mg with 300 mg APAP) Monitor total APAP dose.	3	4-6
Hydrocodone	Not available	30 mg		Not available	5 mg q3-4h *(◆ 2.5 mg)*	Tablet—multiple brand and generic strengths ranging from 2.5-10 mg combined with 300-750 mg APAP Table (hydrocodone/ibuprofen: 7.5/200mg) Elixir 2.5 mg and 167 mg APAP/5ml Monitor total acetaminophen or ibuprofen dose.	3.3-4.5	4-6
Propoxyphene	Not available	130 ng (HCl) 200 mg (Napsylate)		Not available	Not recommended	Not recommended: relatively ineffective Capsule (propoxyphene HCl 65 mg) Tablet (propoxyphene N with APAP 50/325 or 100/650 mg) Monitor total acetaminophen dose.	6-12	4-6

*See Table 5-4 for Guidelines.
†New York State currently requires triplicate reporting.
‡Adults weighing more than 50 kg.
§Half dose for elderly patients or those with severe renal or liver disease.
IR, Immediate release; *IVP,* intravenous push; *MAOI,* monoamine oxidase inhibitor; *meth,* methadone; *mod,* moderate; *morph,* morphine; *MS,* morphine sulfate; *PDR, Physicians' Desk Reference; sev,* severe; *sol,* solution; *SR,* sustained release; *TD,* transdermal.

Table 5-6 Dosing Data for Coanalgesics

Pain Source	Pain Character	Drug Class	Examples	Comments
Bones or soft tissue	Tenderness over bone or joint pain on movement	NSAIDs	Ibuprofen, 400 mg q4hr	Inexpensive; large pills
			Sulindac (Clinoril), 200 mg q12hr	Well tolerated; preferred in renal impairment
			Naproxen (Naprosyn susp, 125 mg/5 mL), 15 mL q8hr	Liquid preparation
			Indomethacin (Indocin, 50-mg caps *or* susp), q8hr	Suppository; more gastritis?
			Piroxicam (Feldene, 20-mg caps), qD	Easiest to swallow; more gastritis?
			Choline magnesium trisalicylate (Trilisate susp, 500 mg/5 mL), 15 mL q12hr	No platelet dysfunction; less problem with gastritis; less effective
			Celecoxib (Celebrex), 100 mg q12hr	Less GI toxicity; high cost
		Steroid	Dexamethasone 4-8 mg at 8 AM and 2 PM daily	Liquid available Insomnia, vivid dreams possible
Nerve damage or dysesthesia	Burning or shooting pain radiating from plexus or spinal root	Tricyclic antidepressant	Amitriptyline (Elavil), 10-50 mg HS	Best studied; sedating; start with low dose
			Doxepin (Sinequan), 10-50 mg HS	10 mg/mL susp available
			Trazodone (Desyrel), 25-150 mg HS	Less anticholinergic effect; one third as potent as amitriptyline
		Anticonvulsant	Carbamazepine (Tegretol), 200 mg q6-12hr	Absorbed from rectum, unlike phenytoin
			Valproic acid (Depakene), 250 mg q8-12hr	Liquid available; can be absorbed rectally
			Gabapentin (Neurontin), 100-400 mg qd to qid	Often effective but expensive
		Steroid	Dexamethasone 4-8 mg at 8 AM and 2 PM daily	Liquid available Insomnia, vivid dreams possible
Smooth muscle spasms	Colic: cramping, abdominal pain, bladder spasms	Anticholinergic	Glycopyrrolate 0.4 mg q 1hr PRN	Oral or parenteral
			Dicyclomine (Bentyl), 10 mg q4-8hr	Capsules
			Oxybutynin (Ditropan), 5-10 mg q8hr	Tablets
			Hyoscyamine (Levsin), 0.125 mg q4-8hr	Sublingual available
			Glycopyrrolate (Robinul), 2 mg q8hr 0.2 mg/mL IV or IM q4h PRN	

Cap, capsule; *GI,* gastrointestinal; *HS,* at bedtime; *IM,* intramuscular; *IV,* intravenous; *NSAID,* nonsteroidal antiinflammatory drug; *PRN,* as needed; *q,* every; *qd,* every day; *qid,* four times a day; *susp,* suspension.

routes. It is metabolized in the liver and has no active metabolites, making it especially useful in patients with renal insufficiency (Toombs and Kral, 2005). The cost of methadone, especially in the parenteral form, has recently skyrocketed, making it cost prohibitive in many settings. The availability of parenteral methadone is limited.

Slow-release morphine preparations such as MS Contin and Oramorph SR can provide excellent analgesia for 8 to 12 hours, and Kadian and Avinza last 12 to 24 hours. The shorter-acting, slow-release tablets may be given rectally when the patient cannot swallow (Wilkinson et al., 1992). Small, soluble tablets or concentrated solutions of morphine or hydromorphone can be given sublingually when the patient is too weak to swallow and can be used for both 4-hour and booster doses.

Fentanyl, a synthetic opioid, is available for use as a transdermal patch (Duragesic) in 12.5-, 25-, 50-, 75-, and 100-µg/hr strengths or a transmucosal lozenge on a stick (Actiq) in 200- to 1600-µg strengths. Because these products are expensive and deliver a wide variation of plasma levels (25-µg patch = 4 to 11 mg of oral morphine every 4 hours), they should be reserved for patients who cannot receive drugs by the oral or subcutaneous routes. However, the patches may not work in thin, malnourished elderly patients because they need a subcutaneous fat reservoir to work. There is no need to use injections when an adequate dose by mouth will work effectively.

Two opioid agents that are available orally are not recommended for cancer pain. Meperidine (Demerol) has a very low oral potency, a short duration of action, and a toxic metabolite that can cause tremors or even seizures (Kaiko et al., 1983). Pentazocine (Talwin, Talacen) is an agonist–antagonist agent that is no more potent than aspirin with codeine and has a high incidence of psychotomimetic effects (hallucinations, confusion) in cancer patients.

Co-analgesics

Co-analgesics are drugs that potentiate the analgesic effects of opioids for particular types of pain (Table 5-6).

Bone Pain

Nonsteroidal antiinflammatory drugs are quite helpful in the alleviation of pain from lesions in bones or skeletal muscles. The nonacetylated salicylates (e.g., salsalate [Disalcid], choline magnesium trisalicylate [Trilisate]) are less toxic to the gastric mucosa and do not inhibit platelet function (Zucker and Rothwell, 1978) but are less potent analgesics. The newer nonsalicylate NSAIDs are more potent, more convenient, more expensive, and less toxic than aspirin. Although no single agent has been shown to be consistently more efficacious, particular patients do seem to favor one drug over another. If swallowing large tablets becomes a problem, piroxicam (Feldene) capsules, naproxen (Naprosyn) suspension, or indomethacin (Indocin) rectal suppositories may be used. The cyclooxygenase-2 (COX-2) inhibitor celecoxib (Celebrex) offers comparable analgesia and less gastrointestinal toxicity but at a higher risk of stroke or heart attack (which may not be an issue in the final weeks of life) and a higher cost. Steroids may also be a helpful adjuvant for bone pain. The steroid side effect of insomnia or vivid dreams may arise. Administering the doses of steroids earlier in the day,

such as dexamethasone 4 mg at 8 AM and 2 PM daily, can prevent negative side effects.

Neuropathic Pain

For the burning, stabbing, or shooting pain caused by nerve damage, an anticonvulsant such as gabapentin (Neurontin), 100 to 400 mg orally one to four times a day, or pregabalin (Lyrica), 50 to 100 mg orally three times a day, may be a useful addition (Rosenberg et al., 1997). Amitriptyline or nortriptyline, in doses smaller than those used to treat depression (10-50 mg at bedtime), are often effective, but newer agents such as venlafaxine (Effexor) or duloxetine (Cymbalta) may be effective for neuropathic pain and have fewer side effects. If swallowing problems arise and a tricyclic drug is needed, doxepin (Sinequan) solution may be used. The addition of carbamazepine (200 mg three times daily) or valproate (Depakene, 250 mg three times daily) should be considered if the tricyclic agent alone is not adequate. Both doxepin and carbamazepine can be administered rectally in gelatin capsules (Storey and Trumble, 1992). Steroids are helpful in treating neuropathic pain.

Visceral Pain and Smooth Muscle Spasm

If smooth muscle spasms are not caused by a treatable condition, such as urinary tract infection from a nonessential Foley catheter, these are best treated with an anticholinergic agent such as dicyclomine (Bentyl) or oxybutynin (Ditropan). For severe cases, 0.6 to 1.6 mg of glycopyrrolate (Robinul) subcutaneously may be used (Storey et al., 1990). The physician must be alert for side effects such as dry mouth, constipation, and delirium.

ANXIETY AND DEPRESSION

If anxiety is severe enough to require drug therapy, a benzodiazepine such as lorazepam (Ativan), 0.5 to 1 mg two or three times a day, may be effective. Antidepressants such as nortriptyline (Pamelor), desipramine (Norpramin), and doxepin in low doses (25-75 mg at bedtime) have analgesic properties and can help with insomnia and agitation. Selective serotonin reuptake inhibitors (SSRIs) and serotonin–norepinephrine reuptake inhibitors (SNRIs) may also be effective. Mirtazapine may provide the advantage of improved sleep and appetite. Psychostimulants such as methylphenidate (Ritalin), 2.5 to 10 mg orally at 9 AM and 12 noon, take effect quickly and can relieve depression and pain in some terminally ill patients, especially when the prognosis is limited (Block, 2000). Quetiapine (Seroquel), an atypical antipsychotic beneficial for addressing bipolar disorder and schizophrenia, can also be used as an adjuvant antidepressant.

Grief and depression may appear similarly. The key to their differentiation is whether the patient is able to function. For example, a grieving patient will still function by taking his or her children to school or going to work and will temporarily improve on seeing his or her grandchildren, but depressed patients will not function appropriately.

In family members, *complicated grief,* also called "unresolved grief," is grief persisting more than 6 months and occurring at least 6 months after death. Normally, grief symptoms fade over time, but those of complicated grief linger or worsen, resulting in a chronic state of mourning. Although complicated grief can lead to depression, it may be distinct and associated with long-term functional impairment (Prigerson et al., 1995). Parents who have not successfully worked through their grief are at increased risk of mental and physical problems 4 to 9 years later (Lannen et al., 2008).

DELIRIUM OR AGITATION

Delirium or agitation is often seen in dying patients. It may result from the disinhibition of the nervous system that takes place. It is often concerning for family members because personality changes are associated with the delirium. This can result in the patient's attempting to get out of bed, when he or she is significantly weaker, increasing the risk of falling or harming caregivers. Haloperidol (Haldol) is an antipsychotic that is beneficial for restlessness or confusion. It can be administered orally, rectally, intravenously, or subcutaneously. It is reasonable to start with 0.5 or 1 mg every hour as needed for breakthrough restlessness and monitor over an initial 24 hours. If the patient requires three or more doses in a day, adding the total haloperidol, dividing evenly and scheduling the haloperidol regularly may be beneficial. Chlorpromazine (Thorazine) is an antipsychotic that is more sedating than haloperidol; the patient's family members may desire this sedating effect at a certain point in the patient's disease progression. Escalating the dose of the chlorpromazine may be necessary to treat progressively worsening agitated delirium (Bascom et al., 2013). Chlorpromazine, given subcutaneously, may cause more irritation to the injection site than haloperidol. Atypical antipsychotics may be used when there is a longer prognosis of weeks to months to decrease the side effects of extrapyramidal symptoms and tardive dyskinesia. Quetiapine (Seroquel) is favored over other atypical antipsychotics for patients with Parkinson disease or parkinsonian features because it improves delirium without worsening motor function (Friedman, 2011). When symptoms of anxiety and restlessness are both present, benzodiazepines are effective in treating these symptoms, as listed in the previous section on anxiety.

DYSPNEA

As with pain, dyspnea can have many causes. When anemia, bronchospasm, and heart failure have been excluded or treated, the focus should be on symptom control. Oxygen has been shown to be helpful for controlling dyspnea in patients with hypoxia but may be less convenient and more expensive than opioids. When the dose of opioid is titrated carefully to control the pain and is administered on a regular schedule, with additional doses available for breakthrough dyspnea, the patient can obtain excellent relief without significant respiratory depression (Bruera et al., 1990).

Evidence from 13 studies shows a valuable effect of morphine for dyspnea in advanced lung disease and terminal cancer. However, using nebulized versus oral opioids showed no additional benefit. Good-quality evidence shows that long-acting β-agonists are beneficial in the treatment of

dyspnea in patients with chronic obstructive pulmonary disease (Qaseem et al., 2008).

Albuterol nebulizer treatments every 4 hours while the patient is awake may help relax the bronchospasms that often result in dyspnea and loosen the secretions that become more cumbersome as the respiratory muscles become weaker.

It may also be helpful to provide cool, moving air (open window, fan) and keep an unobstructed line of sight between the patient and the outside. Careful consideration should be given to the use of antibiotics for pneumonia in terminally ill patients. Because dyspnea can be controlled well without antibiotics, the physician must decide whether the antibiotics will improve the quality of life or just prolong the dying.

CONSTIPATION

Constipation can be more easily prevented than treated. When mobility and oral intake decrease and opioid analgesics are required, virtually every patient will require regular doses of laxatives to avoid distressing constipation. The laxative should be given once or twice *every* day and the amount increased to get a soft bowel movement every 1 to 2 days. Bulk laxatives are tolerated poorly and rarely are adequate for these patients. If docusate (Colace), 100 to 200 mg twice daily, is not effective, senna (Senokot), 1 to 4 tablets twice daily, should be added. Sorbitol 70% may be added in doses of 15 to 45 mL two or three times per day if the tablets are inadequate or if dysphagia causes aspiration risk when taking tablets. If a patient has gone several days without a bowel movement or is having small, frequent, liquid stools, an impaction may require manual removal. Bisacodyl (Dulcolax) 10-mg suppositories or sodium phosphate (Fleet) enemas may be needed occasionally until an effective oral regimen is found. Impaction may cause delirium, which can mimic pain. In these patients, the delirium may be improved with a simple enema.

NAUSEA AND VOMITING

In patients with nausea and vomiting, the physician should first look for a reversible cause such as constipation or gastritis from NSAIDs. If increased intracranial pressure is the cause, the patient may require steroids. Overfeeding may be the problem if a nasogastric or gastrostomy tube is in place. Metoclopramide (Reglan) is the agent of choice when an enormous liver limits gastric emptying or slow motility is causing early satiety. Many patients whose nausea and vomiting have not responded to prochlorperazine (Compazine) or promethazine (Phenergan) will be relieved by haloperidol (Haldol), 0.5 to 2 mg orally or subcutaneously every 4 to 8 hours. Effective and expensive preparations (usually unnecessary for hospice patients) that are approved for the treatment of nausea associated with chemotherapy include ondansetron (Zofran), granisetron (Kytril), dolasetron (Anzemet), and palonosetron (Aloxi). Parenteral fluids administered subcutaneously may provide some relief from the nausea. Either D5 ½ normal saline or normal saline is often effective, given about 1 L/day or 40 cc/hr. It can be administered as a rapid drip, if time is limited, so that the patient does not have to have a cumbersome fluid bag all day. If the patient develops worsening respiratory secretions, increasing abdominal girth, or worsening extremity edema, it would be necessary to decrease or stop the parenteral fluids because it demonstrates that the patient's body is not able to process the fluid.

As with persistent pain, persistent nausea should be treated with regularly scheduled antiemetics. Combinations of antiemetics that have different modes of action may be needed. A combination of haloperidol with metoclopramide or dexamethasone may be effective. When oral antiemetics cannot be tolerated, rectal suppositories can be tried but rarely provide adequate control for persistent nausea and vomiting unless they are compounded from the potent agents just mentioned. Continuous subcutaneous infusions of metoclopramide, haloperidol, and the required opioid are more effective (Baines, 1988). Discontinuation of metoclopramide is recommended for complete bowel obstruction because this can worsen abdominal pain, nausea, and vomiting (Doyle et al., 2004). Even vomiting associated with complete bowel obstruction can be controlled *without* a nasogastric tube or gastrostomy with a continuous subcutaneous infusion of opioids, antiemetics, and anticholinergic agents (Baines et al., 1985). Octreotide (Sandostatin) has also been extremely effective.

HICCUPS

Persistent hiccups can be caused by any lesion affecting the phrenic nerve and by gastric distention or systemic problems, such as uremia. Oral treatment may include baclofen (Lioresal), 10 mg every 8 hours as needed; chlorpromazine (Thorazine), 25 to 50 mg every 4 to 6 hours as needed; metoclopramide, 10 to 20 mg every 6 to 8 hours as needed; or haloperidol, 1 to 2 mg every 4 to 6 hours as needed.

SUBCUTANEOUS ROUTE

When oral opioids or antiemetics cannot be tolerated because of nausea, vomiting, stupor, or extreme weakness, parenteral medications may be needed. Frequent intramuscular injections or frequent restarting of intravenous infusions can be painful and difficult to manage at home. In these cases, medications can be administered subcutaneously, either by intermittent bolus or by continuous infusion. At least 50 mL of medication per day can be infused through a small-gauge butterfly needle under the skin of the upper chest, arms, abdomen, or thighs using a portable pump. Morphine and hydromorphone have been shown to be safe and effective when administered by this route (Bruera et al., 1988). Methadone, metoclopramide, haloperidol, lorazepam, dexamethasone, glycopyrrolate, and parenteral fluids can also be administered subcutaneously (Destro et al., 2012).

Nutrition

Although uncontrolled pain is the principal complaint of many patients, the family's primary concern is often the patient not eating well. The causes of cancer cachexia are still poorly understood. Because patients seem to stop eating, lose weight, and eventually die, the natural

assumption has been that even if physicians cannot effectively treat the cancer, they can at least treat malnutrition and thereby delay death.

The problem is that more harm than good can come from tube feedings or pushing multiple cans of supplement each day. The family may feel responsible if the patient loses weight and may feel guilty when the person dies. Unfortunately, the patient's final weeks become a struggle with the family over how much the person has eaten. One patient said, "Tell her to stop pushing that spoon into my face; I don't want any more!" This can be carried to extremes, such as inserting nasogastric tubes in patients who "do not cooperate." If they tug on the tube, their hands may be tied to the bed rails. A study of tube feedings in elderly patients revealed that within 2 weeks, 67% of patients with nasogastric tubes had attempted self-extubation, and 43% had aspiration pneumonia. Gastric or jejunal tubes had a lower self-extubation rate (44%), but 56% of the patients had aspiration pneumonia, 31% had a leak or infection at the insertion site, and 50% had a clogged or kinked tube (Ciocon et al., 1988). Another comprehensive analysis found evidence of many risks and no benefits from tube feeding in patients with advanced dementia (Finucane et al., 1999). Large volumes of supplemental feeding can cause painful gastric distention, nausea, diarrhea, and copious pulmonary secretions. Routinely checking residuals of gastric content before each tube feeding is beneficial. This can be done by gently pulling back on the syringe attached to the tube used for feeding to measure any fluid left in the stomach. If residuals are more than approximately 60 cc, then the patient may not be processing the tube feeding, so that the patient or family can see why decreasing or stopping the tube feeding would be in the patient's best interest.

There is no evidence that forced feeding of cancer or dementia patients prolongs life. Careful metabolic studies on force-fed cancer patients at the National Institutes of Health showed irreversibly increased metabolic rates from forced feeding. It was speculated that tumor growth was accelerated (Terepka and Waterhouse, 1956). Animal experiments have shown that growth rates of a variety of different cancers are nutrient dependent; the growth rate slows down with fasting or protein-free diets and speeds up with total parenteral nutrition (TPN) (Buzby et al., 1980; Stragand et al., 1979). In several trials, patients who received TPN plus chemotherapy were compared with those receiving chemotherapy alone. The TPN group died faster, especially patients with lung adenocarcinoma (Jordan et al., 1981), colorectal cancer (Nixon et al., 1981), and small-cell lung cancer (Shike et al., 1984). Pooling data on TPN and cancer through 1985, Klein and associates (1986) found that infections were more common in patients receiving TPN and that these patients were less responsive to chemotherapy and had shortened survival times. After reviewing all the clinical trials of parenteral nutrition in patients receiving cancer chemotherapy, the American College of Physicians (1989) concluded, "The evidence suggests that parenteral nutritional support was associated with net harm, and no conditions could be defined in which such treatment appeared to be of benefit. Thus, the routine use of parenteral nutrition for patients undergoing chemotherapy should be strongly discouraged."

What should be done to relieve the anorexia of patients with advanced cancer? eTable 5-2 lists a number of treatable causes of anorexia. Uncontrolled pain blunts any person's appetite and can be alleviated. Low-level nausea, oral candidiasis, and constipation can interfere with eating and can be treated effectively. Families can be taught to relieve xerostomia (dry mouth) using a small syringe filled with water or juice and to prepare soft foods. Corticosteroids and megestrol have been beneficial to some but can cause side effects. The most important service the family physician can provide is to allay guilt. An appropriate statement would be: "I do *not* believe that how much time your husband has or how comfortable he is depends on how much he eats." Family members can be counseled about offering pleasure feedings, not for nutrition but to bring back the pleasant memories of food that was enjoyable. Offering small amounts, about a handful at a time, can keep the portions from being overwhelming. Allowing the patient to take as much or as little as desired is best.

Where to Die

Death with dignity is easiest to accomplish when the patient dies amid the surroundings that gave meaning to his or her life and in the company of those whose companionship provided most of the rewards of living. Physicians too often deny this, however, in the medically conditioned struggle to prolong life. Medical technology has advanced to the point that too few patients are permitted to die at home even though improved diagnostic techniques identify the irreversible nature of a terminal process at an earlier stage. A sorry commentary, reflecting the abuse of technology, is the case of a man who had built his house with his own hands and wanted to die there but was prevented from doing so while physicians exhausted their therapeutic armamentarium in an attempt to prolong his life a few days or weeks. The family physician must remain in charge as the patient's advocate when the consultants want to continue aggressive therapy yet all the patient wants to do is be comfortable. The family physician must have the courage to discontinue aggressive therapy when the evidence points to its futility.

Charles Lindbergh is an excellent example of an individual who insisted on designing his final days in a manner that would preserve dignity and allow him to die as comfortably as possible. When dying of lymphoma, he refused to remain in a medical center on the East Coast and returned to his home in Hawaii, where he made final arrangements regarding his estate and discussed with friends and family the details of his memorial service and burial site. His death was as he preferred—quiet, dignified, private, and in the company of family and friends—a striking contrast to what it would have been had he not insisted on leaving the medical center.

Although 70% of Americans still die in institutions (39% in hospitals and 31% in nursing homes), polls show that 80% of them say they would rather die at home (Farber et al., 2002). Jacqueline Onassis is an example of a prominent person whose wish to die at home was respected. Similarly, Richard Nixon's wishes were respected when his physicians and family knew that he wanted no extraordinary means taken to keep him alive if he developed

eTable 5-2 Management of Anorexia

Treat "anorexia":
Aches and pains
Nausea
Oral candidiasis
Reactive depression
Evacuation problems (constipation)
Xerostomia (dry mouth)
Iatrogenic problems (from chemotherapy or radiation therapy)
Acid problems (gastric ulcers)

Teach the family to prepare soft, easy-to-swallow foods.

Consider steroids.

Avoid nasogastric or gastrostomy tubes and hyperalimentation.

Allay guilt.

an illness that left him seriously debilitated, particularly intellectually.

Some patients do not want to be a burden to their families and pride themselves on being able to afford hospitalization or nursing home care. For some of these patients, the gradual withdrawal from family may be an emotional "letting go" that is necessary for all concerned in their particular family and circumstances. In other cases, the spouse simply may not be equipped physically or psychologically to deal with the loved one dying in the house over time. The important aspect is a network of support for all concerned, with no arbitrary judgment about the best approach. The family physician will be sensitive to the style of living and the style of dying that seem most appropriate in a given case after the options have been explained to the patient and family.

Hospice Care

Key Points

- Hospice care is intended for patients with a prognosis of 6 months or less.
- Most patients are referred too late, with a reported median survival time of only 3 weeks.
- A primary goal of a hospice is to support the patient's wish to die at home.
- The hospice team gives around-the-clock support to the family, relieves them at times to prevent burnout, and provides follow-up bereavement care for up to 1 year.

"Hospice" originally meant a way station for pilgrims and travelers, where they could be replenished, refreshed, and cared for if needed. The Irish Sisters of Charity viewed death as one stage of a journey. They opened hospices for dying patients in Dublin in 1879 and in London in 1905. These were places where dying people could be cared for when such care could not be managed at home.

Cicely Saunders was trained as a nurse and social worker in London in the 1940s. She cared for a dying cancer patient who made a £500 donation to "be a window" in the special home for the dying they both knew was needed. Saunders went to medical school and then worked in St. Joseph's Hospice in London from 1958 to 1965. She discovered the effectiveness of interdisciplinary team support, scheduled doses of oral opioids, and other methods to relieve the symptoms and stresses of her patients and their families. She opened St. Christopher's Hospice in south London in 1967, and the modern hospice movement was born. In 2008, there were almost 5000 hospices in the United States alone.

The hospice concept can benefit patients and families wherever death takes place. A hospice program consists of palliative and supportive services that provide physical, psychological, social, and spiritual care for dying persons and their families. Services are provided by a medically supervised interdisciplinary team of professionals and volunteers and are available both in the home and in an inpatient setting. Home care is provided as necessary: on a part-time, intermittent, regularly scheduled, or around-the-clock on-call basis. The hospice concept is directed toward providing compassionate care for people facing life-limiting illnesses or injuries. Hospice and palliative care involve a team-oriented approach to expert medical care, pain management, and emotional and spiritual support expressly tailored to the patient's needs and wishes. Support is provided to the patient's loved ones as well. At the center of hospice and palliative care is the belief that everyone has the right to die pain free and with dignity and that patients' families will receive the necessary support to allow them to do so (www.nhpco.org, 2009).

The principal requirement for hospice admission is a life-limiting illness with a prognosis of 6 months or less, if the disease runs its normal course, as certified by the patient's physician and the hospice physician. eTable 5-3 lists the standards of a hospice program as developed by the National Hospice and Palliative Care Organization (NHPCO).

The interdisciplinary hospice team consists of a patient care coordinator, a nurse, a physician, a counselor, a volunteer coordinator, and spiritual support. Medical services are on call 24 hours a day, 7 days a week. Continuity of care by the same group of team members provides a familiarity that is comforting to the patient. Volunteers are an integral part of the program and provide many helpful services. Hospice services are covered by Medicare, Medicaid, and most insurance companies to some extent. Some hospices are able to provide charity care.

To qualify for hospice under the Medicare Hospice Benefit, a patient should have a life expectancy of less than 6 months. Again, however, referrals are usually made much too late. A study of five hospice programs in Chicago showed that the median survival time after referral was only 24 days (Stone, 2001). In fact, 7% of patients referred to hospice die within hours of admission. This may be because survival estimates by physicians at admission are accurate only 20% of the time, 63% being optimistic and 17% pessimistic. The longer the physician had cared for the patient, the more optimistic the prediction. In 2011, the median (50th percentile) length of stay in a hospice was only about 19.1 days, and the average length of service was 69.1 days, with 35.8% enrolling in the last week of life (NHPCO, 2013). Family physicians should discuss hospice care when options are still available, not at the end of life.

SUPPORT FOR THE FAMILY

Families and close friends of the dying patient also suffer and should be supported. A good policy is for the physician not only to be sensitive to the needs of family members before death but to also follow up with the family after the patient dies with a phone call, letter, or home visit.

Hospice care is not focused only on the patient; the unit of care is the patient and family. The physical, psychological, and interpersonal needs of both the patient and the family are addressed. After a patient's death, family members may experience increased morbidity and mortality, emphasizing the need for greater family support from the physician. Unfortunately, most physicians do not routinely contact the family after a patient's death, so this need often goes unrecognized.

The "widower effect" is the likelihood that the surviving spouse will die shortly after the death of the partner. However, spouses of partners who received hospice care live

eTable 5-3 Principles of Hospice Care

1. Hospice offers palliative care to all terminally ill people and their families, regardless of age, gender, nationality, race, creed, sexual orientation, disability, diagnosis, availability of a primary caregiver, or ability to pay.
2. The unit of care in hospice is the patient and family.
3. A highly qualified, specially trained team of hospice professionals and volunteers works to meet the physiological, psychological, social, spiritual, and economic needs of patients and families facing terminal illness and bereavement.
4. The hospice interdisciplinary team collaborates continuously with the patient's attending physician to develop and maintain a patient-directed, individualized plan of care.
5. Hospice offers a safe, coordinated program of palliative and supportive care in a variety of appropriate settings from the time of admission through bereavement, with the focus on keeping terminally ill patients in their own homes as long as possible.
6. Hospice care is available 24 hours a day, 7 days a week, and services continue without interruption if the patient care setting changes.
7. Hospice is accountable for the appropriate allocation and utilization of its resources to provide optimal care consistent with patient and family needs.
8. Hospice maintains a comprehensive and accurate record of services provided in all care settings for each patient and family.
9. Hospice has an organized governing body that has complete and ultimate responsibility for the organization.
10. The hospice governing body entrusts the hospice administrator with overall management responsibility for operating the hospice, including planning, organizing, staffing, and evaluating the organization and its services.
11. Hospice is committed to continuous assessment and improvement of the quality and efficiency of its services.

From National Hospice Organization. *Standards of a Hospice Program of Care.* Arlington, VA: National Hospice Organization; 1993.

longer than those whose spouses died without the benefit of hospice care, probably because hospice patients impose less stress on the family (Christakis and Iwashyna, 2003).

The hospice team provides follow-up bereavement care to the family up to 1 year after the patient's death. Family members who experience grief after the death of a loved one are more vulnerable to physical and other emotional disturbances than at any other time in their lives. They need help dealing with the grief, guilt, and symptoms associated with this emotional turmoil. The bereavement services of a hospice team can minimize these problems and can help family members cope with the pain of memories that arise from time to time, especially at holidays, birthdays, and other stressful occasions.

A man dying of cancer did not tell his family or friends in order to spare them. After his death, some admired his ability to suffer in silence, but many were angry and hurt, believing he did not think they were strong enough to suffer with him. The survivors not only were angry because he did not appear to need them but also were hurt because he did not even say good-bye (*New Age Hospice Horizons*, 1989).

The most remarkable contribution of the hospice movement is not that it provides a special and compassionate setting in which terminally ill persons can die without heroic measures but that the family becomes involved and comfortable in caring for the ill member. With the rapid increase of scientific and technologic competence in the field of medicine, families feel increasingly incompetent about the dying process. The hospice movement has reversed this trend and helps family members work with community support services to provide home care for many of these patients. When symptoms cannot be controlled at home, the hospice inpatient unit can provide medical and nursing expertise in a homelike setting.

SELECTING A HOSPICE

Most cities now have more than one hospice. Some organizations consist of volunteers with little or no medical expertise. Others have freestanding inpatient units and their own medical staffs. The questions in eTable 5-4 will help in the selection of a hospice.

Some patients and their families resist entering hospice for fear that their care will be taken over by a stranger and their personal physician will no longer be involved. That fear should be addressed directly by the family physician (Jemal et al., 2009). Many hospices employ a physician board certified in hospice and palliative medicine who can help with particularly difficult symptom problems. (See www.abhpm.org for a list of certified physicians in each area.)

SOCIAL SUPPORT AND RESOURCES IN THE COMMUNITY

See eAppendix 5-1 at www.expertconsult.com.

Advance Directives

An advance directive is a legal document that allows competent adults to express their intentions regarding medical treatment in the event that they lose decision-making capacity because of a terminal illness. Types of advance directives are as follows:

- **Living will:** A form regarding the limitation of life-sustaining medical treatment in the face of a life-threatening illness.
- **Health care surrogate:** The appointment of a person to serve as the health care proxy (or medical power of attorney) to make medical decisions for an incapacitated patient. Ideally, these medical decisions would be based on the patient's preferences expressed in earlier discussions with the health care proxy.
- **Durable power of attorney:** Designates a person to make health, financial, and legal decisions if the patient is unable to do so.
- **"Do not resuscitate" (DNR) order, also known as Allow Natural Death (AND):** Determined by the physician and patient or the patient's health care surrogate or power of attorney.
- **Physician Orders for Life-Sustaining Treatment (POLST):** A set of medical orders based on the patient's wishes, as discussed with the patient's physician. This assures that health care professionals provide only the medical treatment that the patient desires to receive. This is currently endorsed with legislative support in 14 states, and it is in development in several other states.

Key Points

- An advance directive is a legal document expressing a person's preferences regarding care in the event the person becomes unable to make decisions regarding care.
- The most important item is the appointment of a health care surrogate as the patient's proxy.
- Advance directives vary from simple to complex but still cannot cover every possibility.
- A variety of state-specific advance care-planning documents are available on the Internet.

If a person has only one action to take, it should be to appoint a health care surrogate as the person's proxy. Family physicians should encourage every patient to name a substitute decision maker, proxy, or surrogate who can represent the patient's wishes when needed. One problem is that often the surrogates named in the advance directive are not present to make decisions or are too emotionally overwrought to offer guidance.

Each state has its own laws governing advance directives, available at www.caringinfo.org.

Another site for useful advance directive information is:

www.familycaregiversonline.net/legal-resources

The Patient Self-Determination Act of 1991 requires hospitals and other health care institutions that receive Medicare or Medicaid funds to inform patients of their right to formulate advance directives. The purpose is to encourage greater awareness and use of advance directives so that situations of ambiguity can be avoided (Field and Cassel, 1997). The act requires hospitals to provide written information to all patients concerning their rights under state

eTable 5-4 Questions to Ask When Selecting a Hospice

Patient's needs and wishes	1. How does the hospice staff, working with the patient and loved ones, honor the patient's wishes?
Family involvement and support	1. Are family caregivers given the information and training they need to care for the patient at home? 2. What services does the hospice offer to help the patient and loved ones deal with grief and loss? 3. Is respite care (i.e., relief for the caregiver), including inpatient care, available? 4. Are loved ones told what to expect in the dying process, and what happens after the patient's death? 5. What bereavement services are available after the patient dies?
Physician's role	1. What is the role of the patient's physician after hospice care begins? 2. How will the hospice physician oversee the patient's care and work with the patient's doctor?
Staffing	1. How many patients at any one time are assigned to each hospice staff member who will be caring for the patient?
Volunteers	1. What services do volunteers offer? 2. What screening and types of training do hospice volunteers receive before they are placed with patients and families?
Comfort and pain management	1. Does the hospice staff regularly discuss and routinely evaluate pain control and symptom management with patients and families? 2. Does the hospice staff respond immediately to requests for additional pain medication? 3. What specialty or expanded programs does hospice offer? 4. How does the hospice meet the spiritual and emotional needs of the patient and family?
After-hours care	1. How quickly does the hospice respond to after-hour emergencies? 2. How are calls and visits handled when death occurs? 3. Are other services, such as a chaplain or social worker, available after hours?
Nursing home residents and other residential care settings	1. How does the hospice provide services for residents in different care settings?
Hospital and other inpatient options	1. How does the hospice work with hospitals and other facilities during the course of the patient's stay? 2. What will happen if care cannot be managed at home?
Quality	1. What measures does the hospice use to ensure quality? 2. Does the hospice program follow the National Hospice and Palliative Care Organization's Standards of Practice for Hospice Programs? 3. Do hospice professionals have special credentials in their areas of expertise?
Surveys and inspections	1. Is the hospice program certified, licensed, and reviewed by the state (if state licensure applies) or the federal government? 2. What other kind of accreditation or certification does the hospice program or its staff have?
Paying for hospice care	1. Are all of the costs of hospice care covered by the patient's health insurance? 2. What services will the patient have to pay for out of pocket? Are any services provided at no charge?

From National Hospice and Palliative Care Organization. http://www.nhpco.org.

SOCIAL SUPPORT AND RESOURCES IN THE COMMUNITY

In addition to the extended family, other resources that the family physician can use in the care of the dying patient include the visiting nurse or public health nurse. Most county social service departments have some form of homemaker service. Social workers from both public and private agencies can assist the patient and family in dealing with negative feelings, hostile relationships, economic planning, and financial assistance programs. The social worker is often the key to obtaining tangible assistance such as wheelchairs, walkers, and hospital beds and adapting the home for patients with disabilities.

For sensorially deprived patients, talking books, tape cassettes, and other aids are available from local public libraries and the library of the State Commission for the Blind. Chronically and terminally ill children of school age can have teachers for the homebound to keep up with the child's peers, making every day count in as positive a manner as possible. The patient avoids the burden of feeling rejected because of having the stigma of dying. In-home assistance also increases the number of natural interpersonal relationships, avoiding further isolation of a person who already is limited in locomotion and outreach.

Some persons have built close relationships through membership in churches or synagogues, service clubs, choirs, prayer groups, athletic teams, professional associations, hobby clubs, and so on. If these friends and associates do not show up, it may be, as Orville Kelly found before he organized Make Today Count, that they are embarrassed and insecure in the face of this impending death of a friend or that they hesitate to intrude. The family physician does not have time to be a social coordinator, but a brief call to a minister, social worker, or family member usually can start the wheels of social interaction moving again. The physician is simply the catalyst.

Every religion pays special attention to dying persons. Support comes from the priest, minister, or rabbi, who can help the patient work through basic issues of the meaning of life. The question of "why?" and the confusion of guilt that plagues some patients may be addressed best by a religious counselor. Even if a particular unresolved issue is not related directly to the illness, its resolution provides relief for the patient, whether through confession, sacramental absolution, restitution, or reconciliation with a significant other. This can be as important as medication in the care of the whole person. Bereavement on the part of family members or friends also is eased when issues are "made right."

The priest, minister, or rabbi not only serves as a symbol of a community of faith that cares about the sick and dying but also represents a belief system that nurtures hope and trust. The task of the minister (or priest or rabbi) is to sustain and nurture hope through the dying process and to help the dying person surrender the unrealistic forms of hope in favor of more appropriate forms as death draws near (Paterson, 1981).

Example of Medical Power of Attorney

I, ____, appoint _____ as my agent to make any and all health care decisions for me, except to the extent I state otherwise in this document. This Medical Power of Attorney takes effect if I become unable to make my own health care decisions and my physician certifies this fact in writing.

I sign my name to this Medical Power of Attorney on _____ (date).

Signature _____

Printed Name _____

Witnesses

Signature _____ Signature _____

Printed Name _____ Printed Name _____

Figure 5-1 Example of a living will.

law to refuse or accept treatment and to complete advance directives.

Almost 90% of Americans say that they would not want extraordinary steps taken to prolong their lives if they were dying, but only 20% have put that wish in writing in the form of a "living will." The version of the living will shown in Figure 5-1 has several advantages over others. It clarifies the person's preferences, and instead of locking elements arbitrarily in place, it leaves two witnesses as guardians of the individual's wishes and intentions, with discretion to use their judgment in the specific circumstances. This statement presumes goodwill on all sides and should be helpful to all concerned.

There is no one-size-fits-all approach to advance care planning. Some people prefer a simple approach, and others choose a more comprehensive, step-by-step process. The simple approach prevents support measures from being undertaken that should never have been initiated. It is best to have a patient both complete a living will and designate a health care surrogate to ensure that the person receives the desired medical care.

Although advance directives are not guarantees that the patient's wishes will be followed, without them, these wishes probably will not be followed. Since the case of Terri Schiavo, a 41-year-old woman whose feeding tube was removed in 2005 after a legal battle and political storm, patients are much more aware of the need to declare their feelings about life-sustaining treatment. The Schiavo case illustrates the importance of advance care planning to save both families and physicians considerable anguish.

Unfortunately, the legal restrictions arising out of the Schiavo case may be counterproductive. Courts in several states have now ruled that life-sustaining interventions must be continued in the absence of *clear and convincing evidence* that the patient would not want them. Despite efforts to make advance directives address a greater variety of terminal situations, it is almost impossible to state accurately the patient's wishes in every scenario. Advance directives are poorly equipped to cope with the complex clinical situations that often arise, emphasizing the need to appoint a health care surrogate.

In the past, end-of-life decisions were usually limited to deciding whether or not to use cardiopulmonary resuscitation (CPR). Now the range includes feeding tubes, hydration, hospitalization, antibiotic use, and terminal sedation. The more the family can focus on what the patient would want instead of what makes the family members feel most comfortable, the better will be the final decision (Lang and Quill, 2004). CPR can be lifesaving in some cases, but in most terminally ill patients, it is extremely unlikely to result in return of satisfactory cardiopulmonary function, survival to discharge from the hospital, or ability to live outside an institution. In a large multi-institutional study, physicians did no better than chance in identifying their seriously ill hospitalized patients' wishes to forgo CPR, and such wishes, even when known, rarely were respected when the physician believed that another course was more appropriate (Connors et al., 1995).

A relatively simple Advance Care Plan Document is available from Project GRACE (Guidelines for Resuscitation and Care at End-of-life) at www.projectgrace.org. A document that attempts to address a variety of clinical situations that may arise is the Medical Directive site at www.medicaldirective.org. This permits patients and physicians to download a scenario-based living will that includes six different scenarios to cover a variety of situations, plus a personal statement and a health care proxy. See Web Resources for additional sites and more information.

CARDIOVASCULAR IMPLANTABLE ELECTRONIC DEVICES

Many patients with end-stage cardiac disease have implantable electronic devices, such as pacemakers and implantable cardioverter-defibrillators (ICDs). To better prepare patients and their families, the family physician can discuss the risks and benefits of having or discontinuing these devices before an event in which the patient has a significant decline or hospitalization. Pacemakers are considered to neither prolong nor shorten the end of life. Discontinuing a pacemaker may result in angina or dyspnea, so continuing a pacemaker at the end of life is recommended. On the other hand, ICDs cause pain with shocks and are considered to be comparable to resuscitation efforts. At the end of life, when the goal is comfort only, discontinuing the ICD is indicated (Manaouil et al., 2012). The company that

manufactures the device can assist with discontinuing the ICD. Also, placing a magnet the size of the ICD on the chest over the device can deactivate the ICD temporarily while the magnet is in place. ICD deactivation should be explicitly addressed in advanced care planning and at the end of life (Hastings, 2013, p. 167).

EUTHANASIA AND ASSISTED SUICIDE

See eAppendix 5-2 at www.expertconsult.com.

Summary of Additional Online Content

The following content is available at www.expertconsult.com:

eAppendix 5-1 Social Support and Resources in the Community

eAppendix 5-2 Euthanasia and Assisted Suicide

eTable 5-1 Delivering "Bad News" to Patients

eTable 5-2 Management of Anorexia

eTable 5-3 Principles of Hospice Care

eTable 5-4 Questions to Ask When Selecting a Hospice

References

The complete reference list is available online at expertconsult.inkling.com.

Suggested Readings

Available online at www.expertconsult.com.

Web Resources

www.aarp.org American Association of Retired Persons. Consumer information regarding living wills, life after loss, and end-of-life issues.

www.aahpm.org The American Academy of Hospice and Palliative Medicine, a professional organization providing educational resources, jobmart, news, and challenges in symptom management.

www.adec.org Association for Death Education and Counseling. Educational resources on coping with loss, bereavement rituals, grief counseling, and other end-of-life issues.

www.americangeriatrics.org American Geriatrics Society. A variety of clinical practice guidelines and educational materials for those caring for older adults, including inappropriate medication use.

www.ampainsoc.org American Pain Society. Professional education regarding pain management and research.

www.asbh.org American Society for Bioethics and Humanities. Educational materials for health care professionals engaged in academic bioethics and the health-related humanities.

cancer.net American Society of Clinical Oncology. Patient information regarding symptom and disease management.

cancer.org American Cancer Society. Includes a complete listing of support programs and services in your area.

getpalliativecare.org Center to Advance Palliative Care. Tells patients where to find palliative care. Provides links to important websites, videos, and specific resources for clinicians, caregivers, the media, and policy makers.

www.abanet.org/aging Commission on Law and Aging of the American Bar Association. Consumer information on elder abuse, guardianship law, Medicare advocacy, and cognitive impairment.

www.agingwithdignity.org Develops a living will by answering five questions: medical care when incapacitated, medical treatment I want or do not want, how comfortable I want to be, how I want people to treat me, and what I want my loved ones to know.

www.cancer.gov National Cancer Institute. Complete listing of cancer treatment and ongoing clinical trials for the public and health care professionals.

www.caringinfo.org National Hospice and Palliative Care Organization. A layperson's guide to advance care planning. Provides free advance directives for each state, financial considerations, choosing a hospice, and grieving a loss.

www.compassionandchoices.org Compassion & Choices. Nonprofit organization to improve care and expand choice at the end of life, including links to Facing a Terminal Illness, Planning for the Future, and Help for a Loved One.

www.dyingwell.org Dying Well. Dr. Ira Byock's website. Includes resources on end-of-life care, grief and healing, and frequently asked questions about end-of-life experience and care.

www.epec.net The EPEC Project. Education of health care professionals in the essential clinical competencies of palliative and end-of-life care.

www.hospicefoundation.org Hospice Foundation of America. How to locate and choose a hospice, paying for hospice care, tools for caregivers, and so on.

www.nahc.org National Association for Home Care & Hospice. Trade association representing interests and concerns of home care agencies and hospices, including regulatory, legislative, and educational resources.

www.caregiveraction.org Caregiver Action Network. Tips and tools for family caregivers and information on agencies that provide caregiver support.

www.nhpco.org National Hospice and Palliative Care Organization, formerly National Hospice Organization. A professional organization that provides a large variety of educational programs and helps find a hospice or palliative care program.

www.nih.gov/nia National Institute on Aging. Publications and clinical trials on aging and disease and an online searchable database of health topics and contact information that provide help to elderly patients.

www.polst.org Physician orders for life-sustaining treatment. A form that complements but does not replace the advance directive. YouTube videos demonstrate its use in practice.

www.prepareforyourcare.org Prepare for Your Care. An easy-to-use online advance care planning tool. Includes easy-to-understand videos.

www.projectgrace.org Project GRACE. Includes an advance care plan document, examples of a living will in English and Spanish, and which states require it to be notarized.

www.uslivingwillregistry.com U.S. Living Will Registry. National registry that stores advance directives for access by medical professionals (membership required). Provides advance directive forms for all 50 states.

www.ycollaborative.com A consulting service that assists with advance directives, do not resuscitate orders, and medical powers of attorney.

EUTHANASIA AND ASSISTED SUICIDE

Virtually all dying patients think about suicide, and many ask their physicians to help them. The greatest difficulties in the care of the dying sometimes are seen in patients who linger much longer than expected—so-called postmature deaths. How should a caring physician respond to such situations?

In any area where medicine intersects with moral codes, there are diverse opinions and heated debate. The distinctions between euthanasia, assisted suicide, and withdrawing unwanted life-prolonging treatments should be kept in mind. *Euthanasia* involves the purposeful administration of drugs to end life; it is common practice in Holland but unlawful in the United States. Withdrawing or withholding drugs or other treatments that the patient (or surrogate) no longer wants and permitting the disease to run its course are ethical and legal in all states. *Assisted suicide* involves the prescribing of large quantities of drugs for the purpose of empowering patients to take their own lives, which is now legal in certain circumstances in some states.

Most physicians are uncomfortable managing the suffering of a dying patient. It has been proposed that the physician's wish to be released from such a painful clinical relationship may be a factor influencing the patient's suicidal decision. A patient's suicide can have a profound effect on the physician, especially younger physicians. "By some measures, the distress equals in intensity, if not duration, that caused by the death of a parent. Patients' suicides engender anger, guilt, and loss of self-esteem on the part of treating physicians" (Miles, 1994, p. 1787). The emotional strain on some Dutch physicians who had assisted suicide left them "disinclined to repeat the act" (Diekstra, 1993).

The principal reason that most patients requested assisted suicide in Oregon was not uncontrolled pain but rather the loss of control or intolerable debilitation. However, much can be done to relieve patients' fears, and support systems can be devised to provide the necessary care for an incapacitated patient. The physician can almost always find an effective pain-control regimen that does not hasten death. One experience of being thanked for *not* agreeing to assist in suicide by a patient whose previously intolerable pain is now well controlled makes any physician hesitate about participating in assisted suicide. Permanent solutions to temporary problems should be avoided. However, a few patients will have symptoms that are difficult to control in their final days, and physicians should explore "options of last resort," such as palliative sedation, with their hospice and hospital ethics committees.

The idea that any treatable complication of a terminal illness *must* be treated because it *can* be treated is also wrong. Most patients do not want to die, but they are just as concerned about the *quality* of their time remaining as they are about the *quantity*. The physician may rescue a patient with advanced cancer from one potentially lethal complication, only to find that another, which may cause much worse suffering, will end the person's life. Hippocrates' admonition *primum non nocere* ("first, do not harm") also may apply to treatments that under other circumstances might be helpful.

Well-informed and competent adults have the right to refuse medical treatment even if refusal is likely to result in death. Many are willing to sacrifice some quantity of life in exchange for maintaining quality of life. In one study, 60% of seriously ill patients preferred that their treatment focus on comfort and quality of life even if it meant shortening their lives (Teno et al., 2002).

KEY TREATMENT

- Regularly assess patients for pain, dyspnea, and depression at the end of life (SOR: B; Lindqvist et al., 2013; Qaseem et al., 2008).
- Use therapies of proven effectiveness to manage pain at end of life, including NSAIDs and opioids (SOR: A; King et al., 2011; Lindqvist et al., 2013; Qaseem et al., 2008; McNicol et al., 2005; Nicholson, 2007; Quigley, 2007; Wiffen and McQuay, 2007).
- Use therapies of proven effectiveness to manage dyspnea at end of life, including opioids and oxygen (SOR: B; Cranston et al., 2008; Jennings et al., 2001; Lindqvist et al., 2013; Qaseem et al., 2008).
- Use therapies of proven effectiveness to manage depression at end of life, including tricyclic antidepressants, SSRIs, or SNRIs (SOR: B; Qaseem et al., 2008; Widera and Block, 2012).
- Ensure that advance care planning, including completion of advance directives, occurs for all patients with serious illness (SOR: C; Michael et al., 2014; Northouse et al., 2012; Qaseem et al., 2008).
- Use anticonvulsant drugs as adjuvants in management of pain (SOR: B; Bennett, 2011; Wiffen et al., 2005a, 2005b, 2005c).
- Use antidepressants as adjuvants in management of neuropathic pain (SOR: B; Bennett, 2011; Saarto and Wiffen, 2007).
- Treat anxiety at end of life (SOR: C; Lindqvist et al., 2013; Jackson and Lipman, 2004).
- Treat constipation at end of life with laxatives (SOR: B; Miles et al., 2006; Strassels et al., 2010).
- Use therapies of proven effectiveness to manage nausea and vomiting at end of life (SOR: C; Lindqvist et al., 2013; Perkins and Dorman, 2009).
- For patients receiving palliative radiotherapy, if pressure symptoms occur in the beginning of treatment or if symptoms are expected during therapy, start steroid therapy (e.g., dexamethasone, 3-10 mg × 1-3 times orally or parenterally) (SOR: A; Finnish Medical Society Duodecim, 2003).
- Opioids are effective in the treatment of dyspnea; starting dose with morphine solution is 12 to 20 mg; starting dose with long-acting morphine is 10 to 30 mg; and dose is increased by 20% to 30% (up to 50%) (SOR: A; Finnish Medical Society Duodecim, 2003).

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6 Care of the Self

LUKE W. FORTNEY

CHAPTER OUTLINE

Key Points

- Professional burnout is common among physicians and is considered an occupational hazard that significantly impacts patient care.
- Burnout is dynamic and changes along a spectrum depending on both the duration and degree of work-related stress.
- For many physicians, burnout starts as early as medical school but appears to be most significant mid-career, with primary care specialties being at greatest risk.
- Treatment and prevention of professional burnout involves a general, well-balanced approach to physical and mental health.
- Simple but persistent efforts using "The Formula for Good Health" and other tools are an effective evidenced-based approach to achieving wellness.
- Mindfulness is one form of mind-body medicine that is helpful for both burnout prevention and health promotion.
- A regular mind-body practice such as mindfulness can help physicians work through hard times and avoid being overwhelmed by stress.

The Burnout Trap

THE PHYSICIAN PREDICAMENT

Societies of the world have long recognized the fragile and challenging role that healers have played. Although highly regarded in most cultures, healers have also been charged by their communities to oversee and manage the inevitable afflictions of old age, sickness, and death. A culture's medicine-person is and has always been committed to a life of addressing suffering in an endless pursuit to restore and preserve health and balance in the body and mind. Prior to relatively recent advances in science and medical technologies, this endeavor has historically often been unsuccessful (Rakel and Weil, 2012).

Although the landscape, culture, technologies, and beliefs surrounding healing continue to evolve, the predicament has not. Every clinical encounter includes five general patient expectations: trust, compassion, accuracy, safety, and relief. No matter the location or situation, every patient seeks a physician who will establish a trusting therapeutic and compassionate partnership to accurately diagnose the problem and offer safe and effective treatment options that empower the patient. Unfortunately, mistakes, neglect, and bad luck will always be a part of medical practice. It can be very challenging dealing with the blame, guilt, remorse, grief, fear, and anger that come with the loss and injury that occasionally occur in medical practice.

The practice of modern medicine can be called a high-pressure, high-expectation, high-stakes profession that involves the persistent stress of navigating life-threatening issues on a regular basis, but often in a random and unanticipated way. Early psychology research showed that inescapable electric shocks administered to dogs leads to strong emotional stress, learned helplessness, and depression. Just like this classical conditioning experiment where repeated inescapable stress results in depression-like symptoms and learned helplessness (Seligman, 1972), similar effects are also observed among physicians who are subject to the continued, unrelenting, and unpredictable stresses of medical emergencies, overwhelming patient care duties, and beeping pager alerts in on-call situations (Arora et al., 2013). Over time these and other factors can have negative effects on health and quality of life for physicians (Sonneck and Wagner, 1996).

The modern physician predicament incorporates a wide range of stressors and influencing factors. Patient satisfaction scores are now commonly used in part to determine a physician's success and reimbursement, which can pose considerable strain, especially in treating conditions such as addiction, working with demanding patients with unrealistic demands, and managing U.S. Drug Enforcement Administration (DEA) schedule II and III medications, among many others. Furthermore, many physician roles involve not only patient care in clinic and hospital settings, but also teaching, oversight of advanced practitioners, and managerial responsibilities with increasing expectations for excellence (Nedrow et al., 2013).

The advent of electronic health records (EHRs) along with changes in billing, coding, documentation, and electronic patient communication pose new opportunities and challenges in a rapidly changing landscape of insurance coverage and prior authorization processes (Howard et al., 2013). What's more, physicians are independently accountable and licensed professionals who are finding themselves more and more as employees in large health care corporations. Nonetheless, physicians continue to be individually

responsible for staying current with advances in medical research as it applies to patient care. In large corporate hospital environments, physicians must also skillfully navigate personal and professional boundaries with staff, administration, patients, and home life (Chen et al., 2013).

At times the conflicting interests of altruistic expectations from patients and the personal need for rest and limits on work-hour responsibilities can be overwhelming and exacerbate the underlying strain that comes from working with sick patients in an endless stream of crises (Sonneck and Wagner, 1996). In short, physicians are being asked more and more to be everything to everyone in every way all the time (Merton, 1966). It is important to also realize that all of these factors are stressors that come *in addition to* remaining proficient with medical skills in various areas of expertise. Add strain from one's personal life—family, home, and financial disruption—and it is easy to understand why today's physician will at times experience significant professional burnout.

To allow oneself to be carried away by a multitude of conflicting concerns, to surrender to too many demands, to commit oneself to too many projects, to want to help everyone in everything, is to succumb to violence. The frenzy neutralizes our work for peace. It destroys our own inner capacity for peace because it kills the root of inner wisdom which makes work fruitful.

—THOMAS MERTON

BURNOUT AMONG PHYSICIANS

Professional burnout is characterized as a loss of emotional, mental, and physical energy caused by continued job-related stress. It results from ongoing, unrelenting work stress without adequate time away from professional work duties for rest and recreation. The Maslach Burnout Inventory (MBI) is used worldwide and has been validated in samples of various professions, including health care workers (Maslach and Jackson, 1996). It is used to investigate job satisfaction using self-report measures that score three aspects of professional burnout syndrome: emotional exhaustion, depersonalization, and lack of personal accomplishment. A high degree of burnout is one in which a respondent has high scores on the Emotional Exhaustion and Depersonalization subscales and a low score on the Personal Accomplishment subscale (Maslach and Jackson, 1996). Among these, research suggests that emotional exhaustion represents the core burnout dimension among physicians (Lee et al., 2013), which is caused in large part by working long hours with significant off-duty personal-time intrusion (Chen et al., 2013).

Burnout appears to be more common among physicians than other professional groups, with primary care and emergency medicine specialties being at greatest risk (Fortney et al., 2013; Shanafelt et al., 2012; Sonneck and Wagner, 1996) (Figure 6-1). However, research comparing inpatient- to outpatient-based care does not support the belief that burnout is more frequent among hospitalists compared to clinic-based physicians (Roberts et al., 2013). Furthermore, compared with physicians in the early and late stages of their careers, middle career physicians appear to be particularly at risk (Dyrbye et al., 2013).

In general, there are three risk factors recognized as being independently associated with burnout for physicians: hours worked per week, experience of recent work or home conflict, and how that conflict was addressed or resolved (Dyrbye et al., 2011). Overall, up to 60% of all physicians report having experienced burnout at some point in their careers (McCray et al., 2008), with more than 40% experiencing burnout at any single point in time (Wallace et al., 2009). Perhaps the most concerning aspect of physician burnout is that it starts early, with up to 45% of medical students and 80% of medical residents reporting significant work-related burnout (McCray et al., 2008). A cross-sectional survey administered to senior medical students in New York found that 71% met criteria for burnout (Mazurkiewicz et al., 2012).

BURNOUT CAUSES

There are several factors that contribute to burnout (Table 6-1). Increasing workload is significant in primary care. In the United States, implementation of the Affordable Care Act is estimated to enroll 32 million previously uninsured citizens, which will increase demand for primary care services (Mann, 2011). In addition, an expanding elderly population, insufficient supply of new primary care physicians, increased physician attrition, low medical student interest in primary care specialties, and lower primary care services reimbursements compared with other medical specialties add further strain (Baron, 2010; Bell et al., 2002; Dyrbye et al., 2008; Dyrbye and Shanafelt, 2011).

There is a saying that the cobbler always wears the worst shoes. It has been observed that physicians, while striving to deliver high quality care to their patients, tend to give themselves suboptimal care and are less attentive to their own wellness (Wallace et al., 2009). An increasingly bureaucratic health care system also creates the higher likelihood of feeling alienated and depersonalized (Bell et al., 2002; McKinlay and Marceau, 2011). Furthermore, certain personality traits—for example, being highly driven, a strong sense of perfectionism, being strongly empathetic, feeling inadequate, having low self-esteem, and being the classic "type A" workaholic—may add greater risk to burnout syndrome (Table 6-1) (Vicentic et al., 2013).

Other personal factors that correlate with professional burnout (see Table 6-1) include the lack of coping skills for stress (Epstein, 1999; Nedrow et al., 2013), unhealthy habits such as smoking and alcohol abuse, and poor relationships with colleagues. Lack of time for self-care and feeling that there is not enough time in the day to complete necessary work tasks are other common physician concerns—while for some, regret of specialty choice can be a significant cause of burnout (Eckleberry-Hunt et al., 2009). From a medical practice perspective, increasing clinical demands, caring for a difficult or sociomedically complex patient panel, mounting productivity pressures, business or insurance concerns, keeping up with rapidly advancing technology and EHRs, lack of control over office

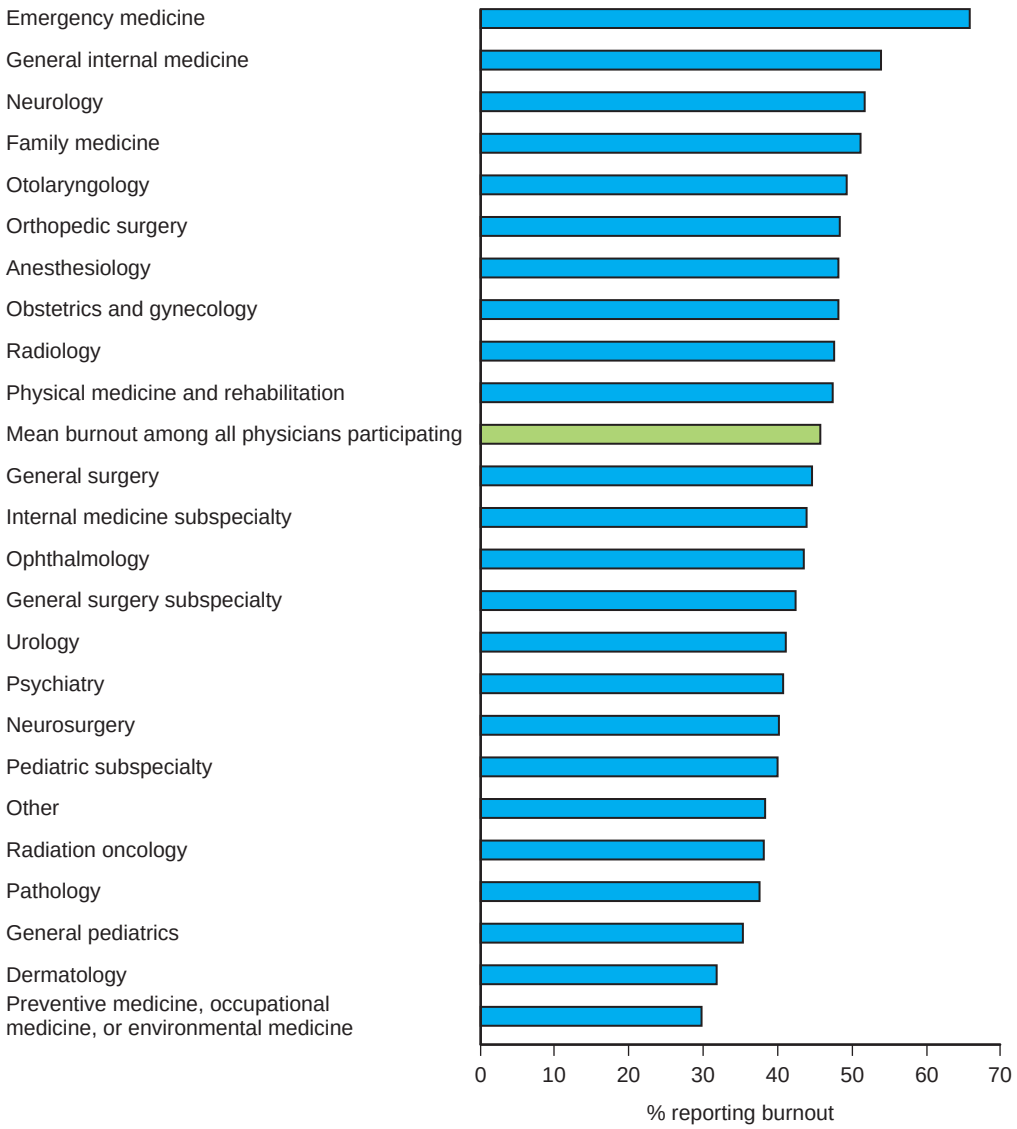


Figure 6-1 Burnout prevalence by medical specialty. (From Shanafelt TD, Bradley KA, Wipf JE, et al. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med.* 2002;136(5):358-367.)

Table 6-1 Risk Factors for Burnout

1. Highly driven, "workaholic," perfectionistic personality
2. Low self-esteem, feeling inadequate
3. Continued unabated work stress and long work hours
4. Poor relationships with colleagues
5. Difficulty resolving home and work relationship conflicts
6. Poor coping skills for stress (smoking, alcohol abuse, drug use, avoidance, confrontational)
7. Lack of time for self-care
8. Feeling there is not enough time in the day to complete work tasks
9. Regret of specialty choice
10. Lack of control over clinic schedule or office processes
11. Rapidly advancing electronic health records, changing insurance landscape
12. Increasing bureaucratization of health care
13. Complex and challenging patient panels

processes and one's schedule are additional physician concerns (Shanafelt et al., 2002). Finally, studies have also identified difficulty in resolving home and work conflicts as a major contributor to physician burnout (McCray et al., 2008; Dyrbye et al., 2014).

BURNOUT EFFECTS

Considerable evidence suggests that burnout negatively affects quality of patient care (Durning et al., 2013), with profound personal implications for physicians, including depression and suicidal ideation (Center et al., 2003; Devi, 2011; Dyrbye et al., 2008; Sonneck and Wagner, 1996). Furthermore, physician attrition because of burnout is both disruptive to continuity of patient care and costly to health care organizations (Scott, 1998). Once burnout is present, absenteeism increases, physician turnover increases, and overall job satisfaction decreases; but perhaps

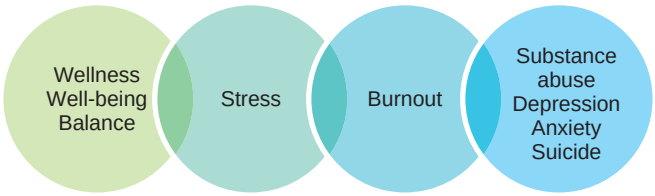


Figure 6-2 Burnout spectrum. (Adapted from West CP, Shanafelt TD. Physician well-being and professionalism. *Minn Med.* 2007;90(8):44-46.)

most concerning is that physicians self-report increased suboptimal patient care and medical errors (McCray et al., 2008). Physician surveys also suggest that 50% of all physicians with professional burnout are also depressed and at risk for alcohol abuse (Brown et al., 2009; Shanafelt et al., 2002). This is especially concerning given that many aspects of patient care—physician self-reported medical error, lower empathy, early retirement, and lower patient satisfaction—are directly affected by physician burnout (Dyrbye and Shanafelt, 2011).

BURNOUT SPECTRUM

On one end of the burnout spectrum is wellness, well-being, and balance in one's personal and professional life (West and Shanafelt, 2007). However as stress increases and persists over time, scores of depersonalization and emotional exhaustion increase, while personal accomplishment measures decrease. The extreme end of the burnout spectrum includes substance abuse, depression, anxiety, and suicidal ideation (Figure 6-2). Death by suicide is considered a major occupational hazard for physicians (Center et al., 2003; Devi, 2011; Sonneck and Wagner, 1996). Among medical students, suicidal ideation is nearly double that of the general population (Dyrbye et al., 2008).

BURNOUT PROTECTION

Certain personal attitudes and perspectives appear to be protective against burnout (Table 6-2). Having a healthy temperament and sense of humor, along with being self-aware, reflective, and attuned to personal needs appears to be helpful. Additionally, having meaningful core values with an optimistic philosophy of life have also been identified as important protective traits (Jensen et al., 2008). Healthy, happy, and well-adjusted physicians also display nonjudgmental and forgiving attitudes, as well as a compassionate acceptance of self and others. Perhaps most importantly, feeling that one is making a difference in one's profession carries significant protection from burnout (Jensen et al., 2008). Fortunately, these skills can be learned and supported.

Finally, as the mind goes, so follows the body and vice versa. This fundamental truth of health was recognized long ago when Plato wrote, "The great error of our day is that physicians separate treatment of psyche from treatment of the body." Even today, this is more commonly recognized. For example, there have been more than 1000 trials that have examined the link between exercise and depression and anxiety (Kirby, 2005), with more than 80 meta-analyses showing significant benefit (North et al., 1990). One study concluded that moderate regular exercise should be included as a viable means of treating depression, anxiety, and improving mental well-being (Fox, 1999). As the saying goes, "we have yet to find a disease that exercise does not help." When it comes to burnout, the importance of regular physical activity as it pertains to wellness cannot be overstated.

Table 6-2 Attributes That Protect Against Burnout

1. Having a healthy temperament and sense of humor
2. Being self-aware, reflective, and attuned to personal needs
3. Having meaningful core values
4. Having an optimistic philosophy of life and work
5. Having a nonjudgmental and forgiving attitude
6. Being compassionate and accepting of self and others
7. Feeling that one is making a difference in one's work
8. Having healthy boundaries and knowing when to say no or step away
9. Maintaining work and life balance with regular restorative time away from work
10. Having supportive and caring friends, family, and colleagues
11. Maintaining a balanced lifestyle of healthy diet, regular exercise, and attention to mind-body needs

A Roadmap to Health and Wellness

The true healer knows that health can only be achieved by promoting a balance of body, emotions, mind, and spirit…first in oneself and then in one's patients.

—HOWARD SILVERMAN, MD

The effects of professional burnout go beyond depersonalization, emotional exhaustion, and low sense of accomplishment. In a ripple effect of consequences, continued unabated work stress can quickly move from health, well-being, and balance on one end of the spectrum and eventually lead to depression, anxiety, substance abuse, and various chronic diseases on the other end. Just as the burnout spectrum is dynamic and shifting from time to time, so is health and well-being, which must be cultivated and supported.

In general, health can be defined as decreased morbidity and mortality. The first rule of health, therefore, is to remove the obstacles to healing. From this perspective, unnecessary early death and suffering are overwhelmingly caused by tobacco use, poor diet, and lack of physical activity alone (Katz, 2013). Just these three adverse health behaviors are directly responsible for 8 out of every 10 deaths in the United States every year (McGinnis and Foege, 1993; Mokdad et al., 2004). Expanding on this, the Centers for Disease Control and Prevention (CDC) has identified four modifiable health risk behaviors—tobacco use, lack of physical activity, poor nutrition, and obesity—that are overwhelmingly responsible for most of the unnecessary illness, suffering, and early death in the United States every year (CDC, 2014; Katz, 2013).

At the same time, positive change in these four main modifiable health risk behaviors is at the root of preventing

unnecessary suffering, while empowering patients and physicians alike to take direct personal action toward wellness in their own lives using straightforward and simple strategies that have dramatic effects on improving longevity and happiness (Kopes-Kerr, 2010; Formula for Good Health). One representative study from the large corpus of literature showing the profound benefits of healthy lifestyle behaviors found that by getting 3.5 hours of exercise per week, eating a healthy diet, not smoking, and having a body mass index (BMI) of less than 30 kg/m^2 reduced the risk of myocardial infarction (MI) by 81%, stroke by 50%, type 2 diabetes by 93%, and cancer by 36% over nearly 8 years. Adhering to all four of these health factors reduced overall risk of death and serious disease by 78% (Ford et al., 2009).

AVOID UNNECESSARY SUFFERING

A basic evidence-based strategy to reduce the risk of developing chronic disease and early death is comprised of the followed five elements (www.meriter.com/wellness; Kopes-Kerr, 2010):

1. Increase physical activity.
2. Eat healthier foods.
3. Avoid tobacco.
4. Consume moderate or no alcohol.
5. Acknowledge and address stress and the mind-body connection.

THE BASIC TENANTS OF WELLNESS: MIND-BODY CONNECTION

There are three main pillars to prevention and health: (1) what we put into the body (e.g., nutrition, medications, supplements, vitamins), (2) how we move the body (e.g., exercise, manual therapies, procedures), and (3) how we perceive the world (e.g., mind-body connection) (Figure 6-3). Mind-body awareness and practice, which are those things that address subjective areas such as emotions, the heart, meaning and purpose, and connection with others, may be the least recognized but most essential aspect of good health. For example, the INTERHEART study, which was a study of risk factors for first MI in more than 24,000 adults from 52 countries, found that psychosocial stress

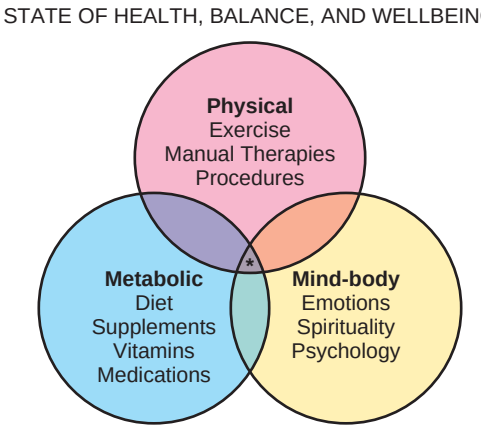


Figure 6-3 Three pillars of health.

was the second most significant risk factor for acute MI, behind smoking, but above hypertension and obesity (Rosengren et al., 2004). Another study found that severe emotional stress was the cause of 19 cases of reversible cardiomyopathy as demonstrated by objective measures such as decreased ejection fraction, prolonged QT interval electrocardiogram (ECG) findings, increased inflammatory monocyte infiltration, and elevated serum troponin and catecholamine levels, despite the fact that 95% of cases had normal cardiac arteries when visualized on catheterization (Wittstein et al., 2005). Yet another study found an inverse association between sense of humor and coronary heart disease. Of 150 participants who were given humorous manuscripts to read, those with existing heart disease were 45% less likely to laugh. Those who did laugh were less likely to have heart disease and hostility overall (Clark et al., 2001). Specific to professional burnout, research shows that there is an increased risk of cardiovascular disease, including metabolic syndrome, hypertension, overall poor health, and increased meta-inflammation, among chronically stressed mid-career physicians (Melamed et al., 2006; Spickard et al., 2002).

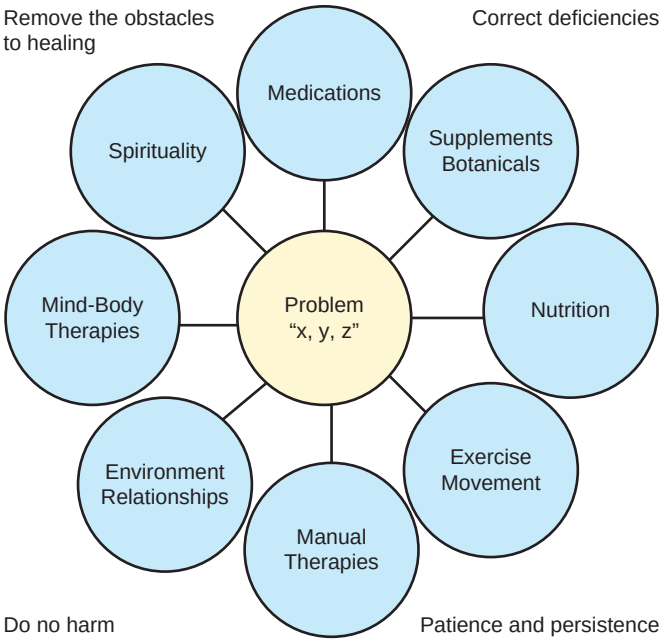
MINDFULNESS IN A MEDICAL CONTEXT

From these three main generalized areas of health (see Figure 6-3) are derived more specific aspects of healing that help guide decisions about what therapies and approaches are best suited from person to person for both illness and wellness (Figure 6-4). But before any therapeutic action can happen, it is essential to start with pausing, being present, and taking an objective inventory of one's current work and life situation before proceeding (Figure 6-5) (Rakel and Fortney, 2012).

The practice of mindfulness is a fundamental dimension of the mind-body connection that addresses every aspect of health. Mindfulness in a medical setting is considered a form of awareness training (Figure 6-6) that enables one to attend to aspects of experience in a nonjudgmental, nonreactive way, which in turn helps cultivate clear thinking, equanimity, compassion, and open-heartedness (Ludwig and Kabat-Zinn, 2008). The goal of mindfulness is compassionate informed action in the world, using a wide array of data, making correct decisions, better understanding the patient and oneself, and ultimately relieving suffering (Epstein, 1999). In this sense, mindfulness aims to maintain open awareness in one's experience in a way that generates a greater sense of emotional balance and well-being. Through the practice of mindfulness, unhelpful habitual thoughts and behaviors can be recognized, allowing for new and creative ways of responding.

MINDFULNESS AND BURNOUT

Growing research shows that the practice of mindfulness can have significant health benefits (Fortney and Taylor, 2010). Among physicians, mindfulness is helpful in both preventing and treating professional burnout. In practical terms, mindfulness operationalizes the notion that increased awareness leads to insight, which in turn leads to increased clarity in making healthy personal choices in any given moment (Epstein, 1999). A study published in *The Journal*



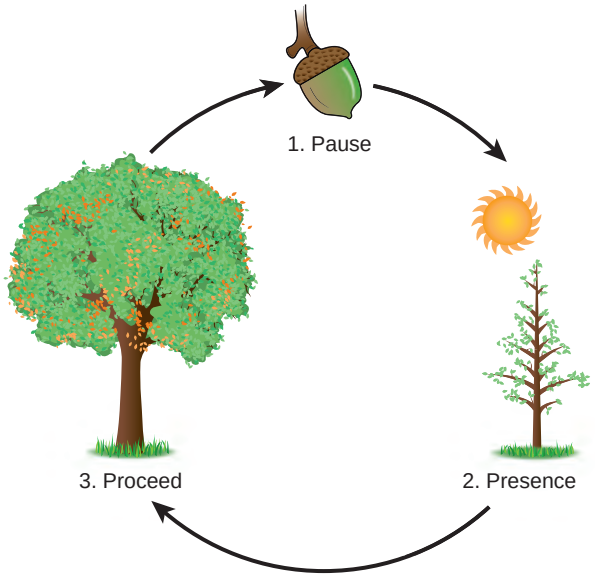
General approach to health and wellness:
1. Awareness of the factors influencing burnout
2. Action steps toward wellness

Peripheral lifestyle factors: (1) Remove obstacles to health, such as smoking, overeating, sleep deprivation, and those lifestyle factors that are in direct competition to well-being. (2) Identify and correct obvious deficiencies (hypothyroidism, anemia, malnutrition, etc.). (3) Choose strategies that are not harmful and have low risk for harm. (4) Encourage patience and persistence with lifestyle changes.

Eight integrated approaches to addressing burnout and any health concern: (1) medications (non-habit-forming options for sleep, mood support, etc.); (2) OTC nutriceuticals that have evidence for safety and efficacy; (3) improving nutrition to include transition to a general healthy, antiinflammatory, whole-foods-based diet; (4) encouragement to increase movement, activity, exercise in any capacity; (5) manual therapies such as massage, acupuncture, etc.; (6) environment and relationships are those external factors that influence health such as air pollution, abusive relationships, toxic work/home settings, etc.; (7) mind-body therapies address internal factors such as emotions, beliefs, thoughts, and memory; (8) spirituality defined as that which gives meaning and purpose and/or is valuable, which may or may not be religious.

Figure 6-4 Integrated eight-wheel approach to health and wellness. OTC, over-the-counter. (Used with permission from Fortney L, Rakel D, Rindfleisch A, et al. Introduction to the integrative primary care: the health-oriented clinic. *Prim Care.* 2010;37(1):1-12.)

of the American Medical Association demonstrated that mindfulness education for primary care physicians over 12 months was helpful in addressing burnout by improving mood and emotional stability. Another study then went on to demonstrate that even an abbreviated course in mindfulness adapted to the professional needs of primary care physicians significantly improved burnout, depression, anxiety, and stress. These positive effects were maintained and generally trended toward further improvements over the length of the 9-month study despite there being no booster sessions or formal follow-up trainings (Fortney et al., 2013).



A 3-step exploration of health: practice in your practice
1. Pause: stop, take a breath, drop in, notice this moment
2. Presence: noticing thoughts, body sensations, and emotions without reactivity
3. Proceed: mindfully responding to whatever needs attention in this moment

Figure 6-5 Mindfulness in medicine: practice in your practice. (Used with permission from University of Wisconsin Integrative Medicine (http://www.fammed.wisc.edu/MINDFULNESS)

Practice:
1. In this moment, what is happening?
2. How does the experience change from moment to moment?

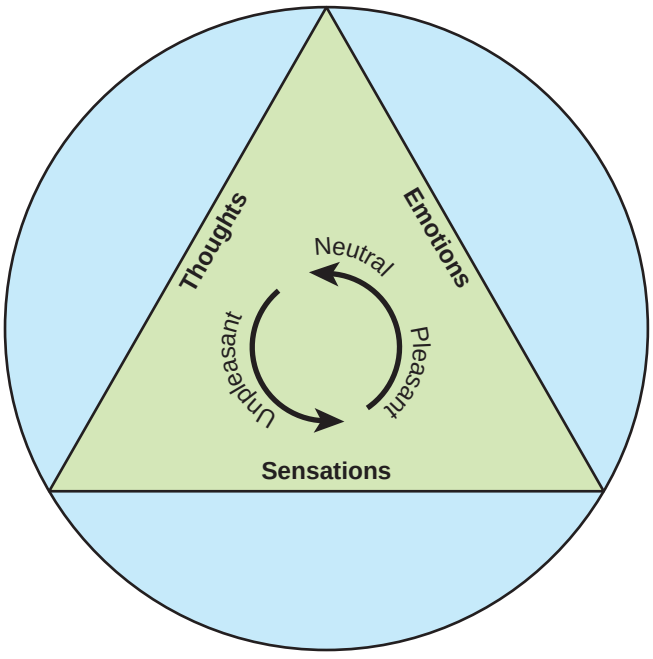


Figure 6-6 Triangle of awareness: becoming aware of things as they are, so as to inform choices for change. (From Fortney L. Chapter 98: Recommending meditation. In: Rakel D, ed. *Integrative Medicine.* 3rd ed. Philadelphia: Elsevier; 2012.)

This study helped show that mindfulness—even relatively brief training—for busy primary care physicians was sufficient in teaching meaningful mindfulness skills that led to significant improvements in burnout that persisted over a relatively long period of time. Similar to exercise, it appears that any amount of mindfulness training and practice is better than none at all when it comes to burnout, stress, health, and well-being (Podein, 2013). These and other findings further support growing evidence that suggests increased emotional awareness among physicians is associated with less burnout, higher work satisfaction, and higher patient satisfaction overall (Jensen et al., 2008; Weng et al., 2011).

MINDFULNESS IN MEDICINE:

Increased research and familiarization with mindfulness in the fields of neuroscience, psychology, and medicine have led to an increased understanding of consciousness and improved treatment for many health conditions, including burnout and stress. Practicing mindfulness (see Figures 6-5 and 6-6) can elicit physical ease and mental stability, which can provide a foundation for health and wellness as they directly influence one's ability to meet the challenges resulting from stress, burnout, and illness for patients and practitioners alike (Rakel et al., 2011). According to experienced meditation teacher Charlotte Joko Beck, the practice of mindfulness "provides a skill that affords a greater sense of self-determination—the ability to cultivate and draw upon inner resources to help meet all circumstances with equanimity and clarity."

Basic mindfulness practice addresses burnout by offering a simple yet effective tool to help ease many of the challenges, both personal and academic, encountered throughout medical training and practice. Medical students who participated in an 8-week mindfulness course showed reduced anxiety, reduced distress and depression, and increased levels of empathy (Shapiro et al., 1998). There is growing evidence that heightened present-moment awareness gained through mindfulness training improves attention and memory as well (Jha et al., 2007). Furthermore, research suggests that mindfulness meditation can help foster present-moment awareness that may reduce medical error and improve patient care by addressing faulty thinking such as snap judgments, distracted attention, inadvertent stereotyping, and other cognitive traps that lead to critical mistakes in patient care (Groopman, 2007). This line of thinking is contrary to previous conventional thinking that medical errors are derived from lack of knowledge. These cognitive processing errors can be avoided by paying attention to the process of thinking by the metacognitive practice of mindfulness (Epstein, 1999).

Research also shows that practitioners who themselves exhibit healthy habits are more effective in motivating patients to make significant positive change for health (Fortney et al., 2010; Frank et al., 2000). In a randomized controlled trial of 124 psychiatric inpatients managed by 18 psychology residents, patients of interns who received mindfulness training did significantly better than those patients treated by interns who did not receive mindfulness training (Grepmair et al., 2007).

CREATE YOUR OWN HEALTH PLAN

Preventive research widely shows the benefits of healthy behaviors, for both avoiding chronic disease and promoting good health. Within the three main areas of wellness (see Figure 6-3), it is clear that even very basic minimal efforts in exercise, nutrition, and mind-body care can have profound health benefits that can lead to reduced mortality and morbidity in the long run (Kopes-Kerr, 2010; Mokdad et al., 2004). In approaching both disease and wellness, the process starts with awareness of those factors that either directly contribute to poor health or create obstacles that interfere with healing and well-being (Fortney, 2010). Heavy alcohol use, smoking, and overindulgence of unhealthy foods are the most common things that inhibit the body's ability to heal and recover. Having a plan to guide the process of wellness can be helpful, and there are simple tools that can facilitate this (Table 6-3; see Figure 6-4) (see the Web Resources).

For busy primary care physicians, knowing when to step away, turn off the pager, and intentionally limit work responsibilities can be very challenging. The practice of "letting go," being more mindful, and living a balanced lifestyle may even seem impossible. However, the effect of burnout on patient care can have negative consequences, as well as negatively affect home life and relationships if a balance of rest, physical health, and work is not

Table 6-3 Strategies That Help Reduce Burnout

Cultivating balance, the "In's and Out's" of personal needs. In any given moment, ask, "What do I need?" Different things are needed in different situations from the perspective of physical, psychological, emotional, and spiritual aspects of life.

Physical	**Energy out**: Unburdening—to release tension and overstimulation in the body. Examples: Movement, exercise, physical activity. **Energy in**: Restorative—to increase energy when physically depleted. Examples: Rest, sleep, food, water.
Psychological	**Energy out**: Unburdening—actively seeking answers and resolving confusion. Examples: Analysis, insight, problem-solving, research, learning. **Energy in**: Restorative—taking in peace and equanimity, letting go of mental clutter and chatter. Examples: Meditation, silence, stillness, mental rest.
Emotional	**Energy out**: Unburdening—cathartic, get it out. Examples: Emotional expression such as journaling, singing, talking with a counselor, "shouting" technique. **Energy in**: Restorative—receiving emotional support and care. Examples: Love, laughter, kindness, positive touch.
Spiritual	Being aware and acknowledging what is personally meaningful in life, what provides a sense of wonder and awe, being connected to something and someone(s) beyond oneself—this may or may not be religious for each person. Examples: Cultivating connection with loved ones, being in nature, recognizing and expressing love, offering service and kindness to others, practicing prayer or meditation, experiencing joy, and pursuing an experience of being alive.

maintained. One study found that doctors who were more mindful with their patients were more upbeat, better listeners, and showed more empathy while remaining efficient in their daily work tasks (Beach et al., 2013). Another study from the University of Warwick found that happier people are more motivated to work harder and overall are more productive (Oswald et al., 2014). As the saying goes, "you can't give what you don't have." Resilience, however, is a dynamic, evolving process of healthy attitudes, mindful awareness, and constructive action steps toward good health (Fortney, 2012; Jensen et al., 2008) (see Figures 6-3 and 6-4).

Summary

It is important to remember that burnout is not static, but rather a dynamic process that changes over time along the burnout spectrum depending on various degrees and duration of work-life stressors (West and Shanafelt, 2007). Nonetheless, the absence of disease—in this case anxiety, depression, and stress—does not automatically imply the presence of health and well-being (WHO, n.d.). The full importance of the impact of happy, healthy clinicians on patient care cannot be overstated (Dyrbye, 2008; Wallace et al., 2009). The path to health and wellness among physicians and for patients starts with self-reflection, personal awareness, and small action steps that incorporate regular physical activity, a reasonably healthy diet, avoidance of substance abuse, and other work-life changes that may be appropriate from person to person (Ford et al., 2009) (see Table 6-3).

KEY TREATMENT

- Professional burnout is a significant occupational hazard for physicians, which has a negative effect on patient care and quality of personal and professional life (SOR: B) (Arora et al., 2013; Brown et al., 2009; Center et al., 2003; Chen et al., 2013; Devi 2011; Durning et al., 2013; Dyrbye et al, 2008; Dyrbye and Shanafelt, 2011; Eckleberry-Hunt et al., 2009; Fortney et al., 2013; Lee et al., 2013; McCray et al., 2008; Melamed et al., 2006; Scott, 1998; Shanafelt et al., 2002; Shanafelt et al., 2012; Sonneck and Wagner, 1996; Spickard et al., 2002; Wallace et al., 2009).
- Emotional exhaustion and emotional awareness are the two most important aspects in recognizing and addressing burnout (SOR: B) (Dyrbye et al., 2013; Epstein, 1999; Jensen et al., 2008; Lee et al., 2013; McCray et al., 2008; Nedrow et al., 2013; Shapiro et al., 1998; Weng et al., 2011).
- Mindfulness training has been shown to reduce stress and burnout among medical professionals (SOR: B) (Beach et al., 2013; Epstein, 1999; Fortney et al., 2013; Krasner et al., 2009).
- Stress, poor diet, lack of exercise, and substance abuse are four modifiable risk factors that contribute to early mortality and morbidity (SOR: A) (CDC, 2014; Kopes-Kerr, 2010; McGinnis and Foege, 1993; Mokdad et al., 2004; Rosengren et al., 2004).
- Stress reduction, eating a healthy diet, getting a minimum of 2.5 hours of exercise a week, avoiding tobacco products, and drinking no to moderate alcohol significantly reduces the risk of chronic lifestyle-related disease and early death (SOR: A) (Ford et al., 2009; Fox, 1999; Katz, 2013; Kopes-Kerr, 2010; Mokdad et al., 2004).

Acknowledgment

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References

The complete reference list is available at www.expertconsult.com.

Web Resources

www.fammed.wisc.edu/mindfulness Comprehensive website for mindfulness in medicine, for personal use and for patient care.

www.fammed.wisc.edu/integrative/modules Evidence-based "Mind/Body Awareness Writing Exercises" that help address stress, trauma, and pain for physicians and patients.

www.fammed.wisc.edu/aware-medicine/self "Writing Your Personal Health Plan" and other self-awareness and self-care tools for physicians.

www.meriter.com/wellness An evidence-based roadmap and plan for improving general health, "The Formula for Good Health."

www.meriter.com/wellness General user-friendly exercise and nutrition prescriptions.

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7 Preventive Health Care

DOUG CAMPOS-OUTCALT

CHAPTER OUTLINE

Key Points

- Preventive interventions should be supported by high-level evidence of effectiveness and safety.
- Of all organizations and committees that make prevention recommendations, the U.S. Preventive Services Task Force (USPSTF) uses the most robust, evidence-based methodology.
- Other groups that make recommendations pertinent to prevention in the primary care and community setting are the Advisory Committee on Immunization Practices (ACIP) and the Community Preventive Services Task Force, both supported by the Centers for Disease Control and Prevention (CDC).
- Screening tests should be assessed for accuracy, safety, and effectiveness. Effectiveness means that screening results in an outcome that is better than occurs when the condition presents naturally and that the benefit gained exceeds harms caused.
- Screening tests can appear effective when they are not because of lead time and length biases.
- In low-prevalence conditions, even with accurate tests, the positive predictive value of the test will be low.
- One of the harms that can arise from screening is overdiagnosis, finding and treating disease, with the associated harms from diagnosis and treatment, when the condition would have resolved on its own or never progressed.
- Some behaviors that lead to bad health can be modified by brief interventions in a clinical encounter, others need more intensive interventions.
- A four-step approach of considering risk assessment, risk reduction, screening, and immunizations can assist family physicians in remembering to address prevention with each patient.
- Reducing "risks" for specific diseases found in observational studies should be tested in controlled clinical trials to see if risk reduction lowers the incidence of the disease.
- Tools available for risk reduction include behavior modification and chemoprevention.
- Physicians should offer to patients screening tests that have an A or B recommendation from the USPSTF.
- Physicians should offer and encourage patients to accept immunizations recommended by the ACIP.
- Preventive services offering the most benefit and those most acceptable to the patient should be prioritized.
- Smoking is the leading cause of preventable mortality and morbidity. Any patient who smokes should be encouraged to cease smoking and be offered nicotine replacement, medications, and support group referral.
- Accurately diagnosing and treating diseases of public health importance, such as sexually transmitted infections, influenza, and tuberculosis, helps control these diseases and prevent drug resistance.
- Family physicians can minimize the effects of communicable diseases in the community by providing recommended treatment for family members and other contacts of those with infectious diseases either with expedited partner therapy or by referring them to the public health department.
- Infection control practices should be enforced in the clinical setting.
- Physicians should report infectious diseases, cancers, and other reportable conditions as required by state and local reporting requirements.
- Clinic staff should be vaccinated as recommended by the CDC.
- Avoiding unnecessary or harmful testing and treatments and their associated harms should be considered part of the preventive practices of family physicians.
- Genomic and genetic testing holds promise for enhancing clinical prevention, but only a few tests have been proven effective at this time, and genetic risk profiling for chronic disease risk has not proven to be beneficial.
- Making prevention interventions routine, as part of the clinical system, helps to ensure a high level of performance.

Family Medicine and Prevention

Prevention is a large part of family medicine. Family physicians provide preventive health care on a daily basis and are frequently consulted by patients on how to stay healthy and avoid disease. Family physicians are also a part of the foundation of the nation's public health system, being the first contact for patients with illnesses of public health importance, a source of surveillance for disease prevalence, and a resource for dissemination of information that can protect the health of the public. This chapter will discuss all these roles and describe how to maximize the effectiveness of preventive services delivered.

Definitions of Prevention

Prevention can be divided into three categories: primary, secondary, and tertiary. Family physicians should consider how all three categories may benefit each patient.

Primary prevention results in the prevention of a disease or condition from occurring. Examples include vaccinations, which prevent an array of infectious diseases, and smoking cessation, which prevents myriad illnesses that result from sustained tobacco use. Primary prevention can be, but is not always, cost saving for society (more money is saved than spent). It often involves community-wide intervention (clean water and sanitation), and the benefits are often unseen and unappreciated by the public.

Secondary prevention involves screening asymptomatic individuals for a disease to detect it early, and with early intervention achieve a better outcome than with later detection and treatment. When testing is performed in those who are symptomatic, to diagnose or rule out a suspected condition, this is not screening, it is diagnostic testing. Screening applies only to those who are asymptomatic. Many disagreements over the value of screening result from not understanding this fundamental difference between screening and diagnostic testing.

Contrary to common belief, secondary prevention does not save money. It can lower morbidity and mortality and usually compares favorably in cost-benefit analyses to medical interventions such as cardiac bypass surgery, but it does not result in more money saved than spent. It can be, however, money well spent.

Tertiary prevention involves interventions that occur after a disease or condition is evident, in an attempt to make the affected person healthier and improve quality of life. An example is cardiac rehabilitation after myocardial infarction. Tertiary prevention also is not cost saving. Because tertiary prevention can prevent a repeat event, such as a second heart attack, it is frequently, although incorrectly, referred to as secondary prevention.

Evidence as the Foundation of Prevention

Solid evidence supporting the effectiveness and safety of an intervention is important. Family physicians are busy and need to use their time effectively, concentrating on providing services that actually result in improvements for their patients. In addition, with primary and secondary prevention, the interventions involve healthy, asymptomatic people. The physician does well to remember that it is hard to improve on the healthy, asymptomatic patient. It can be done, but in attempting to make someone healthier we should ensure that not only are we being effective, we are also being safe and not causing harm in the process.

For this reason the evidence threshold for action should be higher for prevention than for therapy. If a patient has a serious illness, the therapeutic imperative provides a rationale for using treatments that might be supported only by moderate quality studies and intermediate outcomes, if that is the best evidence that exists. For prevention, if the safety and effectiveness of the intervention is not based on high-quality evidence, it is better to wait for better evidence and concentrate on the many interventions available that are backed by strong evidence. It is difficult enough to fit all the proven interventions into a tight clinical schedule without spending time on those we are not sure make a difference.

Figure 7-1 illustrates the pyramid of evidence that is found in the medical literature. At the top of the pyramid, and providing the highest quality evidence, are high-quality systematic reviews and meta-analyses. Next come randomized controlled trials, followed by lesser quality-controlled trials. Below that are observational studies, which are much more subject to bias. Among observational studies, cohort and case-control studies provide more reliable information than cross-sectional studies. Correlational (ecological) studies and case reports are at the base, providing interesting information that should not be used as proof of effectiveness or causation but are useful for generating questions and providing direction for more in-depth research. A description of each type of study is provided in Chapter 9.

Accepted practice should not be altered based on a single observational study and rarely on a single randomized, controlled trial. Single studies are frequently cited to support one view or another, and this practice is called "cherry picking." The astute family physician will want to know that results are reproducible, will realize that more than one study on the topic probably exists, and will ask, "What does the totality of the evidence show?"

There are well-developed methods for assessing the quality of individual studies and for assessing the totality of the evidence. The individual family physician does not need to possess these skills and certainly does not possess the time necessary to properly research each possible prevention intervention; there are organizations and authoritative groups that perform these functions. However, the family physician should know what makes for a high-quality, truly evidence-based recommendation, and know which organizations can reliably be depended on to produce them.

The Institute of Medicine (IOM) has published guidance on how to conduct a high-quality systematic review (IOM, 2011c) and how to produce a high-quality, dependable guideline (IOM, 2011a). A high-quality guideline is based on a high-quality systematic review, preferably conducted by a noninterested, independent party. A high-quality systematic review should involve methods of finding all the

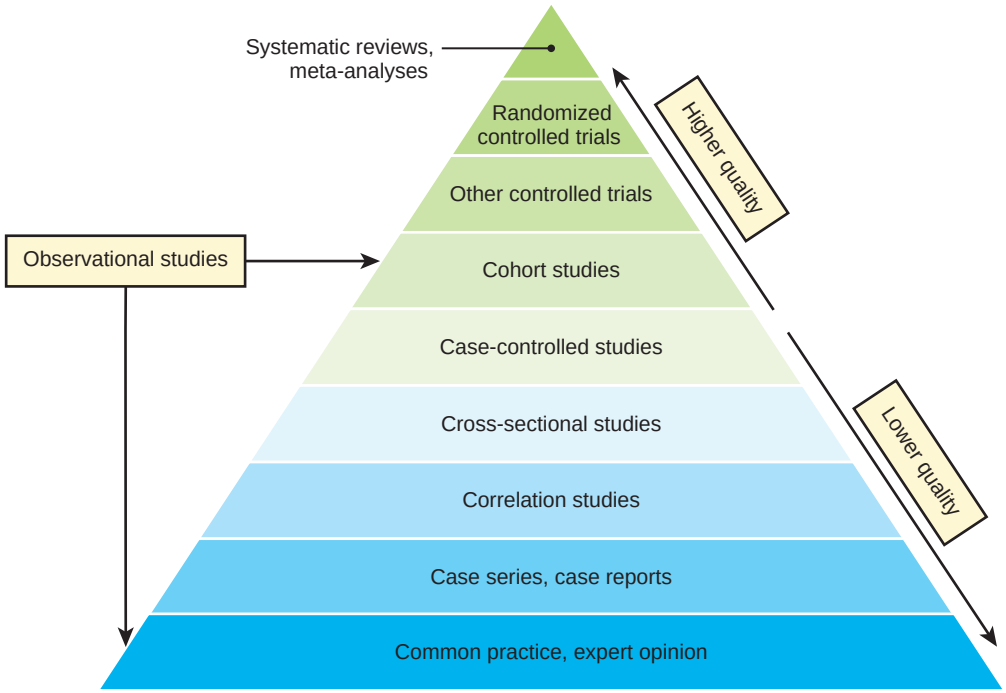


Figure 7-1 The pyramid of evidence.

existing evidence on the issue with clearly defined inclusion and exclusion criteria; a clear and accepted method of assessing each study and for summarizing and ranking all of the evidence; and several reviewers doing the assessment, using defined methods of resolving differences of opinion.

High-quality guidelines also involve a panel of experts with an array of skills, including how to assess the medical literature; conflict of interest policies that minimize and manage potential as well as real conflicts of interest; a methodology that assigns a strength of recommendation that reflects the best available evidence behind it; a limited number of clearly worded, unambiguous recommendations; an emphasis on patient-oriented outcomes, as well as options that allow for patient preferences; a consideration of potential harms as well as benefits; tools that assist with implementation, if they are available; and plans for periodic updating.

As described in the IOM report (2011a), many guidelines and recommendations currently do not meet these standards. This places family physicians in an awkward position, as poor-quality guidelines produced by specialty societies and special interest groups can be perceived as the gold standard because they come from the specialists who are seen as the experts in a particular topic. Some specialty societies produce high-quality guidelines, others do not. Specialist-dominated panels can be conflicted (setting out to defend current practices and justify payments), often do not consider potential harms, frequently are not prevention oriented, and may lack the members with the skills needed to assess the medical literature. This has resulted in the American Academy of Family Physicians (AAFP) developing its own prevention recommendations. These can be found on the AAFP website (www.aafp.org/patient-care/clinical-recommendations/cps.html).

THE UNITED STATES PREVENTIVE SERVICES TASK FORCE

The U.S. Preventive Services Task Force (USPSTF) was first created in 1984 as an independent panel of experts to provide guidance to physicians on the use of clinical preventive services. In 1998, it was placed under the sponsorship of the Agency for Healthcare Research and Quality (AHRQ), while maintaining its independent status, and provided with support to conduct scientific evidence reviews of a broad array of clinical preventive services and develop recommendations. The topics the task force addresses include screening tests, counseling, and preventive medications.

The USPSTF uses a rigorous and strict methodology of considering evidence and making recommendations after balancing documented benefits and harms (USPSTF, 2014). The task force does not consider the costs of the services being assessed or cost-benefit analyses. The interventions evaluated are often already in common use and frequently recommended by specialty and advocacy organizations before they have been thoroughly assessed for effectiveness and safety.

The USPSTF recommendations are separated into four categories: Level A recommendations are reserved for interventions with a clear predominance of benefits over harms backed by high-quality evidence. If evidence is not as robust, or the benefit/harm differential not as great but still in favor of benefits, a B recommendation is given. When benefits and harms are balanced, or overall benefit is minimal, it is assigned a C. Level D (a recommendation against) is assigned when no benefit exists or harms exceed benefits. If insufficient evidence exists to judge the balance of benefits and harms, the USPSTF is not compelled to make a practice recommendation and will assign it an I. Each recommendation made by the task force is accompanied by

a description of the natural history of the condition, the types of interventions available, and the level of evidence that exists on their effectiveness and harms, as well as how the task force recommendation either agrees with or differs from those of other organizations. All USPSTF recommendations are found on their website (www.uspreventiveservicestaskforce.org/recommendations.htm).

The process used by the USPSTF is scientifically robust and is considered the gold standard for assessing evidence and making recommendations. The result, however, often leads to recommendations that are at odds with other organizations and advocacy groups, which tend to adopt new technologies before they are fully tested for effectiveness or safety. In addition, because of a reluctance to make a recommendation without strong evidence, the wording of USPSTF recommendations is often vague about the frequency of testing or screening, because the relative effectiveness of different screening frequencies has not been assessed.

THE CENTERS FOR DISEASE CONTROL AND PREVENTION ADVISORY COMMITTEE ON IMMUNIZATION PRACTICES

The Advisory Committee on Immunization Practices (ACIP) was created in 1964 to provide expert external advice and guidance to the director of the Centers for Disease Control and Prevention (CDC) and the Secretary of the U.S. Department of Health and Human Services (DHHS) on use of vaccines. The ACIP is an official federal advisory committee and is governed by the Federal Advisory Committee Act, which has strict requirements for public notification of meetings, allowing for public comment, and publication of minutes.

The ACIP recently adopted a new system for developing evidence-based recommendations that is based on a modification of the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) approach (Guyatt et al., 2011). Key factors considered in the development of their recommendations include the balance of benefits and harms, type of evidence, values and preferences of the people affected, and health economic analyses. There are two categories of recommendations: category A (either for or against) applies to all persons in an age- or risk-factor-based group, while category B is a recommendation that is not meant to be universal but recognizes that a vaccination may be found to be appropriate for an individual within the context of a clinician-patient encounter. Evidence tables are used to summarize the benefits and harms and the strengths and limitations of the body of evidence. This new process brings the ACIP more in line with contemporary evidence-based processes (Ahmed et al., 2011).

THE NATIONAL HEART, LUNG, AND BLOOD INSTITUTE

The National Heart, Lung, and Blood Institute (NHLBI) in the National Institutes of Health produces guidelines on prevention and control of the major risks for cardiovascular diseases in adults, including two influential clinical guidelines; one on cholesterol and one on high blood pressure (NHLBI, 2001, 2004). These and other guidelines regarding cardiovascular diseases can be found on their website (www.nhlbi.nih.gov/guidelines). The NHLBI, unfortunately, does not use methodology as strong as the USPSTF to produce their guidelines. Many of the recommendations are based on expert opinion, and the strength of the evidence supporting each recommendation is not readily apparent. They are, however, widely viewed as the standard of care. Both the cholesterol and high blood pressure guidelines are in the process of revision as this chapter is being written.

THE AMERICAN ACADEMY OF FAMILY PHYSICIANS

Clinical prevention recommendations to guide family physicians are made by the AAFP Commission on the Health of the Public and Science, and their recommendations are considered and approved by the AAFP Board of Directors. The AAFP has taken a strong evidence-based approach and tends to endorse the recommendations from the USPSTF and the ACIP, although not always. The AAFP approach to child preventive services is more conservative than that of the American Academy of Pediatrics (AAP), and it does not endorse AAP recommendations if they differ from those of the USPSTF or if they are not evidence based. The AAFP recommendations for clinical preventive services are listed at their website (www.aafp.org/patient-care/clinical-recommendations/cps.html).

THE AMERICAN ACADEMY OF PEDIATRICS AND BRIGHT FUTURES

The AAP endorses a set of periodic visits and clinical guidelines for children starting at birth and continuing to age 21 years. This set of recommendations is called *Bright Futures* and can be found on the AAP website http://www.aap.org/en-us/professional-resources/practice-support/Pages/PeriodicitySchedule.aspx. There is a set of recommended screening tests, developmental assessments, immunizations, and anticipatory guidance recommended for each visit. Due to a scarcity of research on the effectiveness of preventive services in infants and children, many of these recommendations are not based on high-quality evidence. The AAP acknowledges this by calling these recommendations "evidence informed." The AAFP has not endorsed the Bright Futures guidelines. They are, however, the basis for Medicaid preventive services for children and some quality-improvement programs use them as performance measures of quality in child preventive care.

THE COMMUNITY PREVENTIVE SERVICES TASK FORCE

The Community Preventive Services Task Force (CPSTF) was formed in 1996 and consists of 15 members appointed by the director of the CDC. They are tasked to make recommendations and develop guidance on which community-based health promotion and disease-prevention interventions work and which do not work, based on available scientific evidence. The CDC provides the CPSTF with technical and administrative support. This task force uses a

strong evidence-based methodology that consists of systematic reviews of the evidence and tying recommendations to the strength of the evidence.

A challenge for the CPSTF is that community-wide recommendations are rarely subjected to controlled clinical trials so that methods of assessing and ranking other forms of evidence are required. The methods used by the CPSTF are described on their website (www.thecommunityguide.org/index.html). The recommendations made are contained in the Guide to Community Preventive Services, often called *The Community Guide*, which is also available on the website.

The Community Guide also provides evidence-based recommendations for increasing the use of preventive services in the clinical setting.

Paying for Preventive Services

The Patient Protection and Affordable Care Act (PPACA), Public Law 111-148, passed on March 23, 2010, established that a set of preventive health services shall be included without cost sharing by group health plans and health insurers offering group or individual health insurance. These services include:

- Those recommended with an A or B rating by the USPSTF.
- Immunizations that are recommended by the ACIP.
- Preventive services for infants, children, and adolescents that are included in guidelines supported by the Health Resources and Services Administration (HRSA), which in effect are those described in the Bright Futures initiative of the AAP.
- Additional services for women as provided for by guidelines supported by the HRSA. The HRSA contracted the task of developing this list to the IOM (2011b).

The intent of this provision in the PPACA is to provide an incentive to Americans to obtain evidence-based (or at least evidence-informed) preventive services to promote health and prevent disease. While on the surface it appears to provide an array of free preventive services, family physicians and patients need to appreciate that unanticipated expenses can occur from these services. As an example, while colonoscopy screening for colorectal cancer every 10 years should be available without patient cost sharing (it is a level A recommendation by the USPSTF), a polypectomy performed during the procedure and follow-up testing are not covered by this PPACA provision and can result in significant out-of-pocket expenses.

Assessing Screening Tests

Many physicians and much of the public believe that screening and finding disease early is always beneficial. Many single-issue advocacy groups view screening as a key element in the control of their condition of concern. Family physicians simply do not have time to screen for every condition advocated, and should not screen for all of them, even if they did have time. Screening should only be conducted when the outcome of screening (finding the condition early and treating it) provides an outcome that is superior to waiting for the condition to become symptomatic. Additionally, the benefits provided by the screening test should outweigh any harms it causes.

Assessing the effectiveness of screening tests is not easy. Let us take an imaginary example. If screening for a cancer, labeled cancer of organ A, is detected by screening and then treated, life expectancy is 8 years. If the disease is detected by the presence of symptoms and then treated, life expectancy is 2 years. Does this prove that screening is effective? Many will answer that it does, including many practicing physicians (Wegwarth et al., 2012), but it does not. There are two biases in observational studies of this type that can affect the results: lead time bias and length bias (Figure 7-2). *Lead time bias* means that the disease is detected earlier, but the outcome is not changed. The point of death is not moved back; the disease was simply detected earlier making it seem that life expectancy is improved. *Length bias* comes from the fact that screening is more likely to find less aggressive disease. Cancers can have more aggressive and less aggressive forms. Aggressive forms leave little time from onset to symptoms to be detected by screening. Less aggressive forms exist in an asymptomatic state for an extended period and are more likely to be detected by screening, again leading to perceived increase in life expectancy.

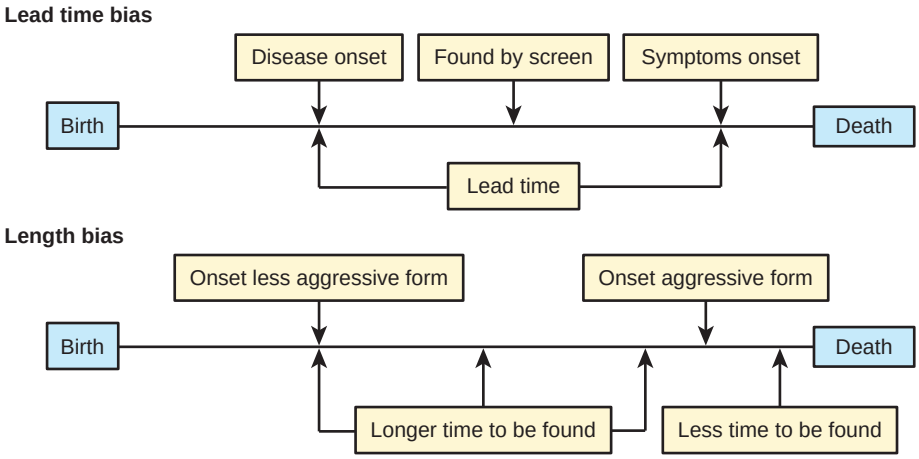


Figure 7-2 Lead-time bias and length bias.

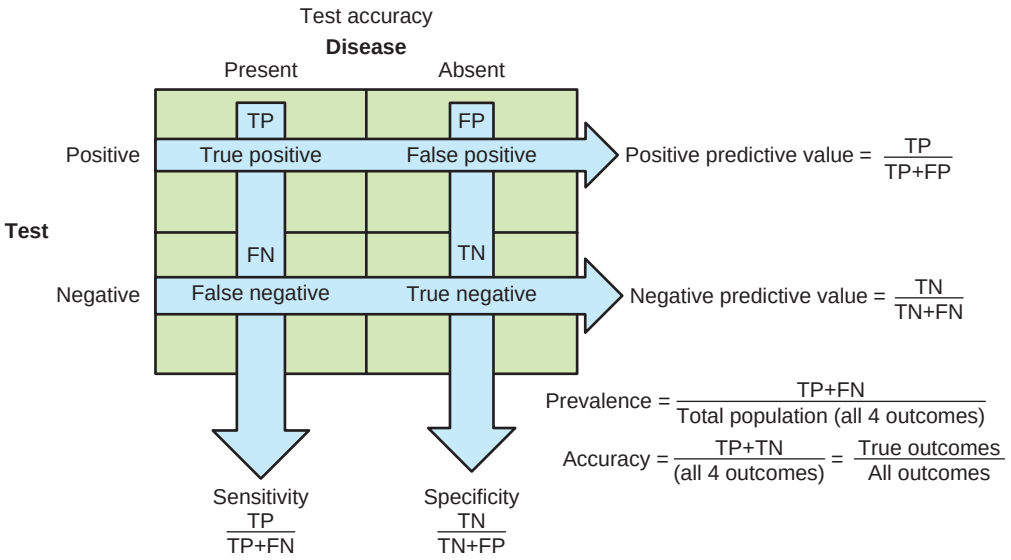


Figure 7-3 Measures of accuracy in screening tests.

Table 7-1 How Positive Predictive Value Changes with Prevalence*

Prevalence	1/100,000	1/10,000	1/1000	1/100 (10/1000)	1/10 (100/1000)
Number of true positives (TP)	1	1	1	10	99
Number of false-positives (FP)	100	10	1	1	1
Positive predictive value (TP/all positives)	1/101	1/11	1/2	10/11	99/100

*This example involves a test with a sensitivity of 99% and a specificity of 99.9% (false-positive rate of 1/1000) and the number tested equal to the denominator of the prevalence.

The only sure way to prove that screening is effective is to perform a controlled clinical trial in which a large number of people are randomly assigned to one of two groups: screening and no screening. They then need to be followed over time to determine the age-adjusted cancer A–specific death rates (using the previous example). If screening is effective in preventing death from cancer A, the death rate in the screened group should be lower than the unscreened group. In addition, the overall death rate should be lower. If both conditions are not met, the screening test is of questionable value. Very few screening tests have been evaluated with such rigor, and we are often left with making decisions about effectiveness on lower quality observational studies. However, a recommendation can still be made without a controlled clinical trial if the observational evidence is strong enough. This requires that there be a large difference between those screened and unscreened, and that the difference is found consistently in multiple studies in which potential biases have been controlled for.

Other factors that should be considered when assessing a screening test should include characteristics of the condition and the screening test. The condition should be serious (causing major mortality or morbidity) with a natural history that includes a lengthy asymptomatic period, and there should be an effective treatment for the condition or an intervention that prevents spread of the condition to others. The screening test should be readily available, relatively inexpensive, acceptable, and, above all, safe. This is because most of those being screened will not have the condition being screened for, and it is important not to cause them harm with screening.

In addition, the test should be accurate. Accuracy is measured by sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV). These terms and how they are determined are illustrated in Figure 7-3. Sensitivity is the proportion of those with the condition who are detected by the test. Specificity is the proportion of those without the condition who are labeled as negative. Generally, as a test's sensitivity improves, specificity worsens and vice versa. PPV is the proportion of those with a positive test who actually have the condition, whereas NPV is the proportion of those who test negative who are condition free. While sensitivity and specificity are frequently reported as the most important statistic, from a physician and patient perspective, the predictive values are more critical.

It is possible to have a test with a very good sensitivity and specificity but a poor PPV. This occurs when the prevalence of the condition in the screened population (the pretest probability) is low. With rare conditions, even with very accurate tests, a positive test is more likely to be a false-positive than a true positive (i.e., it has a poor PPV). The effect of prevalence on PPV is illustrated in Table 7-1. This concept is very important for assessing screening tests because false-positives can cause harm.

Another statistical concept one must understand to assess screening tests is the difference between relative risk reduction and absolute risk reduction. Using another hypothetical example, if a screening test and early treatment result in a 50% reduction in mortality, this looks pretty impressive. But what if the reduction in mortality is from a rate of 2 per 100,000 to 1 per 100,000? That is a relative reduction of 50% but an absolute reduction of only 1 per

100,000. In this example, it is necessary to screen 100,000 people to save one life or, stated another way, the number needed to screen (NNS) is 100,000.

When assessing a screening test, it is important to ask about all these variables: sensitivity, specificity, PPV, NPV, NNS, and number needed to harm (NNH). It also is necessary to compare the benefits from testing to the harms caused by testing. Benefits can include improved outcomes resulting from early detection as well as, with infectious diseases, prevention of spread to others. Harm can result from both false-positive and false-negative results, complications that can result from further testing when the test is positive, and complications from the treatment for the condition.

It is increasingly appreciated that additional harm can occur from testing, called *overdiagnosis*. This occurs because not all disease detected by screening is destined to progress and cause morbidity and mortality. Sometimes the condition regresses or does not progress, or progresses so slowly that other conditions cause death first. An example of this is prostate cancer. Many prostate cancers detected by screening would never cause a man any problems. It would have gone unnoticed if the screening had not been performed. But almost all these men will undergo further diagnostic testing and then treatment, with significant resulting morbidity and even mortality caused by complications of these interventions. There is now an appreciation that overdiagnosis occurs as a result of cancer screening much more frequently than was previously known (Kalager et al., 2012).

Assessing Physician Counseling

Changing patients' behavior is difficult. An in-depth discussion on effective counseling and behavioral modification methods is in Chapter 8. While there are many behaviors that place a person at risk for current and future adverse health, not all of them are conducive to being modified by counseling in a clinical encounter. Since family physicians do not have time to counsel regarding all potential risky behaviors, it is important to focus on the ones that have the greatest effect on health and for which evidence of the effectiveness of counseling exists. The USPSTF provides guidance on this topic but frequently finds that evidence is insufficient to judge whether physician advice and counseling actually change behavior. This does not mean that a family physician should not provide counseling when insufficient evidence exists, but they should be aware that evidence is lacking about the effectiveness of counseling in that situation and that time might be better spent on interventions supported by stronger evidence.

Putting Prevention into Practice

There are many barriers to practicing preventive medicine in a family medicine clinical setting. These include time pressures, inadequate reimbursement, and lack of interest from the patient. These barriers can be overcome with a systematic and organized approach to prevention that is part of each patient encounter. A complete set of preventive services can be provided as part of a periodic health assessment and wellness examination, which for most people does not need to be performed annually. They can also be approached incrementally, with the physician addressing a limited number of them at each visit. Neither approach has been proven superior to the other. Continuity of care is the family physician's ally in providing comprehensive preventive care, in that a little bit of prevention can be achieved at each visit and important prevention messages can be reinforced. With either approach, a four-step process (Table 7-2) can be used to consider

1. Risk assessment
2. Risk reduction
3. Screening
4. Immunizations

Table 7-2 Four-Step Approach to Prevention in a Clinical Encounter

Step 1: Risk assessment based on:	Age Gender Family history Medical history Occupation Socioeconomics Environment Behaviors: ■ Diet ■ Physical activity ■ Sexual practices ■ Alcohol, tobacco, and drug use ■ Risk taking
Step 2: Risk reduction including:	Counseling and behavior modification Chemoprevention
Step 3: Screening	A and B recommendations from the USPSTF
Step 4: Immunizations	Immunizations recommended by the ACIP

ACIP, Advisory Committee on Immunization Practices; *USPSTF*, U.S. Preventive Services Task Force.

RISK ASSESSMENT

Each patient has a set of risks that can affect his or her health in the near or long term. These risks are based on age, gender, family history, medical history, current chronic diseases, occupation, socioeconomic factors, environment, and behaviors (diet; physical activity; sexual practices; alcohol, tobacco, and drug use; and risk taking). Some of these risks are modifiable; others are not. This information can be obtained at the first encounter or shortly thereafter, but it needs to be updated periodically. Knowing a patient's risks helps to focus risk reduction advice where it will have the greatest impact.

Table 7-3 lists the leading causes of death in the United States. The two leading causes of death are cardiovascular diseases and cancer. Figure 7-4 shows the time trends in these leading causes of mortality and demonstrates that age-adjusted death rates for cardiovascular diseases are declining while those for cancer and injuries are remaining relatively stable. Cancer will soon be the leading cause of death, and unintentional injuries has replaced cerebral vascular disease as the third leading cause. These data show that the largest improvements in population mortality can

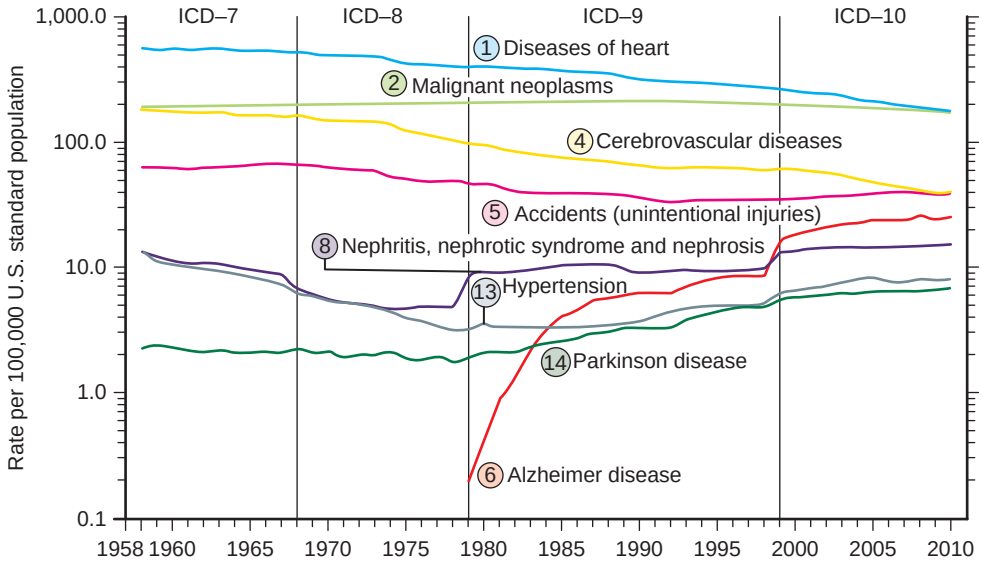


Figure 7-4 Time trends in the leading causes of death. *ICD,* International Classification of Diseases. (From Murphy SL, Xu J, Kochanek KD. Deaths: final data for 2010. *Natl Vital Stat Rep.* 2013;61:67.)

Table 7-3 Leading Causes of Death, United States, 2010

Cause	Number of Deaths	Percent of All Deaths	Rate per 100,000
Heart disease	307,384	24.9	202.5
Cancer	301,037	24.4	198.3
Unintentional injuries	75,921	6.2	50.0
Chronic lung disease	65,423	5.3	43.1
Stroke	52,367	4.2	34.5
Diabetes	35,490	2.9	23.4
Suicide	30,277	2.5	19.9
Alzheimer disease	25,364	2.1	16.7
Kidney disease	24,865	2.0	16.4
Influenza and pneumonia	23,615	1.9	15.6

From Heron M. Deaths: leading causes for 2010. *Natl Vital Stat Rep.* 2013;62(6):1-96. http://www.cdc.gov/nchs/data/nvsr/nvsr62/nvsr62_06.pdf.

Table 7-4 Actual Causes of Death, United States, 2000

Actual Cause	Number (%)
Tobacco	435,000 (18.1)
Poor diet and physical inactivity	400,000 (16.6)
Alcohol	85,000 (3.5)
Infectious diseases	75,000 (3.1)
Toxic agents	55,000 (2.3)
Motor vehicles	43,000 (1.8)
Guns	29,000 (1.2)
Sexual behavior	20,000 (0.8)
Illicit drug use	17,000 (0.7)

Data from Mokdad AH, Marks JS, Stroup DF, Gerberding JL. Actual causes of death in the United States 2000. *JAMA.* 2004;291:1238-1245.

be achieved by concentrating on the causes of cardiovascular diseases, cancer, and injuries.

The actual causes of death in the United States are listed in Table 7-4 and include unhealthy behaviors, most notably tobacco use, poor diets, lack of physical activity, and misuse of alcohol. Table 7-5 lists the risk factors for the leading causes of death and the number of deaths attributed to each. These behaviors and risk factors are prime targets for preventive interventions in the clinical setting.

Figure 7-5 demonstrates that the leading causes of death are quite different in younger age groups than older. In addition, race/ethnicity and socioeconomic factors change the magnitude of these causes. Family physicians knowing the epidemiology of disease and risks in their communities can focus in on the risks that have the greatest impact on their patients.

When assessing the risks linked to each of these leading causes of death and disability, it is important to remember that a "risk factor" identified in an observational study may not translate into reduced disease if that risk is eliminated.

Table 7-5 Deaths Attributable to Risk Factors, United States, 2009

Rank	Risk	Number of Deaths
1	Smoking	467,000
2	High blood pressure	395,000
3	Overweight and obesity	216,000
4	Physical inactivity	191,000
5	High blood glucose	190,000
6	High cholesterol	113,000
7	High dietary salt	102,000
8	Low omega-3 fatty acid intake	84,000
9	High trans fat intake	82,000
10	Alcohol intake	64,000

Data from Danaei G, Mozaffarian D, Taylor, et al. The preventable cause of death in the United States: comparative risk assessment of dietary, lifestyle and metabolic risk factors. PLoS Med. 2009;6(4):e1000058. doi:10.1371/journal.pmed.1000058. http://www.plosmedicine.org/article/info:doi/10.1371/journal.pmed.1000058.

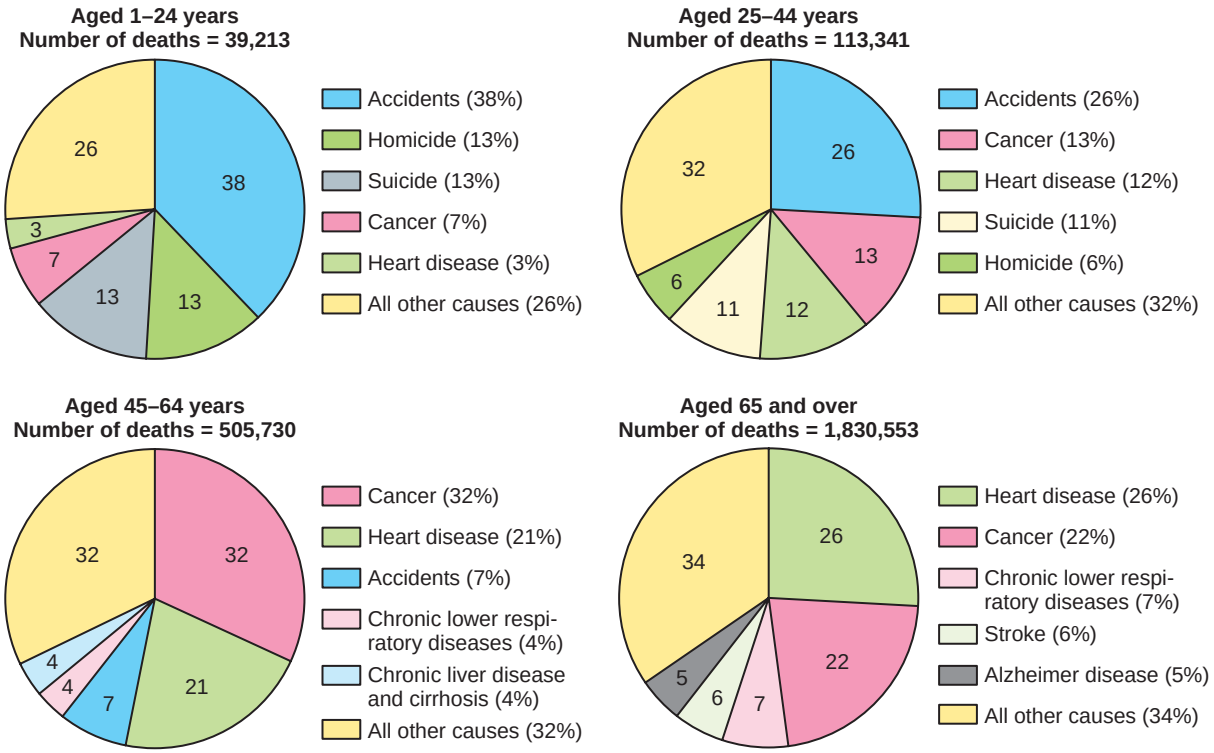


Figure 7-5 Leading causes of death by age. (From Minino AM. Death in the United States, 2011. *NCHS Data Brief.* 2013;115:1-8.)

Controlled clinical trials are needed to provide proof of improved outcomes from risk reduction. An example of a risk reduction intervention for which evidence exists is blood pressure control. It was shown in observational studies that hypertension is a risk for coronary heart disease and cerebral vascular disease. Following that discovery, controlled clinical trials showed that controlling blood pressure resulted in a reduction in these conditions. An example of a risk reduction effort that did not pan out is the use of antioxidants to prevent cancer. Observational studies indicated that lower intake of certain vitamins with antioxidant properties was associated with higher rates of certain cancers. However, controlled clinical trials of increased antioxidant intake failed to demonstrate reduced cancer rates (Boffetta et al., 2010; Gasiano et al., 2009; Zhang, 2008). Looking back at Table 7-5, there is good evidence that reducing risks 1 through 6 and 10 result in improved health outcomes. The evidence of benefit from reducing risks 7 through 9 is not as strong.

RISK REDUCTION

Once a patient's short and long-term health risks are known, the family physician can concentrate on reducing these risks. Time and effort is best spent on risk reduction that evidence demonstrates will result in improved outcomes. There are two major tools for reducing patients' risks for disease—behavioral change counseling and chemoprevention. Both can be applied as primary or tertiary prevention.

Information on how to provide effective behavioral change counseling is provided in Chapter 8. Because the leading causes of death are chronic diseases affected by behavior, with the harmful effects building up over a number of years, convincing younger adults to change unhealthy behaviors is challenging as is altering habits that have been practiced for long periods. We should keep in mind, however, that if behavior change is achieved in only a small percentage of patients, this can add up, on a population level, if all physicians applied the most effective counseling and behavior modification methods.

Some behaviors can be changed by brief counseling that can be provided in a clinical encounter. Table 7-6 lists those that are recommended by the USPSTF. Other behaviors are more difficult to change and require more intensive and multicomponent interventions. Table 7-7 lists behaviors in this category and the more intensive interventions needed to change them that are recommended by the USPSTF. In these instances the family physician can provide more intensive counseling themselves or defer to other health care professionals who have more time and training in this area.

Chemoprevention can be utilized as either a primary or tertiary prevention intervention. Those in Table 7-8 are primary interventions that are recommended by the USPSTF. Table 7-9 includes examples of other uses of medications for prevention in specific circumstances. These include those that are used commonly, such as medications to control high blood pressure and hypercholesterolemia, which can prevent cardiovascular disease, and medications to improve hyperglycemia in those with diabetes, which can prevent the microvascular complications of this chronic condition. Others are less common and need to be kept in mind when patients present after an event that places them at risk for a recurrence or have had an exposure to an infectious agent.

SCREENING

Secondary prevention, or screening for early detection of asymptomatic disease, is an important component of clinical prevention. As described previously, the USPSTF and the AAFP list screening tests that family physicians should offer to patients. The USPSTF offers a user-friendly electronic version of their recommendations called the Electronic Preventive Services Selector (ePSS). It can be downloaded to all types of electronic devices and used to search for recommended screening tests by age and gender (see http://epss.ahrq.gov/PDA/index.jsp). If the screening test is recommended only for certain risk groups, there is an attached tool to assist in measuring risk.

Family physicians should, over time, ensure that their patients have been offered screening tests with A or B recommendations. Table 7-10 lists screening tests recommended by the USPSTF for adults, and Table 7-11 lists screening tests and other preventive interventions the

Table 7-6 Conditions That Can Be Affected by Brief Counseling in a Clinical Encounter

Condition	Counseling	For Whom
Alcohol misuse	Brief behavioral counseling interventions to reduce alcohol misuse	Adults age 18 years and older engaged in risky or hazardous drinking
Skin cancer	Counseling about minimizing exposure to ultraviolet radiation to reduce risk for skin cancer	Children, adolescents, and young adults ages 10-24 years who have fair skin
Tobacco use	Tobacco cessation interventions	All those who use tobacco products
Tobacco use	Interventions, including education or brief counseling, to prevent initiation of tobacco use	School-aged children and adolescents

Data from U.S. Preventive Services Task Force. http://www.uspreventiveservicestaskforce.org/index.html.

Table 7-7 Behaviors That Require Intensive Counseling or Referral

Condition	Intensive Counseling or Referral	For Whom
Fall prevention	Counseling about exercise or physical therapy	Community-dwelling adults age 65 years and older who are at increased risk for falls
Cardiovascular disease risk reduction	Health diet counseling	Adult patients with hyperlipidemia and other known risk factors for cardiovascular and diet-related chronic disease
Intimate partner violence	Intervention services	Women of childbearing age who screen positive for intimate partner violence
Obesity, improvement in weight status	Intensive, multicomponent behavioral interventions	Obese adults and children
Sexually transmitted infections	High-intensity behavioral counseling to prevent sexually transmitted infections (STIs)	Sexually active adolescents and adults at increased risk for STIs

Data from U.S. Preventive Services Task Force. http://www.uspreventiveservicestaskforce.org/index.html.

Table 7-8 Chemoprevention Recommended by the U.S. Preventive Services Task Force

Chemoprevention	Condition to Prevent	When to Use	A or B Recommendation	Risk Group
Aspirin	Myocardial infarction	When the potential benefit due to a reduction in myocardial infarctions outweighs the potential harm due to an increase in gastrointestinal hemorrhage	A	Men ages 45-79 years
Aspirin	Ischemic stroke	When the potential benefit outweighs the potential harm of an increase in gastrointestinal hemorrhage	A	Women ages 55-79 years
Erythromycin ophthalmic ointment	Gonococcal ophthalmia neonatorum	All newborns	A	Newborns
Fluoride supplementation	Dental caries	When the primary water source is deficient in fluoride	B	Preschool children older than 6 months
Folic acid daily supplement containing 0.4-0.8 mg (400-800 µg)	Neural tube defects	All women	A	Women planning or capable of pregnancy
Iron supplementation	Iron deficiency	When at increased risk for iron deficiency	B	Children ages 6-12 months
Tamoxifen or Raloxifene	Breast cancer	Discuss chemoprevention and the potential benefits and harms of chemoprevention	B	Women at high risk for breast cancer and at low risk for adverse effects of chemoprevention
Vitamin D supplementation	Falls in the elderly	When at increased risk for falls	B	Community-dwelling adults age 65 years and older

Data from U.S. Preventive Services Task Force. http://www.uspreventiveservicestaskforce.org/index.html.

Table 7-9 Examples of Chemoprevention Not Addressed by the U.S. Preventive Services Task Force

- Isoniazid (INH) for treatment of latent tuberculosis (TB) and prevention of active TB
- Antivirals for influenza prevention in high-risk, exposed individuals
- Postexposure prophylaxis for human immunodeficiency virus (HIV) exposure from sexual contact or work-site exposure
- Antibiotics in contacts and household members of those with meningococcal and *Haemophilus influenza* type B meningitis
- Anticoagulants in those with atrial fibrillation and post deep vein thrombosis or pulmonary embolus
- Antibiotic prophylaxis in those with heart valves undergoing invasive procedures
- Postexposure prophylaxis after exposure to syphilis, gonorrhea, and chlamydia
- Treatment for high blood pressure, high cholesterol, diabetes control

Table 7-10 Screening Tests for Adults Recommended by the U.S. Preventive Services Task Force

Condition	Screening Test	A or B	For Whom
Abdominal aortic aneurysm	One-time screening for abdominal aortic aneurysm by ultrasonography	B	Men ages 65-75 who have ever smoked
Alcohol misuse	Screen for alcohol misuse	B	All age 18 years and older
High blood pressure	Screen for high blood pressure	A	All age 18 years and older
Breast cancer gene	Referral for genetic counseling and evaluation for *BRCA* testing	B	Women whose family history is associated with an increased risk for deleterious mutations in *BRCA1* or *BRCA2* genes
Breast cancer	Mammography every 2 years	B	Women 50-74 years
Cervical cancer	Screen with cytology (Pap smear) every 3 years or, for women ages 30-65 years who want to lengthen the screening interval, screening with a combination of cytology and human papillomavirus (HPV) testing every 5 years	A	Women 21-65 years
Chlamydia	Screen for chlamydia infection	A	Sexually active women age 24 and younger, older women at risk
Cholesterol abnormalities	Screen for lipid disorders	A	All men age 35 years and older and women age 45 and older if at increased risk of coronary heart disease
Cholesterol abnormalities	Screen for lipid disorders	B	All men ages 20-35 years and women ages 20-45 years if they are at increased risk for coronary heart disease
Colorectal cancer	Screen for colorectal cancer using fecal occult blood testing, sigmoidoscopy, or colonoscopy	A	All age 50-75 years
Depression	Screen for major depressive disorder when systems are in place to ensure accurate diagnosis, psychotherapy (cognitive-behavioral or interpersonal), and follow-up	B	All adults
Diabetes	Screen for type 2 diabetes	B	Asymptomatic adults with sustained blood pressure (either treated or untreated) greater than 135/80 mm Hg
Gonorrhea	Screen for gonorrhea infection	B	Sexually active women, if they are at increased risk for infection
Hepatitis C virus (HCV)	Screen for HCV	B	Adults at high risk for infection, including a one-time screening for adults born between 1945 and 1965
Human Immunodeficiency Virus (HIV)	Screen for HIV	A	All adults through age 65 years and older adults who are at increased risk
Intimate partner violence	Screen for intimate partner violence, such as domestic violence, and provide or refer women who screen positive to intervention services	B	Women of childbearing age
Obesity	Screen for obesity	B	All adults
Osteoporosis	Screen for osteoporosis	B	Women age 65 years and older and younger women whose fracture risk is equal to or greater than that of a 65-year-old white woman who has no additional risk factors
Syphilis	Screen for syphilis infection	A	Those at increased risk for syphilis infection
Tobacco use	Ask about tobacco use and provide tobacco cessation interventions for those who use tobacco products	A	All adults

Data from U.S. Preventive Services Task Force. http://www.uspreventiveservicestaskforce.org/index.html.

Table 7-11 Screening Tests and Other Interventions for Infants, Children, and Adolescents Recommended by the U.S. Preventive Services Task Force

Condition	Screening Test/Intervention	A or B Recommendation
Chlamydia infection	Screen for chlamydia infection in females if sexually active	A
Gonorrhea infection	Screen for gonorrhea infection if sexually active	B
Gonococcal ophthalmia neonatorum	Ocular topical medication for newborns	A
Hearing loss	Screen for hearing loss in newborns	B
Hemoglobinopathies	Screen for sickle cell disease in newborns	A
Human immunodeficiency virus (HIV) infection	Screen for HIV infection age 15 and older, younger if at risk*	A
Hypothyroidism	Screen for congenital hypothyroidism in newborns	A
Intimate partner violence	Screen for intimate partner violence, such as domestic violence, in women of childbearing age†	B
Iron deficiency	Iron supplementation for asymptomatic children ages 6-12 months who are at increased risk for iron deficiency anemia	B
Obesity	Screen children age 6 years and older for obesity	B
Phenylketonuria	Screen for phenylketonuria in newborns	A
Sexually transmitted infections	High-intensity behavioral counseling to prevent sexually transmitted infections (STIs) in all sexually active adolescents	B
Skin cancer	Counsel children, adolescents, and young adults ages 10-24 years who have fair skin about minimizing their exposure to ultraviolet radiation to reduce risk for skin cancer	B
Tobacco use	Provide interventions, including education or brief counseling, to prevent initiation of tobacco use in school-aged children and adolescents	B
Syphilis	Screen those at increased risk for syphilis infection	A
Vision	Vision screening for all children at least once between the ages of 3 and 5 years to detect the presence of amblyopia or its risk factors	B

*The American Academy of Family Physicians (AAFP) recommends routine screening starting at age 18 and screening at younger ages for those at risk.
†Reproductive age is considered to start at age 14. If an adolescent has an intimate partner relationship, screening is recommended.
Data from U.S. Preventive Services Task Force. http://www.uspreventiveservicestaskforce.org/index.html.

USPSTF recommends for infants, children, and adolescents. It is equally important not to provide screening tests that are not effective and/or are harmful, such as those given a D rating by the USPSTF (Table 7-12). These tables describing USPSTF recommendations were developed at the time of the writing of this chapter and reflect the USPSTF recommendations as of that time. Keeping up to date on screening recommendations is challenging. The USPSTF makes a new recommendation or updates an old recommendation about once a month. Physicians can sign up for periodic updates at the USPSTF website (www.uspreventiveservicestaskforce.org/announcements.htm).

IMMUNIZATIONS

One of the most effective forms of primary interventions available to family physicians is vaccines. The ACIP publishes updated immunization schedules annually. These include routinely recommended immunizations for infants, children, and adolescents (Figure 7-6), routinely recommended immunizations for adults starting at age 19 years (Figure 7-7), and catch-up recommendations for these two age groups (all can be found at www.cdc.gov/vaccines/schedules/index.html). The catch-up schedules are useful in determining what vaccines to provide to someone who is not completely vaccinated with recommended vaccines at the time of the clinical encounter.

Family physicians should take every opportunity and use systematic approaches to ensure that patients are completely protected from vaccine-preventable diseases. This can involve assigning a clinical team member to be a vaccine advocate, implementing standing orders for nurses and others to administer vaccines, sending electronic reminders when vaccines are due, and taking advantage of each clinical encounter to provide recommended vaccines unless a valid contraindication exits (Community Preventive Services Task Force, *Increasing Appropriate Immunizations*).

PRIORITIZING PREVENTIVE SERVICES

Given the large number of possible preventive interventions that can be implemented, it is often necessary to prioritize them and address the most important ones first and the others as time and continuity allow. Patient preferences are important to consider. Difficult choices are sometimes necessary when patients have multiple risks and comorbid conditions. Chronic diseases often occur concurrently, and the guidelines for each often are written from the assumption that only one disease is present. Research is being conducted on what preventive interventions will yield the greatest gains to patients with multiple chronic conditions and risks (Taksler et al., 2013). Family physicians and patients should prioritize together.

Table 7-12 U.S. Preventive Services Task Force D Recommendations (Screening Tests That Should Not Be Performed)

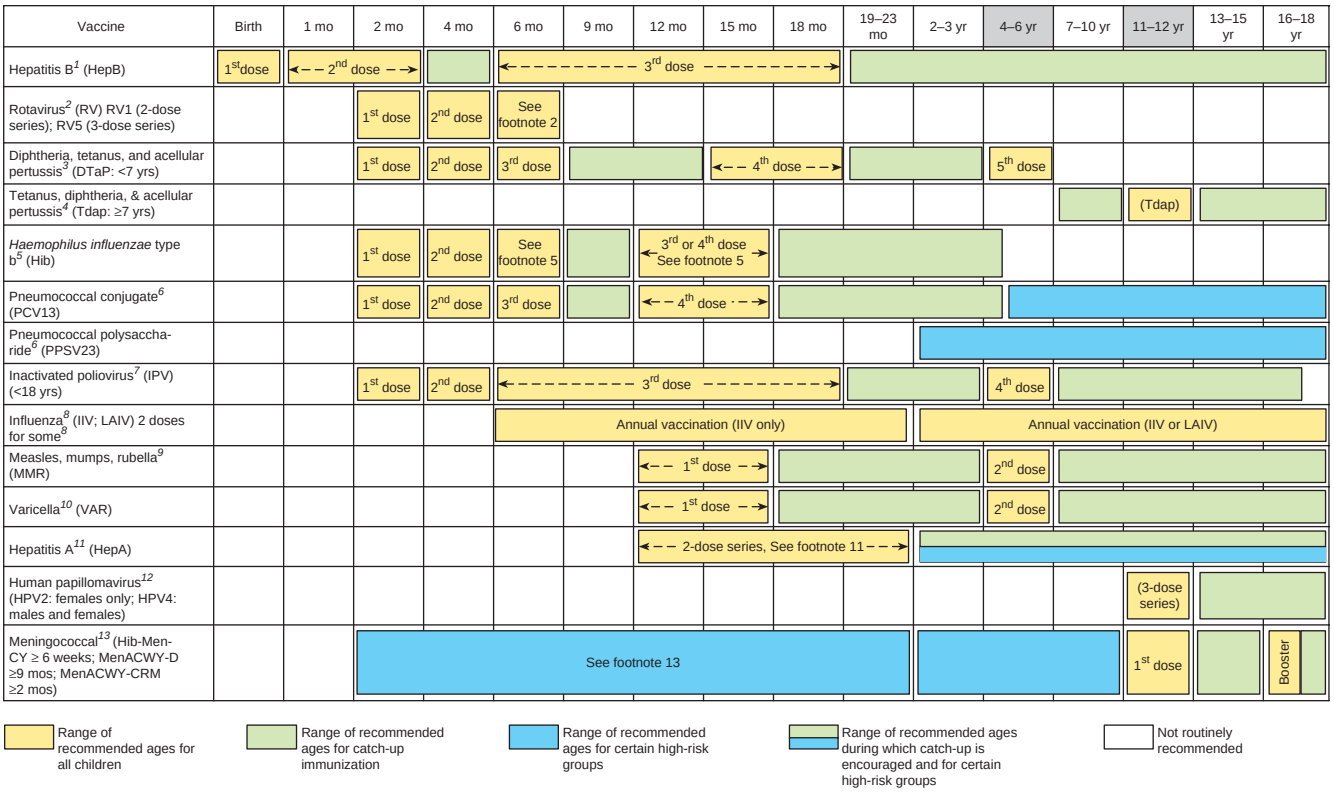
Infants, children, and adolescents	■ Screening of asymptomatic adolescents for idiopathic scoliosis ■ Screening for elevated blood lead levels in asymptomatic children age 1-5 years who are at average risk
Pregnant women	■ Screening for bacterial vaginosis in asymptomatic pregnant women at low risk for preterm delivery ■ Screening for elevated blood lead levels in asymptomatic pregnant women
Adults: chemoprevention	■ Use of aspirin and nonsteroidal antiinflammatory drugs (NSAIDs) to prevent colorectal cancer in persons at average risk for colorectal cancer ■ Routine use of medications, such as tamoxifen or raloxifene, for risk reduction of primary breast cancer in women who are not at increased risk for breast cancer ■ Use of aspirin for stroke prevention in women younger than age 55 years and for myocardial infarction prevention in men younger than age 45 years ■ Use of β-carotene supplements, either alone or in combination, for the prevention of cancer or cardiovascular disease ■ Use of combined estrogen and progestin for the prevention of chronic conditions in postmenopausal women ■ Use of estrogen for the prevention of chronic conditions in postmenopausal women who have had a hysterectomy ■ Daily supplementation with 400 IU or less of vitamin D_3 and 1000 mg or less of calcium for the primary prevention of fractures in noninstitutionalized postmenopausal women
Adults: screening	Cancer ■ Routine referral for genetic counseling or routine breast cancer susceptibility gene (*BRCA*) testing for women whose family history is not associated with an increased risk for deleterious mutations in breast cancer susceptibility gene 1 (*BRCA1*) or breast cancer susceptibility gene 2 (*BRCA2*) ■ Teaching breast self-examination (BSE) ■ Screening for cervical cancer in women younger than age 21 years ■ Screening for cervical cancer in women older than age 65 years who have had adequate prior screening and are not otherwise at high risk for cervical cancer ■ Screening for cervical cancer in women who have had a hysterectomy with removal of the cervix and who do not have a history of a high-grade precancerous lesion (i.e., cervical intraepithelial neoplasia [CIN] grade 2 or 3) or cervical cancer ■ Screening for cervical cancer with human papillomavirus (HPV) testing, alone or in combination with cytology, in women younger than age 30 years ■ Screening for testicular cancer in adolescent or adult males ■ Screening for colorectal cancer in adults older than age 85 years ■ Screening for ovarian cancer in women ■ Screening for pancreatic cancer in asymptomatic adults using abdominal palpation, ultrasonography, or serologic ■ Prostate-specific antigen (PSA)-based screening for prostate cancer Cardiovascular and Lung Disease ■ Screening for abdominal aortic aneurism in women ■ Screening for asymptomatic carotid artery stenosis in the general adult population ■ Screening adults for chronic obstructive pulmonary disease (COPD) using spirometry ■ Screening with resting or exercise electrocardiography (ECG) for the prediction of coronary heart disease (CHD) events in asymptomatic adults at low risk for CHD events ■ Routine genetic screening for hereditary hemochromatosis in the asymptomatic general population Infectious Disease ■ Screening for asymptomatic bacteriuria in men and nonpregnant women ■ Screening for gonorrhea infection in men and women who are at low risk for infection ■ Screening the general asymptomatic population for chronic hepatitis B virus infection ■ Serological screening for herpes simplex virus (HSV) in asymptomatic pregnant women at any time during pregnancy to prevent neonatal HSV infection ■ Serological screening for HSV in asymptomatic adolescents and adults ■ Screening of asymptomatic persons who are not at increased risk for syphilis infection

Data from U.S. Preventive Services Task Force. http://www.uspreventiveservicestaskforce.org/index.html.

Examples of Putting the Four-Step Approach into Practice

EXAMPLE 1, YOUNG ADULT MALE

A 28-year-old male visits the clinic in October with a complaint of abdominal pain. The pain occurs after nights when he parties with friends, consuming 6 to 7 alcohol-containing drinks. He drinks some alcohol almost every day. He admits to occasionally driving home after these parties, but feels like he is not impaired, although he was cited for driving under the influence several months ago. He also admits to being in bar fights once or twice the past year. He smokes less than one pack of cigarettes per day and started at the age of 17 years and states he would like to quit. He denies any use of illicit drugs except occasionally smoking marijuana. He is an only child and both parents are alive with no health problems. There is no known history of cancer or early heart disease in his family. He currently takes no medications and has no chronic health problems. He has sex only with women, has had eight partners in the past year, and uses condoms irregularly. He works as an insurance adjuster in an office, exercises three to four times a week at the gym, lifting weights. He eats mostly fast food for convenience. He believes he has had all childhood vaccines but is not sure. His last tetanus shot was at age 22 years after a laceration. He is 5 ft 11 in tall and weighs 180 lb (body mass



This schedule includes recommendations in effect as of January 1, 2014. Any dose not administered at the recommended age should be administered at a subsequent visit, when indicated and feasible. The use of a combination vaccine generally is preferred over separate injections of its equivalent component vaccines. Vaccination providers should consult the relevant Advisory Committee on Immunization Practices (ACIP) statement for detailed recommendations, available online at http://www.cdc.gov/vaccines/hcp/acip-recs/index.html. Clinically significant adverse events that follow vaccination should be reported to the Vaccine Adverse Event Reporting System (VAERS) online (http://www.vaers.hhs.gov) or by telephone (800-822-7967). Suspected cases of vaccine-preventable diseases should be reported to the state or local health department. Additional information, including precautions and contraindications for vaccination, is available from CDC online (http://www.cdc.gov/vaccines/recs/vac-admin/contraindications.htm) or by telephone (800-CDC-INFO [800-232-4636]).

This schedule is approved by the Advisory Committee on Immunization Practices (http/www.cdc.gov/vaccines/acip), the American Academy of Pediatrics (http://www.aap.org), the American Academy of Family Physicians (http://www.aafp.org), and the American Congress of Obstetricians and Gynecologists (http://www.acog.org).

Figure 7-6 Infant, child and adolescent immunization schedule. **These recommendations must be read with the footnotes shown on the Centers for Disease Control and Prevention (CDC) website.** For those patients who fall behind schedule or start late, see the Catch-Up Schedule from CDC website. (From CDC. *Recommended Immunization Schedule for Persons Aged 0 through 18 years—United States*, 2014. http://www.cdc.gov/vaccines/schedules/downloads/child/0-18yrs-schedule.pdf.)

index [BMI] 20.9 kg/m^2). He is well developed and muscular. His blood pressure is 125/75 mm Hg.

Because he presents out of concern for his abdominal pain, this problem needs to be addressed first. However, doing a quick assessment (Step 1), it can be determined that his major health risks are smoking, alcohol misuse (which is likely contributing to his abdominal pain), unsafe sex, and risk-taking behavior. You can mention each of these to him quickly and focus on smoking, strongly advising him to quit, offering nicotine replacement, and providing information on smoking cessation support groups. You make a note to address the other two risks, which are related, at the follow-up visit. You advise a healthier diet and the addition of aerobic exercise to his weight lifting, even though the value of this advice in changing behavior is uncertain (Step 2).

Using the USPSTF ePSS you determine the recommended screening tests are human immunodeficiency virus (HIV), syphilis (although this may not be indicated if the rate of heterosexual syphilis in the community is low), lipid disorders (since he is at higher risk for cardiovascular disease due to his smoking), high blood pressure (done at this first visit and to be repeated at each follow-up visit), obesity (done with the initial height and weight measurement), and depression (which can be deferred to a future visit). HIV testing and a nonfasting cholesterol and high-density lipoprotein (HDL) cholesterol level can be performed on a blood sample taken in the office, in addition to any diagnostic blood tests needed (Step 3).

You can ask him to try to find his childhood vaccine record at his parent's house to bring to the next visit and offer him influenza vaccine and tetanus toxoid, reduced diphtheria toxoid, and acellular pertussis vaccine (Tdap) today (Step 4).

EXAMPLE 2, OLDER ADULT MALE

A 61-year-old male is in the clinic for a routine visit for several medical conditions including hypertension, hypercholesterolemia, obesity, and osteoarthritis of his right knee. His medications include lovastatin, hydrochlorothiazide, enalapril, and acetaminophen. He has had no recent hospitalizations or surgery. He smoked in the past but quit 15 years ago, currently drinks a glass of wine several times a week, uses no illicit drugs and denies past use, has been married to his wife for 35 years, and has no extramarital sexual partners. He has three children, all grown and out of the house, and three grandchildren, one of them

Recommended adult immunization schedule, by vaccine and age group[1]

VACCINE ▼ AGE GROUP ▶	19–21 years	22–26 years	27–49 years	50–59 years	60–64 years	≥ 65 years
Influenza[2,*]	1 dose annually					
Tetanus, diphtheria, pertussis (Td/Tdap)[3,*]	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs					
Varicella[4,*]	2 doses					
Human papillomavirus (HPV) Female[5,*]	3 doses					
Human papillomavirus (HPV) Male[5,*]	3 doses					
Zoster[6]					1 dose	
Measles, mumps, rubella (MMR)[7,*]	1 or 2 doses					
Pneumococcal 13-valent conjugate (PCV13)[8,*]	1 dose					
Pneumococcal polysaccharide (PPSV23)[9,10]	1 or 2 doses					1 dose
Meningococcal[11,*]	1 or more doses					
Hepatitis A[12,*]	2 doses					
Hepatitis B[13,*]	3 doses					
Haemophilus influenzae type b (Hib)[14,*]	1 or 3 doses					

*Covered by the Vaccine Injury Compensation Program

For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection; zoster vaccine recommended regardless of prior episode of zoster

Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indication)

No recommendation

Report all clinically significant postvaccination reactions to the Vaccine Adverse Event Reporting System (VAERS). Reporting forms and instructions on filing a VAERS report are available at www.vaers.hhs.gov or by telephone, 800-822-7967.

Information on how to file a Vaccine Injury Compensation Program claim is available at www.hrsa.gov/vaccinecompensation or by telephone, 800-338-2382. To file a claim for vaccine injury, contact the U.S. Court of Federal Claims, 717 Madison Place, N.W., Washington, D.C. 20005; telephone, 202-357-6400.

Additional information about the vaccines in this schedule, extent of available data, and contraindications for vaccination is also available at www.cdc.gov/vaccines or from the CDC-INFO Contact Center at 800-CDC-INFO (800-232-4636) in English and Spanish, 8:00 a.m. to 8:00 p.m. Eastern Time, Monday to Friday, excluding holidays.

Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

The recommendations in this schedule were approved by the Centers for Disease Control and Prevention's (CDC) Advisory Committee on Immunization Practices (ACIP), the American Academy of Family Physicians (AAFP), the American College of Physicians (ACP), the American Congress of Obstetricians and Gynecologists (ACOG), and the American College of Nurse-Midwives (ACNM).

A

Vaccines that might be indicated for adults based on medical and other indications[1]

VACCINE ▼ INDICATION ▶	Pregnancy	Immuno-compromising conditions (excluding human immunodeficiency virus [HIV])[4,6,7,8,15]	HIV infection CD4+ T lymphocyte count[4,6,7,8,15]: < 200 cells/μL	HIV infection CD4+ T lymphocyte count[4,6,7,8,15]: ≥ 200 cells/μL	Men who have sex with men (MSM)	Kidney failure, end-stage renal disease, receipt of hemodialysis	Heart disease, chronic lung disease, chronic alcoholism	Asplenia (including elective splenectomy and persistent complement component deficiencies)[8,14]	Chronic liver disease	Diabetes	Healthcare personnel
Influenza[2,*]	1 dose IIV annually				1 dose IIV or LAIV annually	1 dose IIV annually					1 dose IIV or LAIV annually
Tetanus, diphtheria, pertussis (Td/Tdap)[3,*]	1 dose Tdap each pregnancy	Substitute 1-time dose of Tdap for Td booster; then boost with Td every 10 yrs									
Varicella[4,*]	Contraindicated			2 doses							
Human papillomavirus (HPV) Female[5,*]		3 doses through age 26 yrs				3 doses through age 26 yrs					
Human papillomavirus (HPV) Male[5,*]		3 doses through age 26 yrs				3 doses through age 21 yrs					
Zoster[6]	Contraindicated			1 dose							
Measles, mumps, rubella (MMR)[7,*]	Contraindicated			1 or 2 doses							
Pneumococcal 13-valent conjugate (PCV13)[8,*]		1 dose									
Pneumococcal polysaccharide (PPSV23)[9,10]		1 or 2 doses									
Meningococcal[11,*]	1 or more doses										
Hepatitis A[12,*]	2 doses										
Hepatitis B[13,*]	3 doses										
Haemophilus influenzae type b (Hib)[14,*]	post-HSCT recipients only	1 or 3 doses									

*Covered by the Vaccine Injury Compensation Program

For all persons in this category who meet the age requirements and who lack documentation of vaccination or have no evidence of previous infection; zoster vaccine recommended regardless of prior episode of zoster

Recommended if some other risk factor is present (e.g., on the basis of medical, occupational, lifestyle, or other indications)

No recommendation

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

These schedules indicate the recommended age groups and medical indications for which administration of currently licensed vaccines is commonly indicated for adults ages 19 years and older, as of February 1, 2014. For all vaccines being recommended on the Adult Immunization Schedule: a vaccine series does not need to be restarted, regardless of the time that has elapsed between doses. Licensed combination vaccines may be used whenever any components of the combination are indicated and when the vaccine's other components are not contraindicated. For detailed recommendations on all vaccines, including those used primarily for travelers or that are issued during the year, consult the manufacturers' package inserts and the complete statements from the Advisory Committee on Immunization Practices (www.cdc.gov/vaccines/hcp/acip-recs/index.html). Use of trade names and commercial sources is for identification only and does not imply endorsement by the U.S. Department of Health and Human Services.

B

Figure 7-7 Adult immunization schedule. These recommendations must be read with the footnotes shown on Centers for Disease Control and Prevention (CDC) website. (From CDC. *Recommended Adult Immunization Schedule—United States*, 2014. http://www.cdc.gov/vaccines/schedules/downloads/adult/adult-schedule.pdf.)

born just 3 weeks ago. Both parents are still alive at ages 89 and 90 years. He does not exercise regularly. He had a tetanus shot an uncertain number of years ago and has never had a flu shot. His current height is 5 ft 10 in. and weight is 250 lb (BMI 35.9 kg/m^2). His blood pressure in the clinic is 130/75 mm Hg (using a large cuff) and he reports a similar reading when he checks it at home. His fasting labs, obtained a week before the clinic visit, demonstrate normal renal functions, a cholesterol level of 155 mg/dL, an HDL cholesterol level of 35 mg/dL, and glucose level of 95 mg/dL.

His risks include obesity, hypertension (controlled on medication), and hypercholesterolemia (also being treated with medication but not optimally controlled). Using the NHLBI cardiovascular disease (CVD) risk calculator (http://cvdrisk.nhlbi.nih.gov/calculator.asp), his risk of a myocardial infarction in the next 10 years is 12%.

Risk reduction could include obesity intensive educational interventions. To be effective in assisting him to lose weight, this will need to consist of setting weight loss goals, improving diet and increasing physical activity, addressing barriers to change, self-weight monitoring regularly, and setting strategies to maintain lifestyle changes. Today you can ask him to go online and assess his diet and obtain advice on how to improve his diet at the DHHS website (www.healthfinder.gov/HealthTopics/Category/health-conditions-and-diseases/diabetes/eat-healthy). A plan for regular follow-up and monitoring should be established.

Recommended chemoprevention includes continued treatment for hypertension and hypercholesterolemia to reduce risks of cardiovascular disease. If he has no history of bleeding disorders, he might benefit from daily low-dose aspirin, and this can be discussed. At age 61, with a 12% risk of a heart attack, daily aspirin will prevent about four heart attacks per 100 men over 10 years (see www.uspreventiveservicestaskforce.org/uspstf09/aspirincvd/aspcvdrsf2.htm).

Recommended screening includes being tested for colorectal cancer (with colonoscopy, sigmoidoscopy, or fecal occult blood testing), HIV and hepatitis C virus, hyperlipidemia (not applicable since he is on treatment), high blood pressure (not applicable since he is on treatment), obesity (done), depression using one of the scales linked on the USPSTF website (www.integration.samhsa.gov/images/res/PHQ%20-%20Questions.pdf), and type 2 diabetes (done with the preclinic laboratory work). He does not meet the criteria to screen for syphilis (men who have sex with men, commercial sex workers, persons who exchange sex for drugs, and those in adult correctional facilities).

Immunizations that are recommended include influenza vaccine annually, herpes zoster, and Tdap. Tdap and influenza vaccine are especially important if he is going to be in contact with his 3-week-old grandchild. You should mention that Tdap and influenza are also recommended for his wife for the same reason.

EXAMPLE 3, EARLY ADOLESCENT FEMALE

A 12-year-old African American female visits the clinic with her mother because the mother felt it was time for her daughter to have a checkup. The patient is seen at first with the mother and then alone. The patient is well, with no acute or chronic medical problems. She started having her menses 6 months previously and states she is not sexually active or considering it. She is active in sports, and her mother feeds her lots of fruits and vegetables and minimizes consumption of fast foods and sweetened drinks. The mother provides an immunization record that shows the patient has received all recommended childhood vaccines except for a single dose of varicella vaccine. The patient is 5 ft 4 in. tall and weighs 120 lb (75th percentile for both height and weight; BMI 20.6 kg/m^2). Her mother is 45 years old and was diagnosed with breast cancer earlier in the year.

Risk factor assessment shows that injuries from a motor vehicle crash are the most likely cause of death in this age group. A more detailed family history is important to see if she has a high-risk family history for breast cancer. You can request that the mother gather this information to present at a future visit.

Risk reduction should include counseling about tobacco avoidance. Skin cancer behavioral counseling is recommended only for those with fair skin color, not African Americans and others with dark skin.

Recommended screening includes tests for depression, which can be performed using one of the tools on the USPSTF website, and obesity (done).

Recommended immunizations include Tdap, meningococcal conjugate vaccine (MCV4), human papillomavirus (HPV) first dose of a three-dose schedule, varicella dose 2 (catch up), and annual influenza vaccine.

Bright Future recommendations for this age group include measuring blood pressure, checking vision, performing a psychosocial and behavioral assessment, and providing anticipatory guidance focused on substance abuse and safety. The USPSTF states that the evidence is insufficient to recommend for or against these interventions.

EXAMPLE 4, ELDERLY FEMALE

An 85-year-old female visits the clinic for her annual examination to have her migraine medication refilled. She has occasional migraine headaches that are relieved by sumatriptan. She lives alone, walks 2 miles daily, and reports no health problems. She has no problem getting out of a chair. Her height is 5 ft 10 in. and weight is 165 lb (BMI 23.7 kg/m^2). Her family history shows no cancer or cardiovascular risks. She is 30 years post menopause, and other than a multivitamin each day, takes no medicine. She received a pneumococcal shot at age 65, a Tdap 4 years ago, and a zoster vaccine 5 years ago. She receives a flu shot each year. All of her children (4) and grandchildren (8, the youngest being age 5 years) live in the local area. Her blood pressure has never been high and today is 125/75 mm Hg.

Influenza and pneumonia are risks for this patient since she is around her school-age grandchildren, and the influenza vaccine has low effectiveness in those age 85 years old.

Risk reduction can best be achieved in this woman through advising influenza and pneumococcal vaccines for

her children and grandchildren and avoiding unnecessary screening tests. The only screening tests recommended for her are for osteoporosis, obesity (done), high blood pressure (done), and depression (which she refuses). She is current on all other recommended vaccines.

This woman is best left alone, other than the screening for osteoporosis to prevent iatrogenic illnesses.

The Family Physician as the Foundation of the Public Health System

Although applied prevention in the clinical setting is important for individualized health and wellness, family physicians should realize that the largest improvements in the health of the public at large come from community-wide, public health interventions. Table 7-13 lists just some of the important public health interventions of the last century that have led to significant decreases in morbidity and mortality.

Each state and local political jurisdiction has some kind of official public health presence. At the local level, these are referred to as *local health departments*, which are subunits of city, county, or other regional government jurisdictions. All states have state public health departments, and the major public health department at the national level is the CDC, although important public health functions are also carried out by other federal agencies. The major roles and functions of local, state, and national health departments include disease surveillance and reporting, infectious disease control, infectious disease outbreak response, emergency preparedness and response, and chronic disease prevention.

The public health infrastructure, however, provides minimal direct clinical care, and depends on family physicians and other primary care providers to fulfill vital public health functions that contribute to improved community health. These functions are listed in Table 7-14. Screening tests, immunizations, and risk reduction have already been discussed in this chapter. Other important functions include accurately diagnosing and treating diseases of public health importance, such as sexually transmitted infections, influenza, and tuberculosis; providing recommended treatment for family members and other contacts to infectious diseases or referring them to the public health department; reporting of infectious diseases, cancers, and other reportable conditions as required by state and local reporting requirements; enforcing infection control practices in the clinical setting; and providing advice to infectious patients on how to avoid spreading disease. Avoiding unnecessary or harmful testing and treatments should also be considered part of the prevention package offered by family physicians.

Family physicians should be continually aware of the epidemiology of disease in their communities, which diseases are endemic, which ones are not, and which infectious diseases are occurring at increased rates as part of an epidemic or seasonal increase. Local and state health departments as well as the CDC provide routinely updated epidemiological information through a variety of communication outlets. This knowledge assists physicians in making more accurate clinical diagnoses and providing appropriate treatments. The CDC and state health departments provide recommendations on how to diagnose and treat infectious diseases such as sexually transmitted infections, influenza, tuberculosis, and many others. A list of the most commonly used recommendations and their location on the CDC website is contained in Table 7-15. Following these official guidelines assists in providing accurate surveillance data, helps control infectious disease outbreaks, and assists in preventing antibiotic resistance.

When an infectious disease is discovered in a patient, the family physician should think about the implications of this for the family and the community. Family members may benefit from immunizations and/or chemoprevention depending on the disease. Some states allow treatment of sexually transmitted infections and other infectious diseases for contacts of patients, without directly examining the contact. This is called expedited partner therapy (EPT), and it not only benefits the contact but can also prevent reinfection of the patient. Examples of when EPT can be

Table 7-13 Major Public Health Achievements of the Past Century

- Vaccination
- Motor-vehicle safety
- Safer workplaces
- Control of infectious diseases
- Prevention of deaths from coronary heart disease and stroke through risk factor reduction
- Safer and healthier foods
- Maternal and child health programs
- Family planning
- Fluoridation of drinking water
- Tobacco use prevention

Centers for Disease Control and Prevention (CDC). Ten great public health achievements—United States 1900-1999. *MMWR Morb Mortal Wkly Rep.* 1999;48(12):241-243.

Table 7-14 Important Public Health Functions of Family Physicians

- Provide and promote recommend immunizations
- Provide screening tests recommended by the U.S. Preventive Services Task Force (USPSTF)
- Avoid providing unproven and/or harmful screening tests
- Use effective methods to modify risky behaviors
- Accurately diagnose and treat diseases of public health importance, such as sexually transmitted infections, influenza, and tuberculosis
- Either provide treatment for exposed family members and other contacts of infectious diseases or refer to the public health department
- Adhere to reporting requirements for infectious diseases, cancers, and other reportable conditions
- Enforce infection control practices in the clinical setting
- Provide advice to infectious patients on how to avoid spreading disease
- Avoid unnecessary and harmful testing and treatments

Table 7-15 Commonly Referenced Guidelines on Diseases of Public Health Importance

Diseases	Guideline Location
Sexually Transmitted Diseases ■ Treatment guidelines and updates	http://www.cdc.gov/std/treatment/2010/default.htm
Tuberculosis ■ Diagnosis, treatment of active and latent tuberculosis	http://www.cdc.gov/tb/publications/guidelines/Treatment.htm#treatment
Influenza ■ Vaccinations ■ Diagnosis and treatment ■ Outbreak control ■ Pre- and postexposure chemoprevention	http://www.cdc.gov/flu/professionals/index.htm

Table 7-16 Policies for Respiratory Hygiene in Health Care Settings

- Signs at entrances asking patients to inform office staff if they have symptoms of a respiratory infection
- Signs describing expectations regarding respiratory hygiene and demonstrating the correct way to cover the mouth and nose with a tissue when coughing or sneezing; proper disposal of tissue and hand cleansing after contact with respiratory secretions
- Offering masks to those who are coughing and not practicing respiratory hygiene
- Providing readily available tissues and hand sanitizer and no-touch receptacles for tissue disposal

useful include chlamydia and trichomonas infections. Family physicians who live in states where EPT is not legal and those who are not comfortable providing EPT should either recommend the exposed contact see a physician for assessment and treatment or refer the patient to the local health department. A current catalogue of the legal status of EPT by state can be found at the CDC Expedited Partner Therapy web page (www.cdc.gov/std/ept/default.htm/).

Much of the public health surveillance system depends on reports that come from clinical settings. Hospitals, physicians, and other providers are required to report to the local health department occurrences of specific infectious diseases. In some locations, new diagnoses of cancers are also required. Family physicians should be aware of what the reporting requirements are in the locale of their practice. These requirements usually specify that individual cases should be reported; however, in some instances, the requirement applies only to suspected outbreaks or multiple cases. Anytime family physicians detect an infectious disease that is out of the ordinary, with potential to spread in the community, they should consult with a public health department, either local or state.

Most of the required reports request information about the patient that includes name, address of residence, and phone number. If this information is required, it is exempt from the requirements of the Health Insurance Portability and Accountability Act (HIPAA), and the patient's consent to report is not required. The public health department uses this information for a variety of purposes, including detailed surveillance, contact notification, and implementation of preventive measures.

A clinical setting can be the source of spread of infectious disease in the community. Sick, infectious patients visit physician offices and clinics, and measures need to be taken to insure that spread of disease does not occur in these settings, to other patients as well as to physicians and staff. Measures that can be taken fall into five categories: policies on respiratory hygiene, policies on hand hygiene, immunization of staff, triage policies, and use of personal protective equipment (PPE). Policies on all these areas should be in place and enforced. A checklist of what the CDC considers minimum expectations for the prevention of infections in the outpatient setting can be found at its Healthcare-associated Infections web page (www.cdc.gov/HAI/settings/outpatient/checklist/outpatient-care-checklist.html).

Respiratory hygiene means covering the nose and mouth with a disposable tissue when coughing and sneezing. This should be an expectation for patients and staff. Measures that can be taken to encourage and enforce respiratory hygiene are listed in Table 7-16. Health care personnel should wash or sanitize their hands after every patient encounter. Patients should be instructed to use frequent hand washing when sick. Hand sanitizer should be readily available in clinical areas and waiting rooms.

Office design and triage policy can assist in physically and temporally separating sick, infectious patients from others. Potentially infectious patients can be placed in a separate waiting area and/or asked to come in during specified time periods. However, if respiratory and hand washing policies are adhered to, having those with common respiratory infections use common waiting areas and examination rooms is acceptable. Other infectious diseases require more stringent measures. Fever accompanied by rash is particularly problematic. Measles, rubella, and varicella can all present this way and are highly infectious. Those presenting with rash and fever can be placed into a designated "rash room" and kept confined there until the diagnosis is clarified. If a highly infectious disease is suspected or confirmed, the room should not be used for other patient encounters for a time period as determined by the public health department.

Physicians and other health care personnel are at increased risk of exposure to infectious diseases and should take measures to protect themselves and thereby also protect their patients and families. All health care personnel should be vaccinated according to CDC recommendations (Table 7-17). Having unvaccinated personnel in a clinical setting causes a risk to them, their families, and patients. They are also a liability risk to the practice. PPE should be used any time an exposure to a potentially infectious body fluid occurs. Details on the proper use of PPE are on the CDC web page, Healthcare-associated Infections (www.cdc.gov/HAI/prevent/ppe.html).

When a family physician detects an infectious disease in a patient, advice should be given on how to prevent the spread of the disease to the patient's family, friends, and the community. A list of advice that can be provided is in Table 7-18.

As noted earlier, the last important role for family physicians in practicing optimal preventive medicine is to avoid

Table 7-17 Vaccines for Health Care Personnel

Vaccines	Recommendations in Brief
Hepatitis B	If you do not have documented evidence of a complex hepatitis B vaccine series, or if you do not have an up-to-date blood test that shows you are immune to hepatitis B (i.e., no serologic evidence of immunity or prior vaccination), then you should: ■ Get the 3-dose series (dose #1 now, #2 in 1 month, #3 approximately 5 months after #2). ■ Get anti-hepatitis B surface antigen (HBs) serologic tested 1-2 months after dose #3.
Flu (Influenza)	Get 1 dose of influenza vaccine annually.
MMR (Measles, Mumps, and Rubella)	If you were born in 1957 or later and have not had the MMR vaccine, or if you do not have an up-to-date blood test that shows you are immune to measles, mumps, and rubella (i.e., no serologic evidence of immunity or prior vaccination), get 2 doses of MMR, 4 weeks apart. For health care workers (HCWs) born before 1957, see the Advisory Committee on Immunization Practices (ACIP) recommendations.
Varicella (Chickenpox)	If you have not had chickenpox (varicella), if you have not had varicella vaccine, or if you do not have an up-to-date blood test that shows you are immune to varicella (i.e., no serologic evidence of immunity or prior vaccination), get 2 doses of varicella vaccine, 4 weeks apart.
Tdap (Tetanus, Diphtheria, Pertussis)	Get a one-time dose of Tdap as soon as possible if you have not received Tdap previously (regardless of when previous dose of Td was received). Get Td boosters every 10 years thereafter. Pregnant HCWs need to get a dose of Tdap during each pregnancy.
Meningococcal	Those who are routinely exposed to isolates of *Neisseria meningitides* should get 1 dose.

From the Centers for Disease Control and Prevention (CDC). *Recommended Vaccines for Healthcare Workers.* http://www.cdc.gov/vaccines/adults/rec-vac/hcw.html.

Table 7-18 Advice to Patients to Prevent Spread of Infectious Disease

- The patient should stay at home while most infectious to avoid infecting others. If patients have to leave the home, they should strictly follow respiratory hygiene.
- At home, place patients in a separate room or separate them physically from other household members as much as possible.
- Limit the number of household members having contact with the patient.
- Follow hand hygiene after contact with the patient or the patient environment and waste products. This includes handwashing with soap and water or use of an alcohol-based hand rub.
- Consider having the patient wear a surgical mask.
- Immunize household members if appropriate.
- Wash dishes, utensils, and laundry in warm water and soap.
- Consider chemoprophylaxis for household members if it is available and recommended.
- Household members should watch for symptoms and seek care at their first appearance.
- Nonhousehold members should not enter the home. If nonhousehold members need to enter the home, they should avoid close contact with the patient.

unnecessary and harmful testing and treatments. This at first glance seems clear cut, but there is good evidence that in daily medical practice many tests and treatments provided are not necessary and result in harm (Kale et al., 2013; Korenstein et al., 2012) Antibiotics for upper respiratory infections is one example. The AAFP and other specialty organizations have joined forces in an initiative called "Choosing Wisely." Each organization has developed a list of testing or interventions that should not be performed, or done only in specific circumstances. The AAFP list of 15 such interventions is contained in Table 7-19. Unnecessary testing and treatments are costly and harmful, and avoiding them is good preventive medicine.

Intergenerational Aspects of Prevention in the Family

Family physicians have the opportunity to appreciate and achieve intergenerational benefits of preventive interventions within families and households. Influenza and pneumococcal vaccines in infants and children provide added protection to elderly family members—who are at the highest risk of morbidity and mortality from these respiratory infections—through herd immunity and reduced disease transmission. Pertussis immunization of adolescents and adults of all ages provides a cocoon of protection around infants who have high rates of serious complications from pertussis and are not fully protected by the vaccine until they have received a full primary series. Other infectious diseases can spread among family members, and ways to minimize this have already been discussed in this chapter.

In addition, chronic diseases tend to be common among family members because of common genes and common environments, and interventions to prevent these conditions can spread their effects through the household. For example, smoking cessation helps prevent disease not only in the smoker but also in the whole family by preventing exposure to secondhand smoke. Improved diets and increased physical activity can be family activities, which lead to improved health for those with obesity and diabetes and contribute to a reduced risk for everyone else in the household.

Genomics and Prevention

The human genome project has led to a better understanding of the genomic basis of responses to specific

Table 7-19 American Academy of Family Physicians "Choosing Wisely" List

1. Do not do imaging for low back pain within the first 6 weeks unless red flags are present.
2. Do not routinely prescribe antibiotics for acute mild-to-moderate sinusitis unless symptoms last for 7 or more days or symptoms worsen after initial clinical improvement.
3. Do not use dual-energy x-ray absorptiometry (DEXA) screening for osteoporosis in women younger than 65 or men younger than 70 with no risk factors.
4. Do not order annual electrocardiograms (ECGs) or any other cardiac screening for low-risk patients without symptoms.
5. Do not perform Pap smears on women younger than 21 years of age or who have had a hysterectomy for noncancer disease.
6. Do not schedule elective, nonmedically indicated induction of labor or cesarean deliveries before 39 weeks, 0 days gestational age.
7. Avoid elective, nonmedically indicated inductions of labor between 29 weeks, 0 days and 41 weeks, 0 days, unless the cervix is deemed favorable.
8. Do not screen for carotid artery stenosis in asymptomatic adult patients.
9. Do not screen women older than 65 years of age for cervical cancer who have had adequate prior screening and are not otherwise at high risk for cervical cancer.
10. Do not screen women younger than 30 years of age for cervical cancer with human papillomavirus (HPV) testing alone or in combination with cytology.
11. Do not prescribe antibiotics for otitis media in children ages 2 to 12 years of age with nonsevere symptoms when the observation option is reasonable.
12. Do not perform voiding cystourethrograms routinely in first febrile urinary tract infection in children ages 2 to 24 months.
13. Do not routinely screen for prostate cancer using a prostate-specific antigen (PSA) test or digital rectal examination.
14. Do not screen adolescents for scoliosis.
15. Do not require a pelvic examination or other physical examination to prescribe oral contraceptive medications.

From American Academy of Family Physicians. *Fifteen Things Physicians and Patients Should Question.* http://www.aafp.org/dam/AAFP/documents/about_us/initiatives/choosing-wisely-fifteen-questions.pdf.

medications, adverse drug reactions, and the underlying inheritability of many conditions. Rapidly evolving scientific advances in genomics, along with reduced costs of genomic tests, holds the promise of one day each person knowing their whole genome. While theoretically this will lead to more accurate targeting of drug therapy, fewer adverse drug reactions, and targeted risk reduction activities, the full translation of this new science into useful and effective clinical interventions is pending the demonstration of clinical utility and improved clinical outcomes.

Genomic tests should be evaluated for effectiveness just as should other screening tests. So far, evidence-based groups that have assessed genetic and genomic tests used for predicting risk for chronic diseases, such as diabetes, coronary heart disease, and obesity, have not endorsed their use because they have not proven to be clinically useful; they do not provide much information beyond that obtained from a family history and traditional risk factors (EGAPP Working Group, 2010, 2013). In addition, it is not clear that people will take any action to improve their health or risks based on this information.

However, testing for two conditions that cause higher risks for cancer have been found to result in improved outcomes: breast cancer genes and Lynch syndrome. The USPSTF recommends that women with high-risk family histories for breast and uterine cancer be counseled about the *BRCA* gene test (USPSTF, n.d.). Patients who have a *BRCA* gene can reduce their chances of breast and ovarian cancer with bilateral mastectomy and oophorectomy. First-degree relatives of those with Lynch syndrome, discovered to be the cause of colon cancer, can be tested to see if they carry the same mutation, and if they do, they can benefit from earlier and more frequent colonoscopy. This has led to a recommendation to test all of those with newly diagnosed colon cancer for Lynch syndrome and counseling of first-degree relatives of those with this inherited disorder (EGAPP Working Group, 2009).

Family physicians will need to stay current with advances in genomics and use discretion when deciding when to use genomic tests and genomic-based interventions, adopt them when the evidence merits it, and avoid unnecessary and potentially harmful testing.

Office Systems as an Aid to Prevention

In a busy clinical setting, prevention can easily be relegated to the back bench. It takes effort to adhere to recommendations for counseling, chemoprevention, screening, and vaccines. Reporting of infectious diseases to the health department can be overlooked. Making prevention interventions routine, as part of the clinical system, helps ensure a high level of performance. Examples of systemization that can occur include electronic health record reminders to providers of recommended preventive services for each patient; flagging of infectious diseases that need to be reported; standing orders for immunizations; alerts when targets such as blood pressure and blood glucose levels are exceeded; and automatically generated reminders for patients that can be sent using electronic media. Other system-wide interventions with good evidence of effectiveness include group education sessions for diabetes self-management and increasing breast cancer screening; team-based approaches to assist patients in managing chronic conditions such as high blood pressure, diabetes, and high cholesterol; and periodic assessment and feedback to providers on performance on prevention measures (Community Preventive Services Task Force, *Cardiovascular Disease Prevention*, *Diabetes Prevention and Control*, and *Obesity Prevention and Control*). Individual team members can be charged with specific responsibilities such as assessing each patient's vaccine status or ensuring that hand sanitizers and tissues are readily available. Immunization schedule wall charts can be posted in waiting areas and examination rooms, and prevention-oriented patient education materials can be placed so they are easily seen and obtained. The key is making all aspects of prevention a priority and finding ways to make it happen.

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The complete reference list is available at www.expertconsult.com.

Web Resources

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http://www.thecommunityguide.org/index.html *Community Preventive Services Task Force*
http://www.thecommunityguide.org/vaccines/index.html Community Preventive Services Task Force article, *Increasing Appropriate Immunizations*
http://www.uspreventiveservicestaskforce.org/index.html *U.S. Preventive Services Task Force*

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8 Behavioral Change and Patient Empowerment

CHARLES W. SMITH and J. CHRIS RULE

CHAPTER OUTLINE

Key Points

- Patients are responsible for their own health.
- Patient engagement and shared decision-making is more likely to result in better patient outcomes.
- Motivational interviewing can help patients make important changes.

Although most people find it very difficult to change behavior, they often do so in the interest of achieving positive health outcomes. This chapter introduces you to the concept of "participatory medicine" and challenges you to think of patient relationships in a new way, as a partnership, and to facilitate the notion that patients are, in fact, responsible for their own health. Patients will never achieve meaningful, lasting behavior change unless the decision is their own. And, they will not feel empowered to make change unless they have access to enabling tools and methods. Motivational interviewing (MI) is one technique that can be used by providers to help patients initiate and implement important change processes. This approach is presented later in this chapter.

Traditional Physician Role

Physician training often involves techniques and advice about how to "lead" or "direct" the patient to change, whether the goal is adherence to treatment recommendations, smoking cessation, or dietary changes to achieve weight loss. As a result of taking on this provider-centric, directive role, physicians often mistakenly assume responsibility for patient outcomes. This can foster paternalistic interaction, cause frustration, and contribute to provider burnout. Embracing the notions of shared decision-making, patient engagement, and patient empowerment frees both patient and provider to form a more equal relationship and allows the patient to receive appropriate guidance and advice. This type of relationship is more likely to result in the patient taking responsibility for making the necessary changes to achieve optimal health (Stewart et al., 2000). Examples that support this approach can be seen in the Kaiser Permanente HealthConnect Collaborative Cardiac Care Case Study, which reported that patient engagement resulted in prevention of 135 deaths and 260 costly emergencies and increased achievement of patient's cholesterol goals from 26% to 73%; and it resulted in the percent of patients screened for cholesterol levels increasing from 55% to 97% (Munro, 2013).

Evolution of the Care Model

The dominant care model in Western medicine has been the biomedical model. The traditional provider role places the physician in an illness/disease paradigm. This model has sustained the health care system for more than a century and has resulted in much success. Yet the system cries out for change, in part because of the perceived negative consequences on patient health outcomes. An alternative approach, the patient-centered, participatory, patient-engagement paradigm, focuses more on health promotion and maintenance of a healthy lifestyle. One of the early "disruptive" forces that led to the evolution of the traditional medical model was Michael Balint, who used his dual training in medicine and psychiatry to explore the way emotions affect symptoms. He also emphasized the importance of the role of the physician himself and the doctor-patient relationship (Balint, 1957). Engel (1977), building on the works of general systems theorists, first proposed the biopsychosocial model, which embraces the complexities of genetics, physiology, family history, family dynamics, environmental stress, and stress-related illness, as well as social and cultural factors. It also takes into account that many deeply personal factors affect the expression of symptoms and one's response to, and recovery from, illness.

The "medical model" focuses on making a diagnosis and providing treatment to eliminate the disease, and it has been largely successful. Yet the obdurate rate of change for

certain chronic diseases illustrates that this model has significant limitations. Likewise, while the biopsychosocial model and Balint's blend of the medical/psychosocial approach to care are helpful in understanding patient behavior, they do not provide readily applicable practice approaches that help doctors and patients achieve optimum health outcomes. Nevertheless, these pioneers provided the background and basis for an exciting new approach by encouraging patients to be active participants in narrating their stories to their physicians (Engel, 1997). This may provide a more effective approach, namely, participatory medicine.

The Participatory Medical Model

The medical and biopsychosocial models describe how providers view their patients. But in the realm of interaction and the doctor-patient relationship, patients and providers alike are calling for a new model of care in which the provider assumes a new, less authoritative role that seeks to engage the patient more actively in the care process. This participatory model assumes that patients will actively learn about their condition, prepare questions for provider visits, collaborate with other patients with similar conditions, and take an active role in making lifestyle changes to improve health and manage their own conditions.

The participatory health model goes hand in hand with the introduction of the Internet and mobile technology. And it embraces the enormous impact the Internet is having on health care. (Reynolds, 2013). But these changes also complicate the doctor-patient relationship, bringing to light multiple, potentially conflicting sources of information from online journals, websites, and blogs that must be reconciled. So then, how can this reconciliation best take place and how will we, as providers, facilitate the role of patients within the participatory model of care?

In this new model of care, patients will receive guidance, tools, and information that foster active participation in their care and effective collaboration with providers. In addition to engaging in research about their health and their medical conditions, patients will network with online communities to discover which treatments, providers, and facilities work best. Through the network effect of communicating with other engaged patients, they will become more aware of their responsibilities for maintaining health. This approach will be even more effective as home monitoring devices become routinely available (Kruse et al., 2013).

As providers increasingly adopt electronic communication options, clinical care will shift to a "care anywhere" model. Office visits will become much less important and less frequent. Most routine follow-up, medication refills, review of blood pressure, adjustment of medications, and other former office-based interactions will be conducted online. Office visits will only take place when a hands-on examination, interaction, or procedure is needed. This new care model will be less costly, more patient-centered, more convenient, and will lower barriers to accessing care. These electronic methods of communication may include e-mail, web-based secure messaging, videoconferencing, mobile phone conversations, text messaging, and instant messaging (Epstein and Street, 2011).

But, as with most things, these sweeping changes are not without risk and potential negative outcomes. Increasing dependence on online communication removes the valuable role of face-to-face communication and nonverbal communication. Thus it will risk missing subtle clinical clues that may otherwise be detected within an office setting. Further, it is difficult to be certain that someone other than the assumed patient is communicating online, so there is also a risk of fraudulent activity occurring. And state medical regulations generally limit the extent to which a provider may give online advice or prescription medications without a previously established doctor-patient relationship or an in-office evaluation before communicating online. So this, appropriately in most cases, limits the breadth of online provider-patient communication.

The Birth of the "e-Patient Revolution"

"e-Patients: How They Can Help Us Heal Healthcare," a Robert Wood Johnson white paper, articulated this emerging change in health care and introduced the participatory model for U.S. health care (Ferguson et al., 2007). More recently, the Affordable Care Act, with its emphasis on patient-centered medical homes and accountable care organizations (ACOs), is in the early stages of implementation. The effectiveness of these health reforms will depend to a great extent on how successful we are in activating and engaging patients to become participatory partners. Ferguson also noted that people provide their own care 80% to 98% of the time and thus self-care is actually the predominant care mode (Figure 8-1). He also noted that, with the advent of the Internet and the accompanying massive access to information, the triangle is becoming "flipped"; that is, self-care is now more encouraged, more routine, and more accepted than previously (Figure 8-2). Ferguson believed that patients are now more knowledgeable about their health and in a better position to use health professionals in a coequal, consultative mode (participatory model) than to continue to function as passive patients.

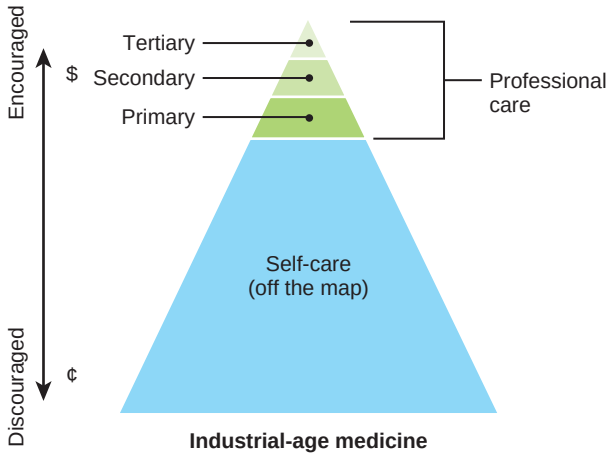

Figure 8-1 Importance of self-care. (From Ferguson T. Consumer health informatics. *Healthc Forum J.* 1995;38(1):28-33.)

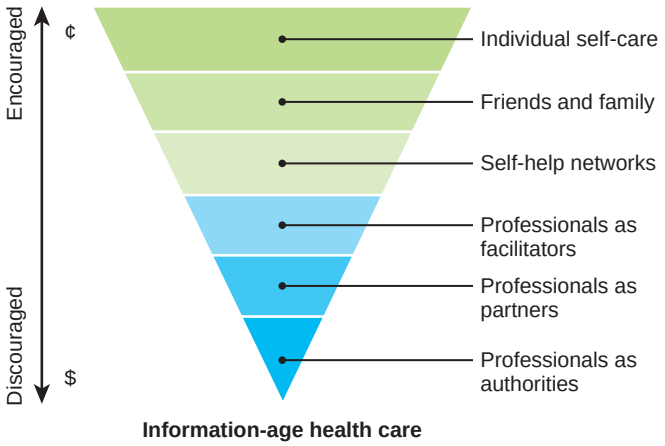

Figure 8-2 Emergence of individual self-care. (From Ferguson T. Consumer health informatics. *Healthc Forum J.* 1995;38(1):28-33.)

Patient- and Family-Centered Care

Medical teachers have emphasized the preeminent role of the provider in making the diagnosis, giving staff and patients "orders" to be carried out, and performing follow-up checks. The picture is one of the providers as "all knowing" and as "captains of the ship" who must remain in control within the medical setting. This focuses all of the pressure on the provider to perform well and places the patient in a passive role that often results in suboptimal outcomes.

In recent years, the patient-centered care movement has gained in popularity. Practicing patient-centered care embodies a number actions and strategies, including shared decision-making, open communication between physician and patient through patient portals, text messaging, e-mails and social media, MI, and being available and responsive during regular hours and after hours (Bergeson and Dean, 2006). Hospitals have encouraged and embraced this movement by building online portals that allow patients to review laboratory and radiography reports, request or make appointments, and communicate with clinical staff. Hospitals have also engaged individuals to serve in patient and family advocacy roles, including formation of patient advisory committees. Many institutions have also begun to add patients to hospital committees, boards, and work groups. This patient participation in the governance of health care organizations is a necessary addition if we are going to effectively bring the patient's voice and perspective into the way these entities function (Luxford et al., 2011).

Patient Engagement

The term "patient engagement" has become a "hot buzz" phrase recently and is variably interpreted and very difficult to measure. Munro notes that the search phrase returns more than 500,000 results and is a lead topic for speakers and conferences (Munro, 2013). He also notes that it is important to use metrics, not just words and platitudes, to measure how providers and institutions move into patient engagement programs. Kernisan (2013) defines patient engagement as fostering a fruitful collaboration in which patients and clinicians work together to help the patient progress toward mutually agreed-on health goals. It requires providers to work collaboratively with patients to determine which health outcomes are important, which ones to pursue, and how they should be pursued. This allows us to engage in meaningful partnerships with patients. Allowing patients to make these choices will be a very different mindset for many providers.

The Patient-Centered Medical Home

The patient-centered medical home (PCMH) concept has been embraced by many organizations and policy groups and is widely regarded as a key tool to reform health care. It involves a team approach to care and describes a wide variety of services to provide high-quality care to patients with chronic illnesses (Robert Graham Center, 2007). It also appeals to healthy patients who want to prevent illness and maintain optimum health.

Utilizing the principles of the PCMH is a practical way to shift physicians' attitudes and practices toward the participatory medicine model. It points to new roles for both patients and providers. It requires physicians to become more involved in and supportive of patient education. It involves a multidisciplinary team approach to care, with each member of the team practicing "at the top of their license." These teams often include mental health professionals, nutritionists, pharmacists, and other professional providers. And it will profoundly alter the provider business model, with widespread adoption and expansion of information technology (IT) capabilities, more accessible and more frequent modes of communication, and reconfigured incentives and rewards for all stakeholders. Many believe that it will ultimately bring an end to the fee-for-service reimbursement method of paying for medical services (NCQA, 2011).

This approach has profound implications for patient and provider interaction. No longer will the care system be based primarily on an "office visit" model. Physicians will be reimbursed for "monitoring" their overall practice population and will receive incentive payments for agreed-on, desired outcomes. Because payment to providers will not be based solely on office visit charges, there will be greater incentives to communicate in other ways, including phone, e-mail, text messages, and social media.

The National Committee for Quality Assurance (NCQA) created a certification standard for PCMH that was modified in 2011 (Peek and Oftedahl, 2010). This list comprises the six basic standards:

1. Enhance access and continuity.
2. Manage population.
3. Plan and manage care.
4. Provide self-care support using community resources.
5. Track and coordinate care.
6. Measure and improve performance.

Meeting these standards involves a significant redesign of the primary care physician office team, including utilization of nurse care managers, greatly expanding access to care, and involving patients in goal-setting and self-management. It also involves a commitment to evaluation of the patient experience and making appropriate modifications. And it

involves significant additional investments in personnel, IT systems, and training. Thus if this model is to be sustainable, payers of health care services will need to take these additional costs into consideration in their reimbursement for this care.

Patient/Provider Collaboration

Adopting and following the principles outlined for the PCMH moves providers from traditional means of communication between doctor and patient. No longer does the provider supply "doctor's orders," but the paradigm has evolved toward the patient and provider conducting collaborative conversations and exchanging ideas. Providers will engage patients to participate in their care and will encourage them to be actively involved. Providers will also invite the patient to provide feedback about the care received. This feedback will include identification of, and reporting, medical errors (Allen, 2012; Pear, 2012).

Physicians and patients will find new ways to use social media to communicate with patient groups who have similar conditions (e.g., Association of Cancer Online Resources at www.acor.org). Physicians will commonly prescribe "information therapy" to give patients the material they need to manage their own health care. Similarly, patients will provide physicians with insights they have gleaned from their own experience and from their social network (Reinders et al., 2011). Most physicians will have interactive practice websites and an electronic portal through which patients can request an answer to a clinical question or renewal of a prescription.

Information Technology and Participatory Medicine

The use of electronic medical records (EMRs) and other technology tools will play a major role in this new model of health care. There will be easy mechanisms within the EMR for follow-up after every encounter (Smith and Graedon, 2012). Physicians will send communication to the patient electronically or give printed information, depending on patient preference and technical access, generated from the EMR. Laboratory and imaging results will be shared, along with interpretative comments and any necessary instructions. Physicians and patients will use e-mail or secure messaging to discuss changes in status, provide progress reports, or communicate other important information. Rather than establishing fixed intervals for when follow-up will occur, there will an ongoing dialogue made possible by these online tools.

Access to health applications (apps) currently available on smartphones and tablets will play a central role in the future of health care. Patients will use apps to help guide weight loss, promote exercise programs, and monitor chronic conditions (Lim, 2013). Patients with cardiac problems will be able to obtain and transmit an electrocardiogram to their providers (Seppala, 2013). Touch-sensitive devices will be used to monitor pulse, respiratory rate, and oxygen saturation (Bloom, 2013). Patients with diabetes will measure their glucose on a connected glucometer and transmit the results directly from their devices, allowing consultation and medication adjustments to be made without the necessity of an office visit.

Health Behavior Change and Motivational Interviewing

Key Points

- Health behavior change and MI are patient-centered approaches that promote change, empower patients to address ambivalence, and improve patient engagement in their health care.
- Brief MI and health behavior change (HBC) interventions in clinical settings are more effective than no treatment and are generally equal to other viable treatments of longer duration and cost.

BACKGROUND AND KEY PRINCIPLES

Motivational interviewing is one good way to engage the patient in the process of positive change. Developed by Miller (1983) as a promising way to treat alcoholism, MI has most recently been defined as "a collaborative person-centered form of guiding to elicit and strengthen motivation for change" (Miller and Rollnick, 2009, p. 137). Often described by its creators as more than a series of techniques and skills, MI is a way of being with patients that empowers them to improve their own health, addresses resistance and barriers to change, and fortifies their ability to maintain these changes over time. Miller and Rollnick (1991) adapted and expanded MI to work with various patient populations in substance abuse treatment settings (see Miller and Rose, 2009, for an extensive background on the development of the method). In the past two decades, a strengthening evidence base has demonstrated that MI can be adapted to many different patient health problems in a wide variety of settings. Rollnick and colleagues (2008), in their book *Motivational Interviewing in Health Care*, identify four guiding principles of MI. These are captured in the mnemonic **RULE:**

1. **R**esist the "righting reflex"—recognize that correcting the patient can produce a paradoxical effect (i.e., "Don't try to fix it, and don't give advice").
2. **U**nderstand your patient's motivations—the desire for change and the goals to achieve must come from the patient not the provider.
3. **L**isten to your patient—use empathic, active listening; this changes the mindset that the provider has all the answers.
4. **E**mpower your patient—understand that the outcomes will be better when patients are active participants in their own care and take responsibility for the change process.

Prochaska and DiClemente (1984) developed their transtheoretical model, also known as the stages of change theory, to provide a structure that providers can use to track a patient's progress through health behavior change. This

Table 8-1 Stages of Change Theory

1. Precontemplation: not yet considering change
2. Contemplation: evaluating reasons for and against change
3. Preparation: planning for change
4. Action: making the identified change
5. Maintenance: working to sustain changes
6. Relapse: backsliding into old behavior patterns

model has five key stages that are used to identify where a patient is in the process and tailor the appropriate intervention to this change. These can be used as a way to open the dialogue about change behaviors with the patient, and the provider can use the process to monitor treatment. The stages are listed in Table 8-1.

The sixth step or stage that is commonly seen in clinical settings is "backsliding" or relapse (see Table 8-1). This part of the transtheoretical process can occur at almost any level and is central to understanding how patients' health behavior is often cyclical as they move back and forth in their decision-making and maintenance of healthier behaviors. This model can serve as a complement to MI in clinical practice. There are several guiding philosophies that undergird MI, which make it an excellent approach within the PCMH model. MI specifically, and health behavior change (HBC) more broadly, are becoming essential tools in clinical practice and support providers' shift to the patient engagement movement and to practicing more patient-centered medicine. With a patient-centered approach, the patient works in collaboration with the provider to set the agenda for treatment; this contrasts with a provider-centered approach in which the physician or other health care team member determines the agenda for the patient and directs treatment. The collaboration between patient and team is seen as essential because the goals must start with what the patient is willing and able to do. This supports patient self-efficacy, autonomy, and expertise, and it creates belief in the patient's own capacity to change and implement these new healthier behaviors.

Key to the success of applying MI to patient care requires several provider behaviors, some of which fly in the face of the formal instruction that physicians receive. One of these is termed "rolling with resistance" or the denial that the patient may put forward. This keeps the encounter from becoming a confrontation or tug-of-war between patient and provider. Providers also need to be acutely aware of how to enhance a patient's readiness by helping the patient identify the real or perceived obstacle to change by resolving the patient's ambivalence. By enhancing patients' self-efficacy, providers become more active collaborators in their patients' health.

Empathy for the patient is a key component, as it allows the provider to really "start where the patient is" and promotes a deeper understanding of what it is like to be that patient as they face his or her health challenges. With this empathic stance, both the provider and the patient recognize that the motivation to change comes from the patient. The provider does not have to convince the patient to change or give sage advice about how this should be done. The mnemonic, OARS, is the basis for patient-centered interventions in brief counseling; it is a path that leads to empathic connection with the patient (Miller and Rollnick, 2002; Table 8-2). These basic microcounseling skills have been shown to work well with all types of patients considering a health behavior change. These interpersonal communication skills help a clinician capture what has been referred to as the "spirit" of MI, and this is often cited by the founders of the model as the most critical aspect of using this method properly (Miller and Rose, 2009).

Table 8-2 OARS for Brief Counseling

Open-ended questions, e.g., "How are you feeling about your health these days?"

Affirmation, e.g., "You may not be at your goal yet, but look at how far you've come."

Reflective listening, e.g., "It sounds as though you don't feel confident about making this change but you do want to change."

Summaries, e.g., "Let me summarize what we've just talked about."

From McAndrews JA, McMullen S, Wilson SL. Four strategies for promoting healthy lifestyles in your practice. *Fam Pract Manag* 18(2):16-20, 2011.

EVIDENCE FOR HEALTH BEHAVIOR CHANGE AND MOTIVATIONAL INTERVIEWING

Recent meta-analyses and review articles across a variety of disciplines have further solidified the evidence for MI and other patient-empowering methods to bring about positive health outcomes (Britt et al., 2004; Burke et al., 2004; Martins and McNeil, 2009; Rubak et al., 2005). Numerous strategies for changing health behaviors have also received attention in recent years (Martins and McNeil, 2009; Rubak et al., 2005). MI has been shown in dozens of controlled trials to produce significant change in client health behaviors in general and in substance use in particular. Randomized trials showing benefit from MI have been completed with patients with alcohol, tobacco, and substance abuse problems, type 2 diabetes, hypertension, gambling addiction, and weight reduction (Miller et al., 2004). Given the wide breadth of articles and subjects covered, this section will focus on those studies that address a few of the problems commonly seen in family medicine practice.

HBC and MI complement the approaches being used in the management of a variety of chronic illnesses in health care settings. The "way of being with patients" that is the central aspect of MI and is a component of many chronic disease models being used to address these complex problems helps the provider address the problems in new ways. By dealing with a patient's feelings and thoughts and ambivalence using MI, there seems to be much less resistance and better adherence to treatments. As with all models, this one is not a panacea, but there are strong indications that MI and HBC approaches can have positive impacts on a wide range of illnesses and effect behavior change in many populations where other standard methods have come up short (Miller and Rose, 2009).

MOTIVATIONAL INTERVIEWING AS APPLIED TO COMMON PROBLEMS IN FAMILY MEDICINE

Diet Changes, Obesity, and Reducing Body Mass Index

More than three dozen studies have been conducted since 1999 that have investigated the effects of MI on changes in

diet, for weight loss, to reduce body mass index (BMI), and to increase physical activity (see Martins and McNeil, 2009, for a review, and Armstrong et al., 2011). These studies, mostly randomized controlled clinical trials, have demonstrated moderate to strong support for MI and other HBC interventions. They used several MI methods to achieve their results, including empathic understanding; opened-ended questions to assess for readiness to change; scaling questions for importance and confidence to create discrepancy and to track progress; and multiple sessions of varying number and duration (10-40 minutes). In-person meetings by a variety of providers as well as telephone calls were used as the primary interventions and as follow-up or maintenance interventions. The most robust findings have been in the areas of maintaining dietary and weight loss changes and lowering BMI based on goals agreed on between patient and the provider. A recent review by Rose and colleagues (2013) summarized that provider advice, including some studies in which MI was used, produces a greater level of health behavior change and commitment to weight loss goals. The long-term value of MI in this area seems well established at this point. In the review by Rubak and colleagues (2005), the combined effect estimates of using MI to produce decreases in body mass index indicate that it can and should be used. The growing weight of the evidence supports using these techniques and this style of counseling with overweight and obese patients.

Case Example of a Participatory Encounter

See Box 8-1.

Hyperlipidemia

Several studies have investigated the effect of MI on lowering cholesterol level, and the results have been mixed. Brug and colleagues (2007) found that dietitians trained in using MI with patients with type 2 diabetes attained a significantly larger self-reported change in their saturated fat scores than dieticians who were not trained in MI in newly diagnosed patients. Other risk behaviors for type 2 diabetes such as glycemic control and body mass were no different than the controls. A study that compared two interventions, one of which was MI, for lowering lipid levels and dietary fat intake showed positive results for both interventions, which were sustained for 12 months (Mhurchu et al., 1998). Additionally, numerous other studies with a wide range of populations, age ranges, and from a broad diversity of cultures have demonstrated that using standard MI interventions to lower serum cholesterol has a strong enough positive effect to suggest its use over other methods (Martins and McNeil, 2009; Rubak et al., 2005).

Diabetes Care

There have been a large number of studies over the past 15 years investigating the impact of MI and other HBC approaches on patients with diabetes (see Rubak et al., 2005 for a review; DiLillo and West, 2011). Most of these studies have yielded positive or mixed (positive-neutral) results when comparing MI- or HBC-focused interventions to controls. The most salient changes have been where intervention groups who have received MI have experienced larger reductions in weight, significantly lower hemoglobin A1c values, improved dietary changes, increased activity levels, an enhanced motivation to learn about their diabetes, and an improved outlook on maintaining behavior change (Channon et al., 2003, 2007; Rubak et al., 2009). West and colleagues (2007) studying a group of overweight women with type 2 diabetes found that MI enhances patient weight loss at 6 and 18 months, as well as leads to significantly reduced hemoglobin A1c levels. However, this study also found that the motivation to change for African American patients seemed to diminish over time. This observation calls into question the clinical durability of MI with some populations; however, there are promising studies being undertaken with adolescents that combine MI with other treatment strategies (Stanger et al., 2013). This will be an important area of future research as MI techniques are refined to discover how best to meet the needs of special populations. Team-based care for diabetes management has become the norm, involving physicians, nurses, care managers, social workers, psychologists, support groups, and lay volunteers. HBC and MI help to educate patients, facilitate change, and maintain patient adherence at all levels of care. Given all the available evidence, these techniques have been shown to empower patients to be more engaged with their diabetic care. They have the potential to make the provider's work more efficient and effective in reducing more costly levels of care. With further data, this may be where the greatest benefits of MI are realized.

TRAINING AND GROWTH OF MOTIVATIONAL INTERVIEWING

In the past 30 years since these approaches were conceived, the current widespread use of MI and HBC methods across a variety of disciplines illustrates that they have moved beyond emerging trends. Currently there is a need for expanded training and teaching of these methods and principles across the health care system. Having emerged from the discipline of psychology, these methods are being used in medical residency programs from family medicine to obstetrics/gynecology, and from internal medicine and pediatrics to psychiatry. They are also widely used in colleges of nursing, public health, schools of social work, and other health-related professions. The adoption of MI and HBC as part of standard curricula is in the beginning stages in medical school and other health care fields, so future professionals should have a stronger grounding in HBC and the basics of MI as essential tools. However, this has been helped along by recent reports from the Association of American Medical Colleges (AAMC, 2011) and the Accreditation Council for Graduate Medical Education (ACGME) that place strong emphasis on the physician-patient relationship, the psychosocial aspects of the human condition, the communication skills and advanced interpersonal competencies necessary to provide excellent care, and the importance of methods and techniques as found in MI and the HBC literature. Important support for these efforts could come from the accreditation bodies for PCMH as these methods are increasingly seen as cost-effective approaches that involve the entire health care team, especially the patient.

In the spirit of collaborative care, with provider and patient working together in MI, Triana and colleagues (2012) recently demonstrated how a standardized MI

Box 8-1 Case Example of a Participatory Encounter

Mrs. Smith is 59 years old, is 20 pounds overweight and has an average blood pressure of 145/98 mm Hg and a fasting glucose of 135 mg/dL. Her hemoglobin A1c is 7.2%, indicating that she has previously undiagnosed diabetes mellitus. She complains of bilateral knee pain, which makes it hard to exercise. Radiographs of the knees confirm the diagnosis of moderately severe osteoarthritis. She also has complained of hot flashes, insomnia, and depression.

When Ms. Smith calls the office to arrange for a new patient visit, she is enrolled in the office's patient portal, which allows her to submit her medical history and all of her insurance and demographic information online prior to her visit. When she arrives in the office, she checks in using a computerized kiosk and, because she has been preregistered, the process takes less than 2 minutes. She is brought back to the examination room a little ahead of her scheduled visit.

The doctor uses a questioning method informed by the spirit of motivational interviewing (MI). Open-ended questioning begins the visit, and the doctor actively listens to allow the patient to tell her story in her own way. This empowers the patient to inform the doctor of her concerns and what her most important issues are from her perspective. She expresses concerns about the diabetes diagnosis and her knee pain.

Using another key technique of MI and health behavior change, the doctor might use a scaling question or review with the patient a "confidence/readiness ruler" to assess the patient's confidence and the level of importance she places on making the necessary changes. This could be in a customized, tablet-based handout synched with the clinic electronic medical record (EMR), or it could be administered as a handout by a patient-centered medical home (PCMH) team member (nurse, medical assistant, or diabetes care manager) depending on the patient's health literacy level. The doctor (who has already reviewed her online history) reviews her laboratory results and discusses the medication choices for her to consider. Instead of making hasty decisions, the doctor then uses this information to

- Affirm how the patient is feeling about making these significant changes.
- Resolve any ambivalence she may be having to the recommended changes in her medication regimen, diet, and activity levels.
- Summarize the biomedical and psychosocial aspects of care into an integrated plan that is personalized and fits with the patient's level of readiness to change.

After reaching common ground the follow-up plans flow easily.

Because this MI approach blends client-initiated information with the doctor's medical knowledge and clinical judgment, the process is collaborative and the patient feels empowered to be more involved in the decision-making. The patient and doctor reach common ground on the patient's medications.

In addition to the core concerns, the doctor and patient discuss additional supports that the patient can receive through the PCMH. She is given an appointment with the nutritionist and with the diabetes educator for later that week. She is also given a web address for an online diabetes support group, and several diabetes care apps that the physician is familiar with are recommended for her to track her blood glucose levels and dietary changes.

To address the patient's second agenda item, the doctor and patient repeat the OARS process as detailed in Table 8-2. They reach mutual agreement to use ibuprofen for her knee pain and decide on a referral to a physical therapist who specializes in hydrotherapy for osteoarthritis. The patient also indicated that she is willing to try some alternative methods so she is provided with information about a certified acupuncturist to help treat her arthritis pain. She is referred to a well-respected website that specializes in home remedies and is encouraged to look over the options listed for treatment of arthritis and knee pain and select any that she is comfortable with. She is asked to log her results for later sharing with the care team.

She is encouraged to use the patient portal to provide blood glucose levels, ask questions, and provide feedback about the effectiveness of her medications. She uses a connected glucometer, along with a new mobile application on her smart phone, to upload her blood glucose data directly to her medical team. She is also given an opportunity to join the patient advisory group that the practice is forming, and she is invited to the first meeting 3 days from now. She is given a follow-up appointment with the physician in 3 months but is reminded that scheduling is "open" so she can come back sooner, or anytime she has a need. At the end of the visit, she receives a brief online feedback survey inviting her to give the doctor and his staff feedback about the visit and what suggestions she may have to improve her experience. She notes on this form that the office staff gave her incorrect information about her group diabetes visit and so the outdated information on the patient forms was promptly corrected for future patients.

She is referred to the psychologist who is integrated with the PCMH to help assess and treat her depression. The psychologist uses brief MI along with cognitive behavioral therapy (CBT) interventions to target the depressive symptoms. MI is used at each visit to affirm, support, and encourage the patient as she makes these changes that affect her overall health. In addition, she is given a web address for an online support group for depression, and is encouraged to log on to Psych Central (www.psychcentral.com) to review its array of resources and patient tools.

A couple of days later, she develops an annoying cough and is starting to have abdominal pain, so she logs onto the patient portal and asks the office team about these symptoms. The nurse who is monitoring the portal messages contacts the physician, who decides to switch her medication from the angiotensin-converting enzyme (ACE) inhibitor she is taking to a β-blocker. He also suggests that she stop taking the ibuprofen, try substituting acetaminophen (Tylenol), and take a proton pump inhibitor, omeprazole (Prilosec), for a 2-week trial. She is asked to log on and provide an online update in 48 to 72 hours.

Two days later, her abdominal pain and her cough have resolved. Her blood pressures are in normal range, but her blood glucose levels are still running from 120 to 150 mg/dL. She is urged to continue the current course and check back online after her nutrition visit, her group visit, and her diabetes education visit.

Two weeks later, on the same dose of diabetes medication, with the benefit of her classes and counseling, she logs back in and proudly reports that her glucose levels have come back into the normal range. She returns to the office 3 months later, feeling great, in good control of her health issues, and confident with the PCMH team's approach.

curriculum can be presented as part of an intensive block rotation for family medicine and psychiatry. This study reinforces the crucial need for continued one-on-one coaching and individual feedback as part of MI training, and it recognizes that increasing the self-efficacy of the learner is essential if clinical practice changes are the goal (Miller et al., 2006). Current research is helping establish a common core of MI that includes skills, training in the spirit of MI, eliciting change talk, and rolling with resistance (Söderlund et al., 2011); however, the authors caution that the results are not strong enough in all studies due to methodological issues. A recent study by Seale and colleagues (2013), in which MI-based training was shown to have relatively small effects in residents' behavior, underscores the difficulty of instilling these methods into their clinical communication skills during this stage of their careers. Despite mixed results so far, one of the benefits of MI's application across a variety of clinical settings and its implementation by providers with a variety of professional backgrounds suggests that this approach is well-suited for the PCMH model of care (VanBuskirk and Wetherell, 2013).

With its widespread adoption in primary care settings, MI has the potential to evolve into an essential clinical tool, much like taking a history and physical, with common practice guidelines and interventions that can be taught reliably. The Motivational Interviewing Network of Trainers (MINT) has established an international group of trainers and a set of criteria for certification for MI (http://www.motivationalinterviewing.org/motivational-interviewing-training). A series of assessment tools (such as the Motivational Interviewing Treatment Integrity [MITI] scale) are being used to validate the core elements of MI and the gains that are made after training in MI (Moyers et al., 2005).

CHALLENGES AND LIMITATIONS TO MOTIVATIONAL INTERVIEWING

As research progresses and MI continues its wide use in health care settings, there are limitations about which providers should be concerned. As several review articles point out, a number of studies fail to provide enough information on the details of each intervention. The measures and assessment tools for MI are still in initial stages of development and require larger validation studies. Additionally, while strong review studies and meta-analyses in the past 5 to 10 years have illustrated significant results, the efficacy of MI and HBC for producing the desired effects in every health problem being studied is not consistent across the board. As with many methods born out of clinical practice and based on experiential, interpersonal communication, the use and applications of MI and HBC techniques in practice has outpaced the research on their validity.

KEY TREATMENT

- Motivational interviewing (MI) has been shown to have moderate to significant and clinically relevant effects on a range of health, mental health, and substance use conditions when compared to control groups in randomized trials in recent meta-analyses and reviews (SOR: A) (Lundahl et al., 2010; Martins and McNeil, 2009; Rubak et al., 2005; VanBuskirk and Wetherell, 2013).
- Training practitioners in MI can be cost-effective and seems to work best when accompanied by 1 : 1 coaching and individual feedback to enhance behavioral rehearsal of specific clinical skills (SOR: B) (Lundahl and Burke, 2009; Miller et al., 2006).
- MI lends itself to cross-disciplinary clinical settings such as patient-centered medical homes, which are common to family medicine. (SOR: B)

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The complete reference list is available at www.expertconsult.com.

Web Resources

Participatory Medicine and Patient Empowerment Web Resources

http://acor.org This is one of the largest, most successful patient support groups for cancer patients, a major patient-empowerment resource for anyone with any type of cancer.

http://e-patients.net This is a participatory medicine "blog" where the leaders of the participatory medicine (PM) movement frequently post key issues from the provider and the patient sector.

http://e-patients.net/e-Patients_White_Paper.pdf This is the white paper that initially lays out the principles of participatory medicine and is regarded as the founding document of the e-patient movement.

http://www.jopm.org This is the online, peer reviewed *Journal of Participatory Medicine* where ideas, editorials, narratives, and research about PM and patient empowerment are published.

http://participatorymedicine.org This is the Society for Participatory Medicine website, where you can join the community of participatory medicine advocates.

http://patients.about.com/od/empowermentbasics/a/wisepatient.htm Patient advocate Trisha Torrey provides this practical guide to becoming an empowered patient.

Motivational Interviewing Resources

http://www.buildmotivation.com/online-training.php Provides a comprehensive series of training resources for MI by Great Lakes Training, Inc., The Center for Strength Based Strategies.

http://www.motivatehealthyhabits.com/html Helpful book and website with free resources for patients and training materials by Rick Botello, MD, of the University of Rochester.

http://www.motivationalinterviewing.org This is the motivational interviewing (MI) website. It provides resources for and information on MI and includes general information about the approach, as well as links, training resources, and information on reprints and recent research.

http://www.nova.edu/gsc/forms/mi_rationale_techniques.pdf Motivational Interviewing Strategies and Techniques: Rationales and Examples is an excellent brief overview with examples of change talk and MI language by Sobell and Sobell (copyright 2008).

http://www.psychologytools.org/motivational-interviewing.html PsychologyTools is a good source for free handouts that can be used for training and teaching or with clinical populations.

http://www.samhsa.gov/co-occurring/topics/training/change.aspx Substance Abuse and Mental Health Services Administration (SAMHSA). Co-Occuring Disorders.

http://www.youtube.com/watch?v=s3MCJZ7OGRk Introduction to MI video by Bill Matulich, PhD, Motivational Interviewing Network of Trainers.

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9 Interpreting the Medical Literature: Applying Evidence-Based Medicine in Practice

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CHAPTER OUTLINE

Key Points

- Interpreting the medical literature is a task any physician can do, particularly when using common, evidence-based summaries that are available at low or no cost.
- The studies should report statistically significant results that are applicable to the physician's population of patients and that should evaluate important patient-oriented outcomes, including potential harms.
- When potentially changing practice behavior, the physician should assess whether the evidence is from high-quality studies replicated over time.
- The medical literature is an evolving body of evidence, and each physician should develop a personal plan to keep up with important changes in medicine and strategies to answer more immediately important clinical questions at the point of care.
- Summary measures, such as the number needed to treat, can help physicians interpret research findings in a way that better informs patient care decisions.

Building Clinical Evidence from Published Research

Evidence-based medicine (EBM)—asking clear, relevant clinical questions, finding appropriate studies, critically appraising the literature, and implementing changes in practice behavior—has become an essential part of medical care. Most busy physicians do not have the time nor the background to answer critically the questions that arise in practice. Primary care physicians identify 2.4 clinical questions for every 10 encounters (Barrie and Ward, 1997), but they spend less than 15 minutes on average with each patient. Evidence about common primary care problems is accumulating at an overwhelming pace, and the broad scope of family medicine presents important challenges. Other barriers to the use of EBM include lack of evidence that is pertinent to an individual patient, quick access to information at the point of care, and potentially negative impacts on the art of medicine (McAllister et al., 1999). How can diligent physicians narrow the gap between their current behaviors and best practices?

In this chapter, hormone replacement therapy (HRT) for postmenopausal women is used as a case example to understand the evolution of medical practice based on the changing landscape of published evidence over time and to review concepts important to interpreting the medical literature. These concepts form the basis for practical EBM tools that family physicians can use to answer important clinical questions.

Evidence that supports interventions such as HRT usually begins with observational studies, including unblinded case series, case-control studies, and cohort studies, and it culminates in randomized controlled trials (RCTs) (Figure 9-1). To better understand how we arrived at the current clinical understanding of HRT and its effects on heart disease, this chapter reviews the progression of research studies and evidence over the past 40 years. A series of observational studies in the 1970s and 1980s led to regular prescribing of HRT to prevent a number of significant health conditions in postmenopausal women. Common types of observational studies are case-control studies and cohort studies.

CASE-CONTROL STUDIES

Case-control studies are often the first step in a progression of building clinical evidence because they are relatively inexpensive and rapid studies to complete. Case-control studies always look backward in time (i.e., they are

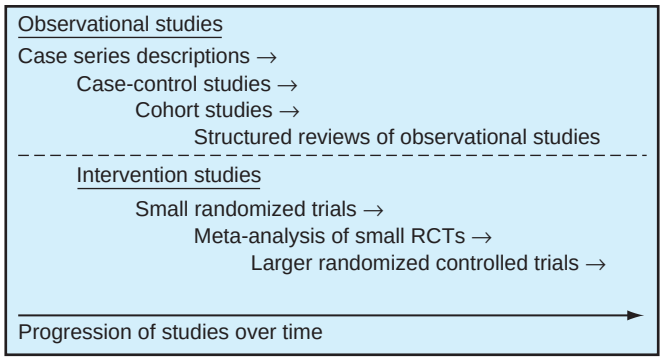

Figure 9-1 Common progression of research in building the strength of evidence. *RCTs,* Randomized controlled trials.

retrospective studies) to determine a statistical association between an exposure and an outcome. To complete a case-control study of the association of HRT and coronary heart disease (CHD), a researcher would identify a group of cases (i.e., women with CHD) and a group of controls (i.e., women without CHD) and look back in time to determine how many women in each group had taken HRT. The association between exposure (i.e., HRT) and outcome (i.e., CHD) in a case-control study is typically summarized by a statistical measure called an *odds ratio*. An odds ratio is an estimation of the true relative risk for the outcome in question. A common form of bias in a case-control study is recall bias: errors in accurately determining whether cases and controls had exposure to HRT in the past.

COHORT STUDIES

Cohort studies are often the next step in building the strength of evidence regarding an association between an exposure and an outcome. Cohort studies typically look forward in time (i.e., they are prospective studies) and are generally more expensive and take longer to complete than case-control studies. However, compared with case-control studies, they provide a more accurate estimate of the relative risk for women who take HRT and those who do not. A cohort study is also an observational study—one that observes outcomes in groups but does not assign participants to a particular exposure or treatment. In a cohort study of HRT and CHD, a researcher would identify a group of women taking HRT and a similar group of women who have chosen not to take HRT, and the researcher would then follow them over time and count the number of CHD events. Because outcome events may be uncommon in each group and may take many months to occur, cohort studies often require large numbers of participants and long follow-up periods to show significant differences between groups.

The primary statistical measure from a cohort study is relative risk. This is a ratio of the rate of CHD events among women who choose to take HRT divided by the rate among women who choose not to take HRT. A common form of bias in cohort studies related to prevention is the healthy user bias, when participants who choose one preventive measure (e.g., HRT) also tend to make healthier lifestyle decisions (e.g., diet, exercise) that may also prevent the measured outcome (i.e., CHD).

Beginning with case-control studies and then using larger cohort studies, early observational research showed that HRT might reduce the incidence of CHD, fractures, and colorectal cancer. These observational studies also suggested that the same therapy might cause harm, with a slightly increased risk of breast cancer, stroke, and venous thromboembolism. On balance, however, even a small positive impact of HRT on preventing CHD was thought to far outweigh the potential adverse effects of HRT.

STRUCTURED REVIEWS AND META-ANALYSIS

After a number of studies are completed, whether cohort studies or initial small RCTs, these are often reviewed and summarized in publications called *structured reviews*. Occasionally, data from a series of studies are combined using a statistical technique called *meta-analysis*, which allows increased statistical power to determine the weight of evidence from a series of studies. The use of HRT was greatly increased during the 1990s based on a number of case-control and cohort studies and on three meta-analysis studies that further suggested that HRT was protective against CHD (Pettiti, 1998).

In 1991, an editorial in the *New England Journal of Medicine* concluded that "a consensus of epidemiologic reports has demonstrated that women who are given postmenopausal estrogen therapy have a reduction of about 40% to 50% in the risk of ischemic heart disease as compared with women who do not receive such therapy" (Goldman and Tosteson, 1991). Prescribing HRT for disease prevention became a de facto standard for postmenopausal women through the 1990s.

THE POWER OF RANDOMIZED CONTROLLED TRIALS

In RCTs, study participants are randomly allocated to two or more groups and then assigned to receive an intervention such as HRT or to receive no active treatment (i.e., placebo or to continue with their usual care). RCTs greatly add to the confidence of measured results because the structure of an RCT helps to eliminate many of the inherent biases that are common in observational studies. Because participants in an RCT are randomly assigned to treatment and control groups, they are less likely to have differences in other factors that might also prevent or promote heart disease.

The decreased likelihood of systematic bias in an RCT may explain why HRT appeared to be protective in cohort studies but later proved to be harmful in large RCTs. Because RCTs have this inherent ability to decrease many important potential forms of bias (but are not immune to biases themselves), they are considered the strongest form of evidence for measuring the true association between the HRT treatment and CHD outcomes (Ebell et al., 2004). Despite decades of work, dozens of observational studies, and structured reviews that strongly suggested a protective effect of HRT for CHD, a single, large RCT trumped them all and caused a sudden reversal in physicians' prescribing behavior.

The results of the Women's Health Initiative (WHI) study, released in 2002, sent a shock wave through the medical

community (WHI Writing Group, 2002). For the first time, a large, randomized trial showed that HRT—given to otherwise fairly healthy postmenopausal women—caused a statistically significant increase in CHD events. Within days of the release of the WHI primary results, many women called their physicians to decide whether they should continue with HRT. Many physicians drastically changed their prescription of HRT based on the WHI; within 9 months, prescriptions of the most popular formulation of HRT decreased by as much as 61% (Majumdar et al., 2004). Perhaps more than any other single study in modern medical history, the WHI report dramatically changed a widespread, common medical practice.

Understanding the Statistical Significance of Study Results

Reports from RCTs such as the WHI study frequently include relative risk as a summary measure of differences between the treatment and placebo groups (Table 9-1). To arrive at the relative risk, the researcher first measures the incidence rate of an outcome in each of the two study groups (i.e., treatment and placebo). The incidence rate for each group is a ratio of the number of new outcome events, such as CHD events, divided by the number of patients at risk for the outcome in that group over a specific period. In multiyear studies, the average annual incidence rate is often reported as a summary measure. In a placebo-controlled RCT, the relative risk is then calculated as a ratio of the incidence rate for the treatment group divided by the incidence rate for the placebo group (see Table 9-1).

How can a physician determine whether the reported relative risk from a study is significant enough to influence clinical decisions? Typically, the statistical significance of the summary measure is reported, which in this case is relative risk. Statistical significance is usually summarized in published studies by a *p* value for a given summary measure. The *p* value describes the statistical probability that the observed difference between the groups could have happened simply by chance alone. A *p* value of less than 0.05 is the arbitrary cutoff most often used for "statistical significance." A $p < 0.05$ means that there is less than a 1 in 20 (5%) probability that a difference as large as that observed would have occurred by chance alone; a $p = 0.04$ means a 1 in 25 (4%) probability; a $p = 0.06$ means a 1 in 16 probability (6%).

Although frequently used, *p* values provide only limited information: the chance that any difference found is caused by chance, or random error. A *p* value alone gives no indication of the clinical significance of a finding and provides no information regarding the likelihood that a finding of "no difference" is caused by chance or random error.

Confidence intervals are more informative than *p* values when interpreting the clinical value of study results. When relative risk is reported as the summary result of a study, the 95% confidence interval (CI) is often used to give an indication of the precision of the estimated relative risk. The 95% CI describes the range within which there is a 95% probability that the true relative risk (RR) is in that range. An RR of 1.0 indicates no difference. For example, if a study reported an RR of 2.5 with a 95% CI of 2.3 to 2.7, we could be reasonably certain (95% certain) that the true RR was no less than 2.3 and no greater than 2.7. Our conclusion would be that the estimated RR of 2.5 is fairly precise. However, if RR was reported as 2.5 with a 95% CI of 1.1 to 5.0, the true RR could be as low as 1.1 (almost no difference) or as high as 5.0 (a fivefold difference), a more imprecise estimate of the RR.

Confidence intervals also provide a better measure than *p* values of the precision for concluding that there is no difference in an RR. Any 95% CI that includes RR = 1.0 indicates that there may be no difference. However, an RR of 1.05 with a 95% CI of 0.99 to 1.11 is almost certainly a finding of no difference (i.e., a narrow CI), whereas an estimated RR = 1.4 with a 95% CI interval of 0.99 to 1.7 is much less precise (i.e., a wide CI). Even though the 95% CI contains 1.0 in the latter example, there may still be a true difference that was not able to be detected in this study.

Table 9-1 Understanding Study Results

Typical summary rates from randomized, controlled trials:

$$\text{Incidence rate} = \frac{\text{Number of new cases of disease over a defined period}}{\text{Number of persons at risk during the period}}$$

$$\text{Relative risk (RR)} = \frac{\text{Incidence rate among the treated group}}{\text{Incidence rate among the placebo group}}$$

Summary measures that may be more meaningful for clinicians:

Attributable risk (AR), or risk difference = (Incidence rate among treated group) – (Incidence rate among placebo group)

Number needed to treat (NNT) or number needed to harm (NNH) = Reciprocal of AR, or 1/AR

Interpreting Study Results: Statistical and Clinical Significance

Although the WHI showed a statistically significant increase in the RR of CHD events among women who were randomly assigned to take HRT, it is important to consider the absolute difference in CHD events between the two groups to understand the strength of the association and to discuss the risk of HRT treatment with individual patients. Calculating absolute risk (in addition to RR) is a helpful way to understand the level of risk that HRT may add for a group of women who are at risk for CHD events (Table 9-2).

In the WHI study, the RR of CHD for participants who took HRT was 1.29, with a 95% CI that did not cross 1.0 (95% CI, 1.02-1.63). This figure (RR = 1.29) can generally be interpreted as HRT being associated with a 29% increase in CHD events. This summary measure was reported widely in medical journals and the mainstream press.

When reported in terms of RR, the weight of the association between HRT and CHD sounds ominous (i.e., a 29% increase). However, in terms of absolute risk attributable to HRT treatment, a less portentous picture emerges (see Table 9-2). In the WHI study, women taking HRT had an average rate of CHD events of 0.37% per year, or 37 events per 10,000 women each year, and those in the placebo

Table 9-2 Examples of Summary Rates from the Women's Health Initiative Study

The following equations show how to take a summary rate commonly reported in published studies (i.e., relative risk) and calculate a summary measure (e.g., number needed to treat, number needed to harm) that may be more useful in describing the results to clinicians and patients. The example considers the average annual incidence rates and relative risk for coronary heart disease (CHD) events in the Women's Health Initiative (WHI) study on the effects of hormone replacement therapy (HRT):

$$\text{Average annual incidence among HRT-treated women} = 37 \text{ CHD events/year/10,000 women}$$

$$\text{Average annual incidence among placebo-treated women} = 30 \text{ CHD events/year/10,000 women}$$

$$\text{Relative risk of CHD} = \frac{37 \text{ CHD events/10,000 women}}{30 \text{ CHD events/10,000 women}} = 1.29 \text{ (adjusted)}$$

The relative risk describes a relative 29% increase in CHD events. It may be more useful to consider the absolute difference in incidence rates between the two groups to understand the magnitude of the potential risk for a given patient:

$$\text{Attributable risk (AR)} = \frac{37 \text{ CHD events}}{10{,}000 \text{ women}} - \frac{30 \text{ CHD events}}{10{,}000 \text{ women}} = \frac{7 \text{ additional}}{10{,}000 \text{ women}} \text{ CHD events}$$

The number needed to harm (NNH) can be calculated to describe, on average, how many women must be treated for 1 year to cause one additional CHD event attributable to HRT:

$$\text{NNH} = \frac{1}{7 \text{ CHD events/1000 women}} = \frac{10{,}000}{7} = 1430$$

Data from Women's Health Initiative (WHI) Writing Group: Risks and benefits of estrogen plus progestin in healthy postmenopausal women, *JAMA* 288:321-333, 2002.

group had an annual rate of 0.30%, or 30 events per 10,000 women each year. Although the adjusted RR of CHD is 1.29 (0.37 divided by 0.30), the attributable risk or risk difference between the two groups is 0.07% (0.37 minus 0.30). In other words, approximately seven additional cases of CHD occurred for 10,000 women using HRT during each year over the course of the study. The attributable risk of the treatment group can be summarized as the number needed to harm (NNH) or, if a study reports a beneficial effect, the number needed to treat (NNT). In this case the NNH was approximately 1430; on average, for every 1430 patients treated with HRT, one additional CHD event occurred each year (i.e., the inverse of the risk difference, 0.07, or 10,000 divided by 7) (see Table 9-2). The NNH or NNT is often a more understandable and useful summary of study outcomes when physicians and patients weigh the risks and benefits of a particular therapy (Bhandari and Haynes, 2005).

Other Keys to Interpreting Clinical Evidence

One of the major tasks in interpreting whether the results of a study should change practice is to determine whether all relevant patient-oriented outcomes were considered. For example, when considering evidence regarding the prevention of fractures, it is important to distinguish among studies that measure physiologic outcomes (e.g., serum calcium), intermediate outcomes (e.g., bone density), and patient-oriented outcomes (e.g., fractures). Whenever possible, practice decisions should be based on outcomes patients would deem important. For example, in a trial of HRT for osteoporosis, a decrease in fracture incidence would be a more convincing finding than a change in an intermediate outcome such as bone density. Likewise, all important harms (i.e., risks) and financial end points (i.e., costs and savings) should be reported and considered. In a trial of a new antiresorptive agent, the rate of esophagitis, gastritis, and esophageal perforation, along with such measures as patient satisfaction, costs, and global well-being, should all be considered in balance with any improvement in fracture incidence.

When assessing the benefits and harms of such a new treatment, appropriate competing alternatives (including no treatment at all) should be compared. Typically, such a comparison may take the form of a "balance sheet," a table comparing each intervention in terms of benefits, harms, and economic end points. Many studies are randomized, placebo-controlled trials in which some patients receive an active intervention and others receive a placebo or sham intervention. Alternatively, a study may use an active comparator, an intervention already known to be effective. Each of these approaches has pros and cons, but the most important point to remember is that just because a study shows statistical significance in a single measure, it does not mean that all appropriate patient-oriented outcomes were considered.

When a study shows no effect, the question of power is raised. Put in simple terms, power is the ability to detect the effect of an intervention; it depends on the number of patients in the study, the magnitude of effect of the intervention, and the variability of the effect from one subject to another. For some interventions, even a small effect may be important. For example, many nonpharmacologic treatments for hypertension (e.g., salt restriction) have relatively modest but important effects. Clinicians should generally be skeptical of small studies that show negative results. Examining the confidence intervals is the easiest way to assess whether the study sample was too small and therefore did not have the statistical power to detect a clinically important difference (as reflected by wide confidence intervals).

When a study is positive or shows statistically significant results, it is important to consider whether the findings are clinically significant and applicable to your practice. For example, if a study showed a drug reduces the risk of heart attack by one in a million patients, we would probably be skeptical about its clinical utility, even if the outcome was statistically significant. Likewise, a study showing that daily borscht reduces fractures in a group of Russian dockworkers may not be applicable to patient populations in the United States. Findings of a study done in a controlled research setting may differ from outcomes experienced in real-world practice. An intervention for osteoporosis requiring daily injections may be demonstrated to be efficacious among carefully selected participants in a clinical trial, but in the average practice setting its effectiveness may be more limited.

Table 9-3 Evidence-Based Medicine Skills and Techniques: Online Learning Resources

Online Learning Resource	Description
Evidence-Based Medicine Course; Michigan State University (MSU); http://omerad.msu.edu/ebm/index.html	Developed for the MSU Primary Care Faculty Development Fellowship Program, this free web-based course introduces the basic concepts of evidence-based medicine, information mastery, and critical appraisal of the medical literature.
Introduction to Evidence-Based Practice; Duke University Medical Center Library and the Health Sciences Library at the University of North Carolina at Chapel Hill; http://guides.mclibrary.duke.edu/ebmtutorial	This free online tutorial provides a basic introduction to the principles of evidence-based practice and covers skills in building good clinical questions, strategies for efficient PubMed literature searches, and critical appraisal of studies.
Centre for Evidence-Based Medicine; University of Oxford; www.cebm.net	The Oxford University CEBM offers conferences, workshops, online PowerPoint presentations, and other tools for effective practice and teaching of evidence-based medicine.
KT (Knowledge Translation) Clearinghouse; Funded by the Canadian Institute of Health Research; http://ktclearinghouse.ca	Website materials are provided by a collaborative effort between St. Michael's Hospital Toronto and the University of Toronto, Faculty of Medicine, and offer a wide range of training and tools for learning evidence-based medicine skills.
JAMAevidence; American Medical Association; http://jamaevidence.com	Free online access to content from the JAMA series *The User's Guides to the Medical Literature, The Rationale Clinical Examination,* and many other resources to learn skills in critical appraisal of the literature and evidence-based medicine techniques.

Clinicians frequently rely on the synthesis of many studies, rather than a single study, to change our practices. Such reviews can be systematic, in which rigorous attempts are made to uncover all studies, published and unpublished, in English and in other relevant languages, or they may be more limited reviews that consider only a portion of the published literature. Some use formal mathematical methods to combine the results of studies (i.e., meta-analysis), and others are qualitative and synthesize data according to an author's overall judgment. Common biases to consider related to published reviews include whether all sources of evidence were considered; how disparate results were combined; whether relevant patient-oriented outcomes were assessed; if there was adequate attention to the quality of the studies and their generalizability; and whether the authors analyzed why differences in outcomes may have occurred based on such factors as study design, population, and intervention. Published reviews, including systematic reviews and clinical guidelines, have become increasingly important tools for the busy clinician.

It is important to understand basic concepts for interpreting and applying research results (Bhandari and Haynes, 2005). Clinicians may move beyond the basic skills in searching the literature and critically appraising individual research studies by using online EBM tools and educational resources or by attending EBM training courses (Table 9-3). The ability to critique original research using a structured approach is facilitated by using widely available worksheets and tools. However, sifting through original research studies can be a tedious, impractical process for busy clinicians.

Using Evidence at the Point of Care

Finding evidence to inform clinical practice no longer requires clinicians to critically appraise individual research studies. Many practical EBM tools are available to help physicians quickly access comprehensive, expert reviews of published studies in the middle of a busy practice. Online searchable databases provide useful summaries of expert analysis of published clinical research for a wide variety of clinical questions. Certain online resources require a paid subscription but may be available to clinicians through institutional subscriptions at a local hospital medical library or academic health center (Table 9-4). Others are free to access on the web or through applications on handheld digital devices and offer physicians a practical first step for rapidly accessing published evidence as part of daily patient care. Examples of freely available online resources include (see links and descriptions in Table 9-4):

- Systematic reviews and meta-analyses from the Cochrane Database of Systematic Reviews, or by searching PubMed using their Clinical Queries tool.
- Critically appraised topics and clinical guidelines from the National Guideline Clearinghouse.
- The *Trip* database, a clinical search engine that draws on multiple sources for systematic reviews and guidelines.

Once a clinician becomes familiar with searching online databases, identifying and reviewing published evidence can be accomplished quickly and at the point of care (Ebell, 1999). The following case describes examples of relevant information that a busy clinician can access using free online EBM resources described in Table 9-4.

CASE EXAMPLE

A 40-year-old woman sees you because she is experiencing severe vasomotor symptoms (i.e., hot flashes). These symptoms are keeping her awake at night. She had a total abdominal hysterectomy and oophorectomy 6 months ago because of enlarging uterine fibroids. She has a family history of heart disease and she is concerned about cardiovascular risks associated with HRT. What is the current evidence regarding cardiovascular risks of HRT for this patient? How should you counsel this patient?

A free search was performed using the Clinical Queries page in PubMed (www.ncbi.nlm.nih.gov/pubmed/clinical). When typing "HRT" into the Clinical Queries search box, a drop-down list of frequently entered queries automatically appears, and "menopause HRT" was chosen. The first

Table 9-4 Examples of Resources for Identifying Evidence-Based Medicine Information at the Point of Care

Information Source Access	Description	Paid Subscription Required?
DynaMed™; https://dynamed.ebscohost.com	Physician authored, clinically organized evidence summaries and expert opinion, organized in a searchable resource that can be used efficiently at the point of care to answer clinical questions.	Yes. Free trial available.
UpToDate®; www.uptodate.com/home/product	Synthesis of evidence and expert opinion on topics in multiple specialties, organized to provide practical answers to clinical questions at the point of care.	Yes
Cochrane Reviews; www.cochrane.org/cochrane-reviews	The Cochrane Collaboration is an international, nonprofit, independent organization that has produced and disseminated thousands of highly detailed systematic reviews of health care interventions. Seen by many as the gold standard of systemic evidence-based reviews.	Free searches and reviews of abstracts. Access to full reports requires subscription.
Family Physicians Inquiries Network (FPIN); www.fpin.org	Virtual learning community with point-of-care answers to clinical questions using structured, critical reviews of the literature, with a strong focus on topics relevant to family practice and other primary care specialties.	Yes
PubMed Clinical Queries; www.ncbi.nlm.nih.gov/pubmed/clinical	The Clinical Queries section of PubMed, a search engine for MEDLINE provided by the National Library of Medicine, conducts focused searches of published clinical studies and systematic reviews. A free Clinical Queries tutorial is available online.	Free
National Guideline Clearinghouse; www.guideline.gov	This public resource for evidence-based clinical practice guidelines is organized by the U.S. Federal Agency for Healthcare Research and Quality.	Free
Trip Database; www.tripdatabase.com	A meta-search engine that retrieves information from multiple evidence-based resources and databases.	Free

article listed from this simple search was a structured review of HRT and cardiovascular risk, including studies published since the 2002 WHI study (Hodis and Mack, 2014). The search and review of this article took approximately 5 minutes. The authors' conclusions include the following statement:

The totality of the data show that HRT decreases coronary heart disease and overall mortality when started in women who are less than 60 years old and/or less than 10 years post-menopausal, providing a "window-of-opportunity."

A second search using the free online database *Trip* (www.tripdatabase.com) with the keywords "hormone replacement therapy menopause" resulted in a list of clinical guidelines. Limiting the search to "Guidelines/USA" and scanning the first few listed titles showed a 2012 guideline and position statement of the North American Menopause Society and a link to a free online copy of the guideline through the National Guideline Clearinghouse (North American Menopause Society, 2012). This systemic review and guideline summarizes both the risks and benefits of HRT. Search of the *Trip* database and review of this guideline took approximately 4 minutes. Summary recommendations of the guideline include the following statement:

Women experiencing premature menopause are at increased risk of osteoporosis and, possibly, cardiovascular disease, and they often experience more intense symptoms than do women reaching menopause at the median age. Therefore, HRT generally is advised for these young women until the median age of menopause when treatment should be reassessed.

This case outlines how a physician with access to searchable databases can quickly review an array of clinical evidence and published guidelines. Such resources are based on systematic evaluations of evidence and can provide clinicians with practical guidance at the point of care. EBM, information mastery, and the application of knowledge at the point of care remain works in progress. By developing a basic understanding of these resources and tools, physicians' care for patients can be more effective, safe, and efficient.

Key Points

- Do not assume that statistical significance is the same as clinical significance.
- Do not rely on pharmaceutical representatives or experts who may be biased in their presentation of information.
- Consider the potential harms and economic effects of an intervention.
- Do not assume that results even from a well-done study are applicable to your population of patients.
- Do not fail to use the many comprehensive sources of evidence-based information.

References

The complete reference list is available at www.expertconsult.com.

Web Resources

See Tables 9-3 and 9-4.

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10 Information Technology

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CHAPTER OUTLINE

Introduction

Information technology in medicine is a topic that has moved from concept and convenience to a critical operational and patient care need. The trend toward this received a big push in 2009 with the introduction of the Health Information Technology for Economic and Clinical Health (HITECH) Act. This act set aside $27 billion in incentives through Medicare and Medicaid for health care organizations to achieve "meaningful use" in the use of their electronic health records (EHRs).

Health care providers have been challenged to incorporate data entry skills into the patient care visit. They have also reaped benefits from the information and knowledge gained from the analysis of that data. Improvements in device technology, clinical work flows, and interface design are continually improving these efforts.

Patients are now witnessing the effects of this technology revolution from within our formal health care structure and from multiple other sources. The Internet remains a powerful tool for health information, but the introduction of the app store in 2008 and smartphone technology has pushed this into everyday life, including the examination room.

Electronic Health Records

EHRs were first discussed in the 1970s. Since then, there has been an evolution of the electronic storage of patient medical information, and at its heart is structured data. The entry and organization of this data is critical to the success of every process going forward. Each data element has a location, and data obtained from individuals or devices populate values to this location. A strong data governance structure is essential to maintain this order. Without governance, individuals will seek their own solutions, and the downstream benefits of structured data will be lost.

This governance group should look toward the needs of the organization and consumers of data when determining data architecture. Each request for a new data field should come with a discussion about where the data will ultimately be used. Examples of areas to include in this discussion are coding, compliance, business office, legal, clinic operations, clinical research, and, ultimately, patient needs.

The ability to enter values into the determined fields needs to be reasonable and practical so that individuals will choose to do the right thing. Tools to aid this may include graphical, tabular, or audible entry. Digital imaging and video are also becoming popular methods of entry.

One emerging technology that will aid entry is called *natural language processing*. This has the ability to analyze unstructured data similar to the original progress notes of years past. The notes are then parsed into specific data elements for inclusion in the electronic record.

ELECTRONIC HEALTH RECORD USABILITY

Adoption of the use of EHRs in a large part is affected by usability, or being "user friendly." Simply defined, this is the effectiveness, efficiency, and satisfaction with which specific users can achieve a specific set of tasks in a particular environment (Schoeffel, 2003). Usability was felt to be a major factor in the slow adoption of EHRs in the United States. In 2009, the Healthcare Information and Management Systems Society (HIMSS) defined a set of key principles behind EHR usability (HIMSS EHR Usability Task Force, 2009).

- Simplicity of design: Show the information minimally necessary to accomplish a task.
- Naturalness: Allow the ability for the user to be automatically familiar with the application.
- Consistency: Enable predictability of behaviors, layouts, and concepts between screens and work flows.
- Minimizing cognitive load: Present information needed to make the correct decision and desired outcome easy to perform.
- Efficient interactions: Minimize the number of steps it takes to complete the task.
- Forgiveness and feedback: Allow the user to explore without fear of bad outcomes through the use of feedback.
- Effective use of language: Provide language that is concise and unambiguous.
- Effective information presentation: Make good use of data density, color, and readability.

- Preservation of context: Avoid distractions common with screen changes and dialog boxes.

OPTIMIZATION

The complexity of patient care and EHR software make it extremely difficult for all clinical operation processes to be taught effectively on day 1. In addition, software is constantly evolving, and new clinical needs arise on a frequent and sometimes emergent basis. Optimization of EHR use becomes essential maintenance. Users of the system will need regular reminders of software processes, especially those that are infrequently used. New processes will need to be introduced as well. Communication may take several forms. The training team becomes helpful for this, as does the use of advanced users in a train-the-trainer model. Written or electronic materials in a push or pull model may also be needed for those users requiring asynchronous learning.

MEANINGFUL USE

Meaningful Use is a Medicare and Medicaid EHR incentive program to provide financial incentives for "meaningful use" of a certified EHR. As of June 2014, 479,941 eligible professionals and 4741 hospitals (Medicaid and Medicare) have enrolled in the Meaningful Use program. The Meaningful Use program is comprised of three stages as summarized in Table 10-1 (HealthIT.gov, 2014). To receive incentives, attestation to specific criteria needs to begin by 2014, and the payments are made over a number of years (HealthIT.gov, 2014). The last year for incentives in the Medicare group is in 2015 and in 2021 for the Medicaid group.

COMPUTERIZED DECISION SUPPORT

Computerized decision support (CDS) is a key component of the Meaningful Use program. It relies on structured data within the EHR to output knowledge to the organization or consumer. The EHR software analyzes data and applies rules to identify patterns or critical values deserving of attention. A key concept here is that the correct data is presented to the correct audience in the correct format at the correct time.

An organization does need to be careful and balance the amount of clinical decision support with the operational work flows. Too many alerts, or "alert fatigue," may counteract the benefits of the intended support. A governance body tasked with monitoring the amount and perceived importance level of support is quite helpful here.

PATIENT PORTALS

Stage II of the Meaningful Use program calls for increased use of patient portals. These portals provide access to things such as messaging to providers, refill requests, appointment requests, notifications, and in some cases, full medical record access. As of 2013, it is estimated that 28% to 40% of patients have access to this technology. There has been concern by providers, but multiple organizations have now started providing patients direct viewing of their entire medical record with good results. The use of these patient portals not only gives patients more information about their health but allows them to participate in their health care. The use of questionnaires and direct entry of medical history is an area that is evolving. Not only may this be done manually, but device makers are starting to incorporate this technology into consumer products such as scales, blood pressure cuffs, and glucometers.

In a multinational study of 9100 patients by Accenture, 41% of U.S. patients said they would be willing to switch doctors to gain access to their records. Eighty-four percent of those patients felt they should have access to their records while only 36% of providers shared this view (Accenture, 2013).

TECHNOLOGY CONSIDERATIONS

With the advance of EHR, electronic means of obtaining data became essential. Equipment that was designed to provide a paper output now needs to also include a method to interface with EHRs. Examples of this technology include cardiac monitoring, radiologic and visible light imaging, audiometric screening, and diabetes monitoring.

Table 10-1 Stages of Meaningful Use Incentive Program

Stage 1: Data Capture and Sharing Meaningful Use Criteria Focus on:	Stage 2: Advance Clinical Processes Meaningful Use Criteria Focus on:	Stage 3: Improve Outcomes Meaningful Use Criteria Focus on:
Electronically capturing health information in a standardized format	More rigorous health information exchange (HIE)	Improving quality, safety, and efficiency, leading to improved health outcomes
Using that information to track key clinical conditions	Increased requirements for e-prescribing and incorporating laboratory results	Decision support for national high-priority conditions
Communicating that information for care coordination processes	Electronic transmission of patient care summaries across multiple settings	Patient access to self-management tools
Initiating the reporting of clinical quality measures and public health information	More patient-controlled data	Access to comprehensive patient data through patient-centered HIE
Using information to engage patients and their families in their care		Improving population health

Adapted from *EHR Incentives & Certification: How to Attain Meaningful Use*. HealthIT.gov; page modified April 10, 2014. http://www.healthit.gov/providers-professionals/how-attain-meaningful-use.

In evaluating this equipment, not only is it essential that the interface exists, but that interface must be compatible with EHRs. Cost considerations need to include the device itself, device maintenance fees, estimated years of service, initial interface fees, and maintenance of that interface. A good first step is to inquire with the EHR vendor about device compatibility. A centralized process for coordinating purchases of this equipment is also quite helpful.

Technical teams will also need to consider the storage of this digital information going forward. This consideration will include location, format, size requirements, and ability to review or recover the data. For that technology preceding electronic interfaces, a robust scanning solution must also be included.

Mobile Technology

By some measures, smartphone owners check their phones 150 times/day (Kvedar, 2013). A quarter of Americans in one survey say they would trust a symptom checker website or mobile application as much as they would their doctor (PMLive, 2013). Another study of 2000 patients and covering 20 disease states found that 90% of patients would accept the offer of a mobile app, while only 66% of respondents would accept prescription medicine from their doctor (Royal Philips Electronics, 2012).

Mobile technology applications are largely unregulated. Those applications that either control a regulated medical device or turn a smartphone into a regulated medical device may soon fall under the jurisdiction of the U.S. Food and Drug Administration (FDA). Several websites exist to give guidance to clinicians and patients about these applications (e.g., mobihealthnews at http://mobihealthnews.com and iMedicalApps at http://www.imedicalapps.com).

A survey conducted by the University of Pennsylvania found that the top eight mobile medical applications for 2012 were

1. Epocrates Essentials
2. MedCalc
3. Medscape Mobile
4. DynaMed
5. VisualDx
6. Micromedex
7. Skyscape
8. Diagnosaurus DDx

These applications are excellent references to clinicians and may also benefit patients. Physicians may consider "prescribing" applications to patients for uses of therapy, reference, or tracking. When considering applications to suggest to patients, consider the patient's likelihood to use, the developer of the application, and ratings that are often available on the developer or app store site (Table 10-2). It is best practice to try the application yourself when feasible.

Table 10-2 Medical Apps for Patients

Condition	App	Developer Website
Nutrition and diet	Lose It!	www.loseit.com
	SparkPeople	www.sparkpeople.com
	CalorieKing	www.calorieking.com
	MyFitnessPal	www.myfitnesspal.com
Stress management	Stress Check Pro	www.azumio.com
	Breathe2Relax	www.t2health.org
	Insight Timer	https://insighttimer.com
Exercise	MyFitnessPal	www.myfitnesspal.com
	Endomondo	www.endomondo.com
	Runtastic	www.runtastic.com
General knowledge	WebMD	www.webmd.com

Engaging Patients

Stage 2 of the Meaningful Use program will make more of the medical record available directly to the patient in the form of the problem list. Although the introduction of the computer to the examination room was a recent phenomenon for many, the computer must now become an interactive learning tool. A few considerations for this include:

1. Position the computer between the health care provider and the patient so the patient may view information along with the provider. Pivot arms on monitors will greatly improve this interaction.
2. Keep patients first. Always greet patients before logging in. At the proper time, introduce the computer as a tool in their medical care.
3. Assure patients about the safety of their data and perhaps make specific mention about logging off to protect their data.
4. Position print devices convenient to the patient flow or alternatively encourage the patient to be involved in a patient portal.

Ultimately, patients may interact more directly with their charts and update information. Beginning to educate them about the problem list in the examination room may serve as a good primer for this.

Security

The Health Insurance Portability and Accountability Act (HIPAA) of 1996 ensured individual rights of patients and added specific privacy and security protections. The scope of this was expanded in 2013 along with the breech notification requirements under the HITECH Act of 2009. Providers play an important part in assuring the continued confidentiality of the patient record. Patient information may be shared for the purposes of treatment, but a few key points to be aware of follow:

- Understand what is protected health information (PHI) and what may be disclosed and authorization that may be needed.
- Provide safeguards such as individual passwords, private areas for viewing PHI, and policies and procedures for the release of PHI.
- Access only that information that is required to perform your job.
- Never discuss PHI in public areas or present PHI to individuals who are not involved in the care of the patient.

- Report any suspected breeches of PHI to your privacy officer immediately.

More information about privacy practices may be found at the U.S. Department of Health and Human Services website (www.hhs.gov/ocr/privacy/index.html). The Meaningful Use incentive program also has additional information about Privacy and Security at its website (www.healthit.gov/providers-professionals/ehr-privacy-security).

Conclusion

We are just beginning to see the impact of health information technology as we use the data stored now in EHRs and other databases. Beyond data acquisition, we derive knowledge and ultimately wisdom. The attention to structure and usability becomes essential to maintain integrity and trust.

Usability remains a top priority for health care providers and patients, and we should not forget the critical and personal interactions we have in the clinical setting. We should strive for seamless acquisition and understanding of data as we move this technology forward.

Finally, data security must guide our behavior and interactions. As health care providers, we are trusted with the most intimate details of our patient's lives and we must not breach that trust.

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The complete reference list is available at www.expertconsult.com.

Web Resources

See Table 10-2.

Suggested Reading

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11 Clinical Problem Solving

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CHAPTER OUTLINE

Introduction

Practicing family medicine is a continual confrontation of problems besetting the human condition, and a goal for many family physicians is to become a master problem solver. Having a front row seat to the joys and tragedies, the drama and the misery that patients experience through the life cycle provides ample opportunity to gain mastery.

The purpose of this chapter is to outline a systematic approach to problem solving commonly used by family physicians. Before presenting the model for clinical problem solving, we review the context of family medicine practice that shapes problem solving by family physicians. By taking a systematic approach to solve problems and using point-of-care information resources, the physician can minimize or at least control some of the uncertainty common in practice.

There are four primary tasks to solve clinical problems: (1) begin to understand the problem in clinical terms, (2) define and select the problem or problems to address, (3) discuss and create treatment and solution options and eventually selecting an agreed-on management plan, and (4) monitoring response to treatment. The model for clinical problem solving can be used as a guide to improve the process and identify the challenges associated with the process to prevent errors. The intent of this chapter is to describe how to move toward mastery as a problem solver, and in turn, achieve desired patient outcomes of care.

The Principles of Family Medicine Define the Context for Solving Clinical Problems

The principles characterizing family medicine (Green et al., 2004) that shape the context for clinical problem solving include (1) deep understanding of whole person care, (2) provision of comprehensive care, (3) first contact care ensuring patient access, (4) continuity of care, and (5) commitment to team-based care.

WHOLE PERSON CARE

Patient problems presenting to family physicians are legion; anything having to do with the human condition can be encountered by family physicians. The family physician must first be a student of humanity and have a working knowledge of the five dimensions of being human: (1) physical, (2) psychological, (3) social, (4) spiritual, and (5) chronological (life cycle). Each dimension can be problem generating and require a treatment or solution. Some problems can be very simple, such as a sore throat that is easily diagnosed, and have a fairly standard course of treatment. At the other end of the spectrum a patient could come in with a congestive heart failure but then live on the street, have no insurance coverage, and have poorly controlled mental health problems. Thus patients can present with a multiplicity of problems, and these problems often are interactive, making it harder to control any one of them with singular solutions. As a result, family physicians need to have a fairly broad-based approach to solving problems, and this requires a very big search net in seeking to understand the nature of the problems.

COMPREHENSIVE CARE

Applying a taxonomy of visit types can also aid in understanding problems commonly seen in family medicine. Patients can be seen by family physicians for acute, self-limited illness, chronic disease, mental health problems, maternity care, prevention and wellness issues, and administrative needs such as disability evaluations or return-to-work notes. In addition, patients could have end-of-life concerns, including nursing home placement or a need for palliative care or hospice services. Thus the patient problems addressed by family doctors are many because of the multiple human dimensions, but also because of the breadth of comprehensive services offered by family physicians in the health system.

FIRST CONTACT CARE

Family physicians are on the frontlines and are often the entry point for patients who seek care, and as a

result, problems present early in the course of an illness. Patients present with symptoms when the disease is not defined, is undifferentiated, and the illness is yet to be organized for the patient. This aspect of seeing patients in an undifferentiated state, when a physician only has a few facts or objective signs of disease, presents challenges and underscores how widespread uncertainty is when trying to define the problem. Family physicians need to be comfortable with uncertainty and to understand that time is an ally in sorting out patient problems. Family physicians also have to be versed in probabilities and consider likelihood ratios for what signs and symptoms mean. Such information can assist in deciding whether an intervention is needed or if a watch-and-wait approach is appropriate.

The family physician provides access to care in a multitude of settings, including home, office, hospital, nursing home, or even a factory. Each setting brings contextual data into play, and understanding the setting or the limitations of the setting can be helpful in solving patient problems. Resources available to the patient to be included in the solution or treatment plan may be setting-specific.

CONTINUITY OF CARE

Family physicians create longitudinal relationships with patients and as a consequence gain valuable prior knowledge of patients used to individualize problem solving. The accumulated knowledge of patients leads to efficiency in understanding patients' problems and then designing treatment solutions. For example, patients with chronic obstructive pulmonary disease (COPD) may have baseline respiratory distress but having adapted are reasonably comfortable with an oxygen saturation of 89%, and when they come in with a little additional distress, a decision needs to be made to hospitalize or closely watch them as outpatients. Having had prior episodes and knowing exactly how the patient responds and what is necessary, physicians are much more comfortable in that area of uncertainty about what the next steps should be in the care of the patient. Contrast this with an emergency department physician who has no prior knowledge of this patient, discovers an oxygen saturation of 88%, is concerned with how distressed the patient looks, and decides to admit the patient to the hospital. Understanding the problem as well as the context for that unique patient is fundamental to making patient-centered clinical decisions in practice.

TEAM-BASED CARE

Finally, an additional context factor for family physicians is the health system, a complex and evolving health environment in which different treatment options or innovative care models can be put into place. Increasingly, care managers are part of the emerging primary care delivery team included in the patient-centered medical home experience. The family physician also needs to be aware of what resources are in the health system, and the new and emerging innovations in care that can lead to potentially better patient outcomes.

Tasks and Steps Used by Family Physicians to Solve Clinical Problems

Figure 11-1 illustrates a systematic step-by-step approach to problem solving. There are four primary tasks, with each task having specific steps: (1) beginning to understand the problem in clinical terms, (2) defining the problem(s) to address, (3) formulating solutions and treatment, and (4) monitoring the response or testing the solution based on actual results. Family physicians perform these tasks in solving clinical problems. This problem-solving approach encompasses many of the fundamental steps of doctoring, including data gathering, clinical reasoning, defining the diagnosis, considering prognosis, generating a treatment plan, and monitoring the response to treatment.

BEGINNING TO UNDERSTAND PROBLEM(S) IN CLINICAL AND CONTEXTUAL TERMS

The first part of the *data-gathering step* is to take the traditional disease-focused approach: listening to the patient's chief concern or complaint, taking a medical history, doing a physical examination, and requesting needed laboratory or imaging data. This traditional approach is structured to elucidate physical diagnoses. Simultaneously, the family physician is also seeking focused data about the patient as a person, and these data include information of the five human dimensions. Patient-as-person data can be a source of nonphysical problems and influence possible solutions to the problems.

The chronological, or seasons-of-life, dimension is readily appreciated during the encounter and is valuable to note because the cause of the patient's symptoms may be age-related. For example, the causes of constipation in a 4-month-old infant are very different from a middle-age person who has constipation of recent onset. The same symptom is present, but there are very different diagnostic possibilities because of the patient's age.

The psychological dimension includes not just mental health diagnoses but also personality, intelligence, attention, ability to process information, mood, and emotional states such as fear and anxiety that are part of the conversation. Any of these can be source of problems for the patient or influence a solution.

A family physician actively scans the patient's social dimension for potential problems. Social dimension is often divided into five different areas (Berkman and Kawachi, 2000): (1) relationships at the individual level, such as a person's family unit or source of social support; (2) the work environment; (3) social status (e.g., educational level); (4) socioeconomic position (e.g., poverty); and (5) community relationships and norms. All can be a source of problems but can also set the stage for potential solutions. Such information is often critical in creating effective solutions to patient's problems.

The spiritual dimension can also be a source of problems and potential solutions for patients. Patients can attribute diseases as punishment from God or as a struggle with

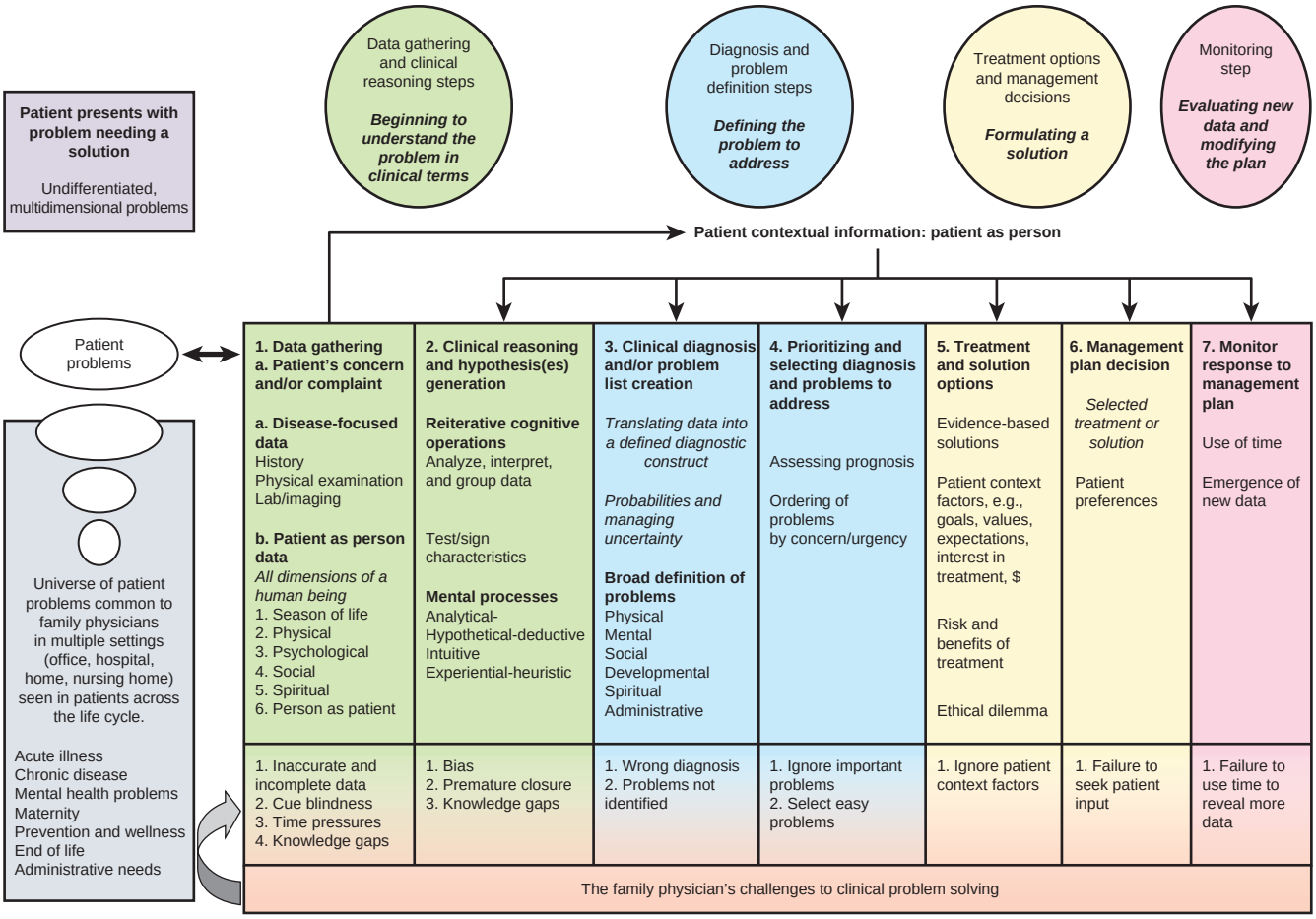

Figure 11-1 Steps family physicians take to define clinical problems and create patient-centered treatment solutions.

purpose and meaning in life. Alternatively, patients may draw on strong spiritual beliefs or a religious community for solace and support.

In addition to these five human dimensions, the role the person plays as patient can also be a source of problems. For example, the ideal patient is expected to follow through on treatment plans, but nonadherence to the plan is a common problem in practice. Trying to understand the factors causing noncompliance become part of the physician's search and demand a solution if patient adherence is to be achieved.

Family physicians elicit and search for "data" related to the physical diagnosis, the various human dimensions, the role of the patient to understand the multitude of problems, and also to generate an active problem list.

The second step after data gathering is *clinical reasoning*. In reality, this goes on simultaneously while gathering the data. The physician conducts specific mental operations that initially include sorting and sifting, analyzing, and interpreting the data. Signs and symptoms have different meanings diagnostically and prognostically (Wilson, 1926). The physician often uses two broad categories of mental operations on the gathered data (Croskerry, 2009). The first is an analytical or a systematic algorithmic approach to hypothesis generation. Questions are ordered sequentially, with the patient's answers directing the next line of questions. In a very systematic way, the physician is sifting and sorting information as it comes forth to get to a likely answer to the hypothesis. The second broad mental operation category is intuitive processing. Here the physician is using prior experience and pattern recognition to sort information in a much more efficient, rapid manner. Intuitive processing is much quicker, but it also has a higher likelihood of error.

One aspect of sorting and sifting data and hypothesis generation is the value of that information in raising or lowering the likelihood of a specific diagnosis. In clinical practice, knowing likelihood ratios of specific signs (McGee, 2012), symptoms, and tests (or a combinations of these, for example, severity of illness scales) (Kellet, 2008) is valuable in defining the probability of a disease and its outcomes. In addition to the likelihood ratios, family physicians are assisted in defining clinical problems by knowing the prevalence and incidence of a specific disease in the community. Such information may not be readily available, but, for example, based on the season of year, monitoring the emergence of communicable disease (e.g., Centers for Disease Control and Prevention [CDC] flu map website) and hearing of patients with flu in the community, a physician's suspicions for flu are elevated when a patient comes in with runny nose, cough, fever, and diffuse body aches. Such information helps with generating probabilities in the same way Will Pickles' work on the incubation periods of certain infectious diseases (Pickles, 1939) allows a physician encountering a jaundiced patient to increase the likelihood of a diagnosis of infectious hepatitis by knowing when the patient was exposed to another person with that condition.

DEFINING THE PROBLEM(S) TO ADDRESS

The next step includes making a *clinical diagnosis, defining the problem(s),* and *creating a problem list*. Diagnosis is a translation of symptoms and signs into a medical disease category or classification scheme. Diagnosis is the naming of the clinical problem based on the patient's signs and symptoms. Diagnosis is laden with meaning, assigning a pathobiological process responsible for the patient's signs and symptoms. The signs and symptoms understood in pathobiological terms begin to demystify and move the process to a specific prognosis and suggest treatment options.

For the family physician, patient problems do not end with a physical diagnosis. Glenn (1984) reminded us that diagnosis for family physicians is much broader and includes problems of the kind alluded to earlier of psychological, social, and spiritual dimensions of being human. Neglecting these problems in the treatment of disease often leads to poor outcomes because of the interaction of problems that permeate the patient's life. An important aspect of helping a patient is to classify these other problems as well and recognize how they are shaping the experience of disease (illness).

An important part of the discussion in generating an active problem list is to gain agreement with the patient on what the problems are and which ones are the most important. Getting to agreement on patient problems (and their treatment) influences the outcomes of care (Stewart, 1995).

The next step in clinical problem solving is *prioritizing and selecting the diagnosis and the problems to address*. This is really not as simple as it sounds, and it is an important part of the process because in practice, faced with multiple problems, the physicians must decide what to address first and in what order (Balint, 1964). Some solutions or treatments are easy, such as writing for a medication, whereas others require much effort by the patient and physician (e.g., behavior changes). A physician's expertise or comfort level influences what problem a physician or patient may choose.

Another factor is the level of concern or urgency to the problems. The patient with suicidal ideation in crisis needs immediate response to treatment, as opposed to somebody who has a nagging fatigue and back pain due to the repetitive stresses of life who may have depression; the sense of urgency is different. A patient may have strong feelings about what is most important and that influences what problem is addressed first. All are part of the conversation on deciding and prioritizing what problems need to be addressed.

The prognosis of the problem also shapes how the physician orders and prioritizes what problem should be addressed. A new diagnosis of cancer, for example, changes a person's life trajectory in the short term as well as the long term. With a new cancer diagnosis, the focus of attention for that patient carries heightened concern and anxiety about what the diagnosis portends for the future and how the cancer is going to impact his or her ability to function in his or her various work or family roles, and such considerations shape the nature of the treatment plan. Thus knowing the prognosis of specific conditions and what their natural history could be with or without treatment is included in formulating solutions and treatment options.

FORMULATING SOLUTIONS AND TREATMENT OPTIONS

Once the problem is understood, defined, and prioritized and agreement is achieved between the physician and patient, the physician and patient can then begin to explore treatment and solution options. Increasingly the physician takes an evidence-based approach to deciding treatment options (Sackett et al., 1991). Some treatments have a strong evidence base with clear likelihood of response to treatment. In practicing evidence-based medicine, the physician often uses point-of-care resources to help guide care decisions. In addition, there are also patient decision aids (O'Connor, 2001) available to help patients understand the risks and benefits of treatment. A selected set of electronic resources is shown in Table 11-1.

Table 11-1 Point of Care Resources Available to Assist with Clinical Problem Solving

Resource	Description	Type	Free
5-Minute Clinical Consult	Quick and concise clinical reference: not a lot of details but good for a quick overview of medical conditions	App, Web	No
AHRQ ePSS	Easy-to-use USPSTF guidelines: enter patient demographics and get patient-specific recommendations	App, Web	Yes
Epocrates	Popular drug reference	App	Yes
MedCalc	Free reference of more than 300 formulas, scoring, scale, and classification systems	App	Yes
MediMath Medical Calculator	More than 140 of the most important medical calculators and scoring tools	App	No
Mediquations Medical Calculator	More than 230 formulas and scoring systems	App	No
Medscape	Popular decision support tool that includes medical news, clinical information, drug information, procedure videos, and medical calculators	App, Web	Yes
Shots by STFM	Easy-to-use immunization program based on CDC guidelines; includes vaccine info and schedules if using combination shots	App	Yes
Skyscape	Decision-support tool that includes clinical information, drug information, and medical calculators	App	Yes
UpToDate	Comprehensive evidence-based resource; requires a subscription	App, Web	No

AHRQ, Agency for Healthcare Research and Quality; *CDC,* Centers for Disease Control and Prevention; *ePSS,* Electronic Preventive Services Selector; *STFM,* Society of Teachers of Family Medicine; *USPSTF,* U.S. Preventive Services Task Force.

In addition to knowing the evidence for specific treatments, patient context factors also impact the treatment plan options. Patient expectations, values, and willingness to pursue specific treatment plans come into play (Janz and Becker, 1984). Common to family medicine practice are patients who do not like to take medications and would prefer to use alternative approaches to treat physical problems. Thus, increasingly, family physicians should be knowledgeable of the integrative medicine approaches that can be used to complement some of the medical approaches to create a management plan that patients will accept.

Patient context factors also play into modifying the treatment plan in other ways. Specifically, concern for quality-of-life issues may want the physician to steer away from aggressive treatment plans that actually lead to lower quality of life. Patients have specific goals they want to accomplish in a certain period of time, and they will delay following through on some medical interventions before they have achieved these other goals. Even though there may be a very strong and compelling evidence base for a specific treatment plan, patients make choices based on other values and goals.

In addition, ethical issues arise in practice and shape and influence decisions. If a person is trying to weigh the benefits of treatment versus harm, and if one available treatment option will cause more harm than another, a patient may decide to avoid the harmful approach even if the patient knows there may be increased risk of premature mortality. Family physicians often handle ethical dilemmas that arise in practice as part of any management plan or decisions patients face.

All this information involving the treatment options is used to select the specific management plan on which the physician and patient agree to move forward. Including patient preferences is an important element in selecting that management plan.

MONITORING THE RESPONSE: TESTING THE RESPONSE BASED ON ACTUAL RESULTS

Monitoring the response to treatment is an important part of the problem-solving process because a plan ultimately must produce the desired results—a good outcome. When a patient presents early in the course of an illness, it is often not clear exactly what the problem is, but with the passage of time more data come forth and the physician can better understand the problem and adjust the treatment plan. In a similar way the response to treatment in time may help clarify what the problem actually might be. For example, a patient comes in with dyspepsia and the physician starts a medication for acid disease. In follow-up, the physician can monitor whether the patient responded to treatment and is able to confirm that the diagnosis is acid dyspepsia. That response may lead to evaluate for *Helicobacter pylori* infection and, in turn, offer treatment to eradicate the problem.

In monitoring the response to treatment, the physician and patient begin to gain further understanding of the problem, and the physician specifically gains practical experiential knowledge of what works and what does not. Time will tell if the problem was understood and defined correctly and if the treatment was effective. In this way, monitoring the response to treatment is a source of learning and helps with future problem solving.

Challenges to Clinical Problem Solving

The data-gathering step can be associated with potential errors that lead to poor problem solving. For example, having inaccurate or incomplete data leads to a limited understanding of the problem and, in turn, to ineffective solutions. Another factor related to data gathering is insufficient clinical knowledge to collect key data and ask important questions. The pressures of practice can limit the time allowed to gather information. As a result, the history may be a little bit briefer, the physical examination may be incomplete, and as a result, important data are not obtained.

Clinical reasoning errors using intuitive processing may lead a physician to prematurely close the search for a diagnosis; quick judgments of the problem based on prior pattern recognition may not be reliable. Knowledge gaps could also impact clinical reasoning abilities with analytical processing. If a physician's knowledge is incomplete, then a very limited algorithmic or analytical approach will be used compared with another physician who has a very detailed knowledge base and can go very deep in questioning to clarify the patient's story. Finally, clinical reasoning can be influenced by faulty assumptions (biases) and, as a consequence, lead to flawed diagnostic impressions and perception of problems.

In prioritizing and selecting problems, it is possible the physician can choose to ignore important problems because they are more difficult to manage than others. The physician may select easy problems rather than tackle those that are more frustrating and difficult to address. For example, changes in behavior to help people to lose weight for hypertension are much harder to accomplish than writing a prescription for hypertension medication. Depending on the degree of difficulty and resources available, patients may choose not to address certain problems.

In designing treatment options and solutions, physicians may ignore patient context factors, such as patient-driven goals or gaining agreement with the plan. Physicians may take a paternalistic approach and exclude patient input in the management plan. Sometimes paternalism is needed, but other times physicians create solutions not acceptable to patients. Patients may simply feign agreement and leave knowing they will not follow through.

Finally, in monitoring response to the management plan the physician may fail to pursue or seek new data and/or not try to understand the problem in a new way. The physician may not recognize how time can help in confirming whether the problems are correct or whether the treatment plan is working.

Conclusion

Effective clinical problem solving occurs when a family physician uses a systematic approach. This chapter offers

a systematic approach to problem solving that outlines the specific tasks and describes specific steps to arrive at effective solutions. Patient involvement is critical throughout the whole process. Family physicians who debrief their problem solving skills and identify areas for improvement in time become master problem solvers, and in turn become trusted advisors to their patients. In the current environment of outcomes-based medicine, becoming a master clinical problem solver—creating care for the unique patient that leads to positive outcomes—cannot be overly emphasized.

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12 Integrative Medicine

MARY P. GUERRERA

CHAPTER OUTLINE

Key Points

- Terms and definitions that describe complementary and alternative medicine (CAM) are diverse and evolving.
- Integrative medicine combines CAM and conventional medicine.

The level of integration of conventional and CAM therapies is growing. That growth generates the need for tools or frameworks to make decisions about which therapies should be provided or recommended, about which CAM providers to whom conventional medical providers might refer patients, and the organizational structure to be used for the delivery of integrated care. The committee believes that the overarching rubric that should be used to guide the development of these tools should be the goal of providing comprehensive care that is safe and effective, that is collaborative and interdisciplinary, and that respects and joins interventions from all sources. (IOM, 2005)

Many countries now recognize the need to develop a cohesive and integrative approach to health care that allow governments, health care practitioners and, most importantly, those who use health care services, to access T&CM [Traditional & Complementary Medicine] in a safe, respectful, cost-efficient and effective manner. A global strategy to foster its appropriate integration, regulation and supervision will be useful to countries wishing to develop a proactive policy towards this important—and often vibrant and expanding—part of health care. (WHO, 2013)

In these tumultuous times of health care reform, family physicians find themselves on a threshold: a place of great professional promise as well as uncertainty. Will they step through this historic doorway with newfound meaning and professional identity? Will they create new practice models, new ways of delivering care, and new methods of collaborating across the spectrum of healing practices and health professionals? Work is already underway with initiatives such as patient-centered medical homes (PCMHs) and accountable care organizations (ACOs). In addition, the field of family medicine has taken the lead and is currently pioneering work bringing complementary and alternative medicine (CAM) and integrative medicine into residency training and clinical care (Benn et al., 2009; Lebensohn et al., 2012; Locke et al., 2013).

How will these relatively new and evolving areas of health care optimize and revitalize the practice of family medicine? This chapter describes these new fields, assesses proposals by U.S. medical organizations, and addresses the challenges for practitioners applying current research techniques to these diverse and complex healing approaches and systems. Core principles and specific examples of CAM encountered by the practicing family physician are presented with relevant evidence and helpful tips.

Complementary and alternative medicine is based on multiple healing traditions practiced long before conventional Western medicine. Emerging from diverse cultural traditions worldwide, these approaches to health and healing offer the wisdom of their unique perspective on the human condition. Many traditional practices, including those of conventional medicine, share common roots and philosophies and uphold the sacred call to relieve the suffering of others. Family physicians should keep an open mind as they explore these dimensions of CAM.

What Is Complementary and Alternative Medicine?

Various definitions have been used to describe the array of approaches and philosophies commonly referred to as CAM. As the field has evolved, so has the terminology. Unconventional, unproven, alternative, complementary, holistic, integrative, and integral are some of the most common examples of terms in current use.

Historically, medical pluralism has long existed in the United States (Kaptchuk and Eisenberg, 2001a). Over the past few decades, *alternative medicine* has become a more recognized entity within conventional medicine. Because of the public's growing use of CAM, the National Institutes of Health (NIH) created an Office of Alternative Medicine (OAM) in 1992, with the intention of bringing its scientific expertise "to more adequately explore unconventional medical practices" (NCCAM, 2000). Because of Americans' ongoing and increasing use of CAM, the OAM was expanded to the *National Center for Complementary and Alternative Medicine* (NCCAM) in 1998, guided by the following mission statement (2000, p 17): "We are dedicated to exploring complementary and alternative healing practices in the context of rigorous science, training researchers, and disseminating authoritative information to the public and professional communities." After a decade of work in the field, NCCAM has become a leading resource for helping the public and health professionals better understand this rapidly growing area of medicine. The center's name has led to the more widespread use and recognition of CAM as the defining term for this field. NCCAM's free website contains a wealth of information, including the following definitions (2014):

- ***Complementary and alternative medicine*** are terms often used to mean the array of health care approaches with a history of use or origins outside of mainstream medicine. NCCAM generally uses the term "complementary health approaches" when discussing the practices and products we study for various health conditions. Although some scientific evidence exists, the list of what is considered to be CAM changes continually as the therapies that are proved to be safe and effective become adopted into conventional health care and as new approaches to health care emerge.
- ***Alternative medicine*** refers to using a non-mainstream approach **in place** of conventional medicine.
- ***Complementary medicine*** generally refers to using a non-mainstream approach **together with** conventional medicine.
- *Integrative medicine* and *integrative health care* combine this array of non-mainstream health care approaches together with conventional medicine.

The NCCAM has classified CAM into five categories, or domains (Figure 12-1). Currently NCCAM finds it useful to consider these approaches as falling into one of two subgroups: natural products or mind and body practices. Examples of alternative or whole medical systems include homeopathy, naturopathy, and Ayurveda (**eAppendix 12-1** provides a glossary of CAM terms). Although there are a variety of approaches to the complex taxonomy of CAM (Kaptchuk and Eisenberg, 2001b), the NIH system is most often used.

Another term, *holistic medicine,* also describes these practices and philosophy. The American Holistic Medical Association (AHMA), founded in 1978, is a membership organization for physicians and other health professionals seeking to practice a broader form of medicine than that currently taught in allopathic medical schools (Table 12-1). "Holistic medicine is the art and science of healing that addresses care of the whole person—body, mind, and spirit.

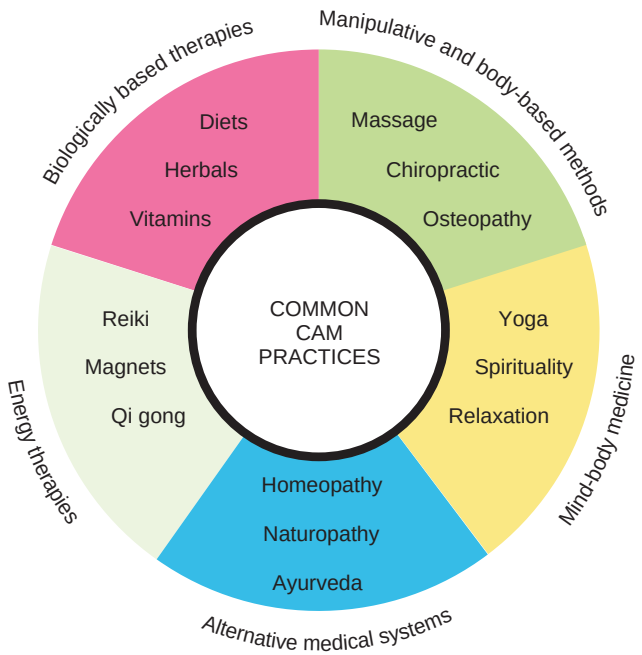


Figure 12-1 The National Center for Complementary and Alternative Medicine (NCCAM) groups' complementary and alternative medicine (CAM) practices into five domains, recognizing that there can be some overlap among them. *Biologically based therapies* use substances found in nature, such as herbs, special diets, or vitamins (in doses outside those used in conventional medicine). *Energy therapies* involve the use of energy fields, such as magnetic fields or biofields (i.e., energy fields that some believe surround and penetrate the human body). *Manipulative and body-based methods* are based on manipulation or movement of one or more body parts. *Mind-body medicine* uses a variety of techniques designed to enhance the mind's ability to affect bodily function and symptoms. *Alternative* or *whole medical systems* are built on complete systems of theory and practice. Often, these systems have evolved apart from and earlier than the conventional medical approach used in the United States.

The practice of holistic medicine integrates conventional and complementary therapies to promote optimal health and to prevent and treat disease by addressing contributing factors" (AHMA, 2014).

In 1981, the nursing profession, guided by a group of nurses dedicated to bringing the concepts of holism to every arena of nursing practice, founded the American Holistic Nursing Association (AHNA). "Holistic nursing is defined as 'all nursing practice that has healing the whole person as its goal' (AHNA, 1998). Holistic nursing is a specialty practice that draws on nursing knowledge, theories, expertise, and intuition to guide nurses in becoming therapeutic partners with people in their care. This practice recognizes the totality of the human being—the interconnectedness of body, mind, emotion, spirit, social/cultural, relationship, context, and environment" (AHNA, 2014).

Integrative medicine, a term brought into popular use by Andrew Weil, MD, founder and director of the innovative University of Arizona Center for Integrative Medicine, describes how CAM and conventional medicine is practiced together (Rakel and Weil, 2003, p 6):

Integrative medicine is healing oriented and emphasizes the centrality of the doctor-patient relationship. It

Table 12-1 Important Events in Complementary and Integrative Medicine

Year	Event
1978	American Holistic Medical Association is founded.
1981	American Holistic Nurses Association is founded.
1992	U.S. Office of Alternative Medicine (OAM) is established.
1996	U.S. Food and Drug Administration (FDA) approves acupuncture needles for use by licensed practitioners.
1998	National Center for Complementary and Alternative Medicine (NCCAM) is established, replacing OAM.
1999	Consortium of Academic Health Centers for Integrative Medicine (CAHCIM) is formed in response to increasing public interest in complementary and alternative medicine (CAM) and grows to 57 members by 2013.
2000	American Board of Medical Acupuncture is established, with a certifying examination for physicians to demonstrate proficiency in the specialty of medical acupuncture.
2000	President Clinton appoints James S. Gordon, MD, to chair the first White House Commission on Complementary and Alternative Medicine Policy (WHCCAMP).
2002	WHCCAMP submits final report with administrative and legislative recommendations for maximizing the benefits of CAM for all Americans.
2005	Institute of Medicine (IOM) releases report on CAM in the United States. NCCAM releases 5-year strategic plan.
2006	CAHCIM sponsors the first North American Research Conference on Complementary and Integrative Medicine.
2009	IOM Summit on Integrative Medicine and the Health of the Public. CAHCIM sponsors a second research conference. NCCAM prepares its third strategic plan.
2011	Veterans Heath Administration (VHA) launches a new Office of Patient-Centered Care and Cultural Transformation for "whole health."
2013	World Health Organization (WHO) Traditional Medicine Strategy 2014-2023 is published to set the course for global traditional and complementary medicine.
2014	American Board of Integrative Medicine offers its first certifying examination.

focuses on the least invasive, least toxic, and least costly methods to help facilitate health by integrating allopathic and complementary therapies. These are based on an understanding of the physical, emotional, psychologic, and spiritual aspects of the individual.

In general, the terms *holistic* and *integrative* seem to best convey the ideal blending of conventional and unconventional medicine "in that both imply a balanced, whole-person–centered approach and involve a synthesis of conventional medicine, CAM modalities, and other traditional medical systems, with the aim of prevention and healing as a basic foundation" (Lee et al., 2004, p 10).

The term *integral* has recently emerged in the literature. First noted several decades ago in the book *Mind, Body and Health: Toward an Integral Medicine* (Gordon et al., 1984), its original use may be traced to the work of Sri Aurobindo, an Indian mystic and political leader. The term has been popularized by contemporary philosopher and transpersonal psychologist Ken Wilber (2005), as applied in the context of his *integral theory.* Many thought leaders in the field of health and healing, including the Institute of Noetic Sciences (IONS), support these concepts and encourage further research into what may be considered the beginnings of a paradigm shift in medicine (Schiltz, 2005). The following excerpt captures the essence of the deep change and transformation that integral medicine calls for (Wilber, 2005, pp xxx-xxxi):

The crucial ingredient in any integral medical practice is not the integral medical bag itself—with all the conventional pills, and the orthodox surgery, and the subtle energy medicine, and the acupuncture needles—but the holder of that bag. Integrally informed health-care practitioners, the doctors, nurses, and therapists, have opened themselves to an entire spectrum of consciousness—matter to body to mind to soul to spirit—and who have thereby acknowledged what seems to be happening in any event. Body and mind and spirit are operating in self and culture and nature, and thus health and healing, sickness and wholeness, are all bound up in a multidimensional tapestry that cannot be cut into without loss.

Family physicians know this to be true. They practice with the intention to care for the whole patient within the context of a continuous healing relationship while honoring the rich complexity and interplay of family, community, and environment. They acknowledge the personal and interpersonal effects of health and illness and are trained to consider the behavioral and social aspects of a person's life as well as the biomedical factors.

Now is the time not only to reclaim its roots, but also to move primary care into expanded dimensions and possibilities of health and healing. Family medicine is the ideal discipline to champion this movement and to actualize changes that will begin to heal the failing U.S. health care system. Whether it is called holistic, integrative, or integral, family physicians are collectively evolving toward a more compassionate and sustainable system of care that may ultimately be called *good medicine.*

Complementary and Alternative Medicine Use in the 1990s

Key Points

- Almost 40% of U.S. adults and 12% of children use complementary and alternative medicine (CAM) therapies.
- The number of adult Americans using CAM rose by 38% between 1990 and 1997 and has remained stable between 2002 and 2007.
- CAM is used more by women, by those with higher levels of education and income, and by those who were recently hospitalized.
- Most patients do not disclose CAM use to their physicians.
- Most patients use CAM and conventional care together.

The first major study of CAM use in the United States was conducted in 1990 by David Eisenberg and colleagues (1993), who published a landmark paper in the *New England Journal of Medicine*. Serving as a wake-up call to conventional medicine, the data from this national telephone survey of 1539 English-speaking adults estimated that one of three Americans (34%) had used a CAM therapy in the prior year. The study estimated that those using CAM had made 425 million visits to complementary medicine practitioners—more than all office visits to primary care physicians in that same time frame! The out-of-pocket costs for these CAM services were approximately $14 billion a year. The striking statistics alerted mainstream medicine and prompted further inquiry into the growing phenomenon of the public's use of CAM.

In 1997, Eisenberg and colleagues conducted a follow-up to the 1990 study, again using a national telephone survey of English-speaking adults (2055). The findings, published in the *Journal of the American Medical Association* in 1998, showed that the number of Americans using CAM rose by 38% (60 to 83 million) and that visits to CAM practitioners increased from an estimated 427 million to 629 million. Overall, 42% of Americans were estimated to be using at least one CAM therapy in the prior 12 months. With regard to costs, conservative estimates put expenditures for CAM professional services at $21.2 billion, with approximately $12.2 billion paid as out-of-pocket expenses (Eisenberg et al., 1998).

Most concerning was the finding that although CAM use had increased over the 7-year period, the number of patients informing their doctors of such use had not changed—approximately 60% to 70% of CAM users in 1990 and 1997 did not discuss their use of CAM with their physicians. Lack of communication was noted again in a 2006 NCCAM/American Association of Retired Persons (AARP) survey of adults 50 or older revealing only one-third of CAM users had talked to their physicians about their CAM use (NCCAM/AARP, 2007). Given this fact and the potential for untoward side effects, it is essential that physicians and all other health professionals ask patients about their use of CAM. In addition to NCCAM's "Time to Talk" campaign, several approaches have been suggested (Eisenberg, 1997); Table 12-2 lists an ABC format especially useful for the busy clinician (Sierpina, 2001).

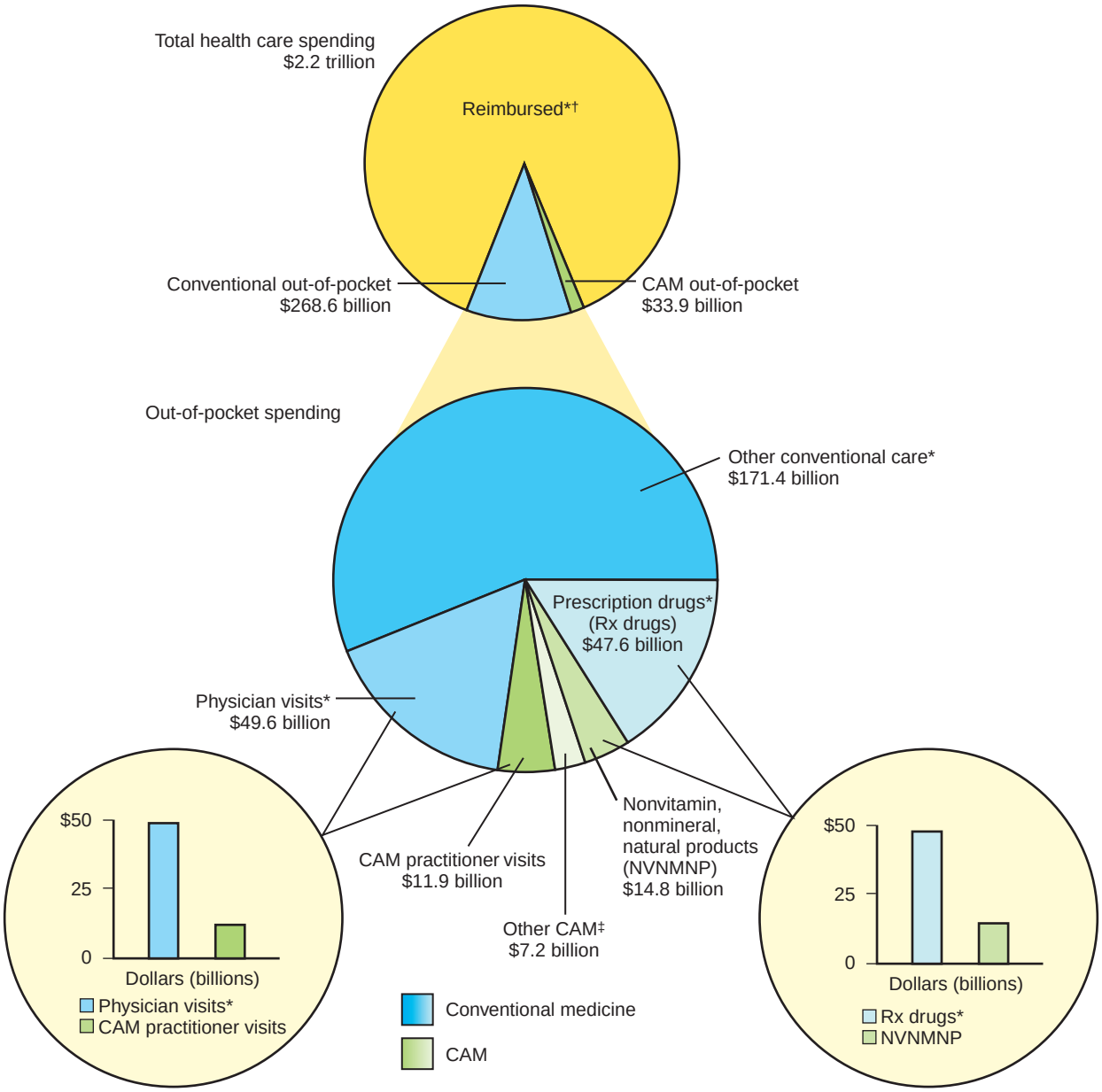
Table 12-2 Guidelines for Advising Patients Who Seek Alternative Therapies

Ask; don't tell.
Be willing to listen and learn.
Communicate and **c**ollaborate.
Diagnose.
Explain and **e**xplore options and preferences.

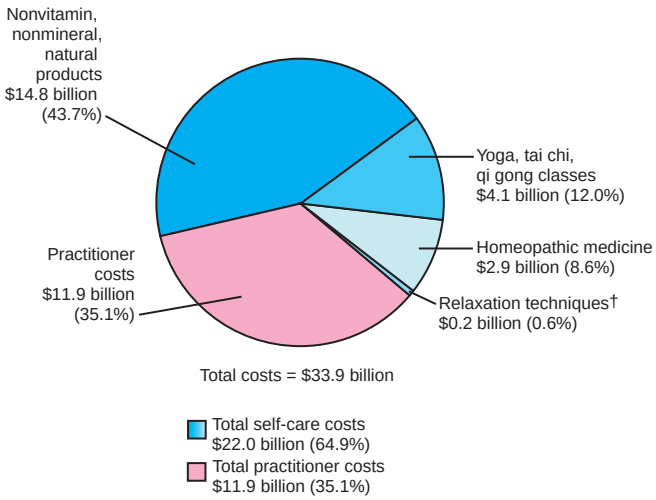
Complementary and Alternative Medicine Use in the 21st Century

Data on the U.S. population's use of CAM was collected in 2002, 2007 (published), and 2012 (publication pending). Considered the most comprehensive and reliable findings on Americans' use of CAM, these studies were conducted by the NCCAM and the National Center for Health Statistics (NCHS), part of the Centers for Disease Control and Prevention (CDC). For the first time, detailed questions regarding CAM were added into the 2002 edition of the NCHS National Health Interview Survey (NHIS), an annual study interviewing tens of thousands of Americans about their health- and illness-related experiences. The 2002 and 2007 studies were completed by approximately 30,000 families through adults 18 years or older who spoke English or Spanish. The study reflected CAM use during the 12 months before the survey. The 2007 survey included expanded questions on 36 types of CAM therapies commonly used in the United States: 10 practitioner-based therapies, such as acupuncture, and 26 other, self-care therapies not requiring a practitioner. CAM therapies included in the surveys are listed in Table 12-3, and the terms are defined in eAppendix 12-1.

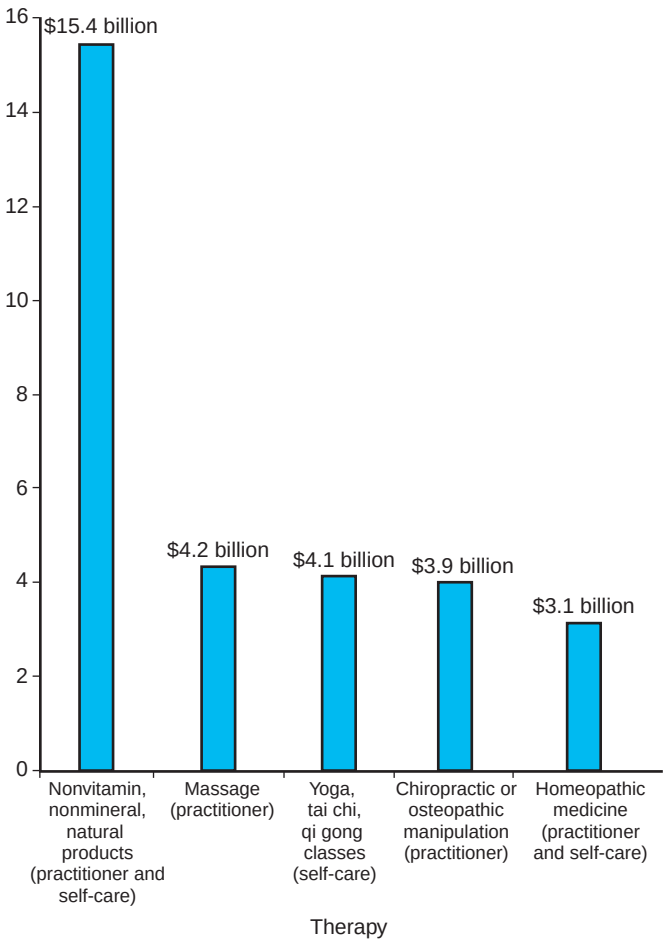
As shown in Figure 12-2, CAM use increased from 36% of U.S. adults in 2002 to 38% in 2007, or almost 4 of 10 adults (Barnes et al., 2004, 2008). For the first time, the 2007 survey collected data on CAM use in children (<18 years), showing 12% use, or 1 in 9 children. The top 10 CAM therapies for both adults and children are shown in Figure 12-3. Significant increases in adults' use of deep breathing, meditation, massage, and yoga occurred over the 5 years of the study. Another notable NCCAM/AARP study focused on CAM use in adults older than 50 years. Approximately two-thirds (63%) had used one or more CAM therapies (NCCAM/AARP, 2007). The most common reasons cited for not discussing CAM included: the physician never asked (42%), the patient did not know they should ask (30%), and there was not enough time during the office visit (19%). Of those using CAM, 66% did so to treat a specific condition and 65% for overall wellness. For details on CAM costs in the United States, see eFigures 12-1 to 12-3 online.



eFigure 12-1 Combined total health care spending and out-of pocket spending for conventional health care costs and complementary and alternative medicine (CAM). *National Health Expenditure Data for 2007. US Department of Health and Human Services, Centers for Medicare and Medicaid Services website. Accessed June 2009. http://www.cms.hhs.gov/NationalHealthExpendData/o2_NationalHealthAccounctsHistorical.asp#TopofPage. †Reimbursed spending includes employer and individual private insurance, Medicare, Medicaid, State Children's Health Insurance Program, other private and public spending, and some CAM. ‡Other CAM includes yoga, tai chi, qi gong classes; homeopathic medicine; and relaxation techniques. (From Nahin RL, Barnes PM, Bloom E. Costs of complementary and alternative medicine [CAM] and frequency of visits to CAM practitioners: United States, 2007. Hyattsville, MD: CDC–National Center for Health Statistics, 2009.)



eFigure 12-2 Complementary and alternative medicine (CAM) out-of-pocket spending: self-care versus practitioner care. (From Nahin RL, Barnes PM, Bloom E. Costs of complementary and alternative medicine [CAM] and frequency of visits to CAM practitioners: United States, 2007. Hyattsville, MD: CDC–National Center for Health Statistics, 2009.) *Self-care costs include CAM products, classes, and materials. †Relaxation techniques include meditation, guided imagery, progressive relaxation, and deep-breathing exercises.



eFigure 12-3 Out-of-pocket costs for select complementary and alternative medicine (CAM) therapies. Totals for nonvitamin, nonmineral, natural products, and homeopathy include both CAM practitioner costs and costs of purchasing CAM products. Totals for massage and chiropractic and osteopathic manipulation are only CAM practitioner costs. Totals for yoga, tai chi, and qi gong classes are only the cost of purchasing CAM products. (From Nahin RL, Barnes PM, Bloom E. Costs of complementary and alternative medicine [CAM] and frequency of visits to CAM practitioners: United States, 2007. Hyattsville, MD: CDC–National Center for Health Statistics, 2009.)

Table 12-3 Complementary and Alternative Medicine Therapies Included in 2002 and 2007 National Health Interview Surveys

Acupuncture*
Ayurveda*
Alternative practitioner*†
Biofeedback*
Chelation therapy*
Chiropractic care*
CAM†
Deep breathing exercises
Diet-based therapies
Vegetarian diet
Macrobiotic diet
Atkins diet
Pritikin diet
Ornish diet
Zone diet
Energy healing therapy*
Folk medicine
Guided imagery
Homeopathic treatment
Hypnosis
Massage*
Meditation
Megavitamin therapy
Movement therapy†
Alexander technique
Feldenkrais
Pilates
Trager psychophysical integration
Natural nonvitamin and nonmineral products (e.g., herbs, other products from plants, enzymes)
Naturopathy*
Osteopathic manipulation*†
Prayer for health reasons
Prayed for own health
Others ever prayed for your health
Participate in prayer group
Healing ritual for self
Progressive relaxation
Qi gong
Reiki*
Tai chi
Traditional healer*†
Botanica
Curandero
Espiritista
Hierbero (yerbera)
Native American healer
Shaman
Sobador
Yoga

CAM, Complementary and alternative medicine.
Definitions of these therapies are provided in the glossary of eAppendix 12-1.
*Indicates a practitioner-based therapy.
†Indicates addition to 2007 survey.

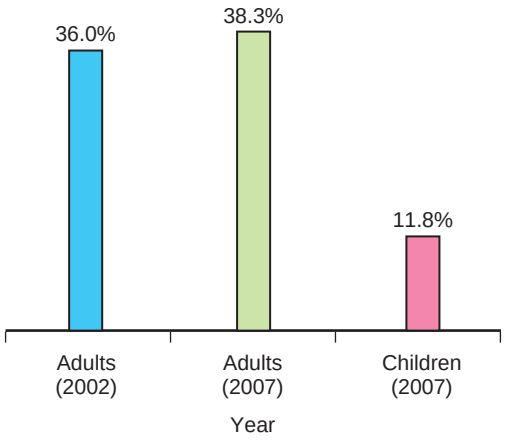


Figure 12-2 Complementary and alternative medicine (CAM) use by U.S. adults (2002, 2007) and children (2007). (From Barnes PM, Bloom B, Nahin R. Complementary and alternative medicine use among adults and children: United States, 2007. *Natl Health Stat Rep.* December 2008;(12):1-23.)

WHO IS MORE LIKELY TO USE COMPLEMENTARY AND ALTERNATIVE MEDICINE AND WHY?

Consistent with data from the 2002 NHIS study, CAM use by adults in 2007 was more prevalent among women; adults age 30 to 69; those with higher education level, not poor, or living in the West; former smokers; and those hospitalized in the prior year (Barnes et al., 2008). CAM use was positively associated with number of health conditions and number of physician visits in the previous year. When concerned about cost or unable to pay for conventional care, adults were more likely to use CAM. For children, the 2007 data show no gender difference. For all therapies combined, CAM use was highest among adolescents age 12 to 17 years (16%) versus children age 5 to 11 years (11%) or preschool children age 0 to 4 years (8%). Children's use of CAM increased as their parents' education or income level increased, and when families were unable to afford conventional medical care. Children with a parent or other relative who used CAM were about five times as likely (23%) to use CAM as children whose parent did not (5%).

Figure 12-4 shows the disease or condition for which adults and children are most likely to seek CAM. The 2002 survey also addressed the important question: Why do people use CAM? Previous studies revealed general issues of the overuse of technology and a reductionist approach to care, managed-care time constraints limiting visits and eroding the physician-patient relationship, and the explosion of Internet-based information on CAM. Astin (1998) found that along with being more educated and reporting poor health status, most alternative medicine users were not dissatisfied with conventional medicine but rather found these health care alternatives to be more congruent with their own values, beliefs, and philosophic orientations toward health and life. Only 4.4% reported relying primarily on CAM therapies for their health care. A subsequent study of patients using both CAM and conventional care also found that use of CAM did not primarily reflect dissatisfaction with conventional care (Eisenberg et al., 2001).

Reasons for CAM use reported in the 2002 NHIS study are shown in Figure 12-5, with slightly more than one-half of all respondents believing CAM *combined with* conventional medicine would be helpful.

TRENDS IN COMPLEMENTARY AND ALTERNATIVE MEDICINE USE

The 2002 and 2007 NHIS data show that although the overall prevalence of CAM use by adults had remained relatively stable (36% and 38%, respectively), there have

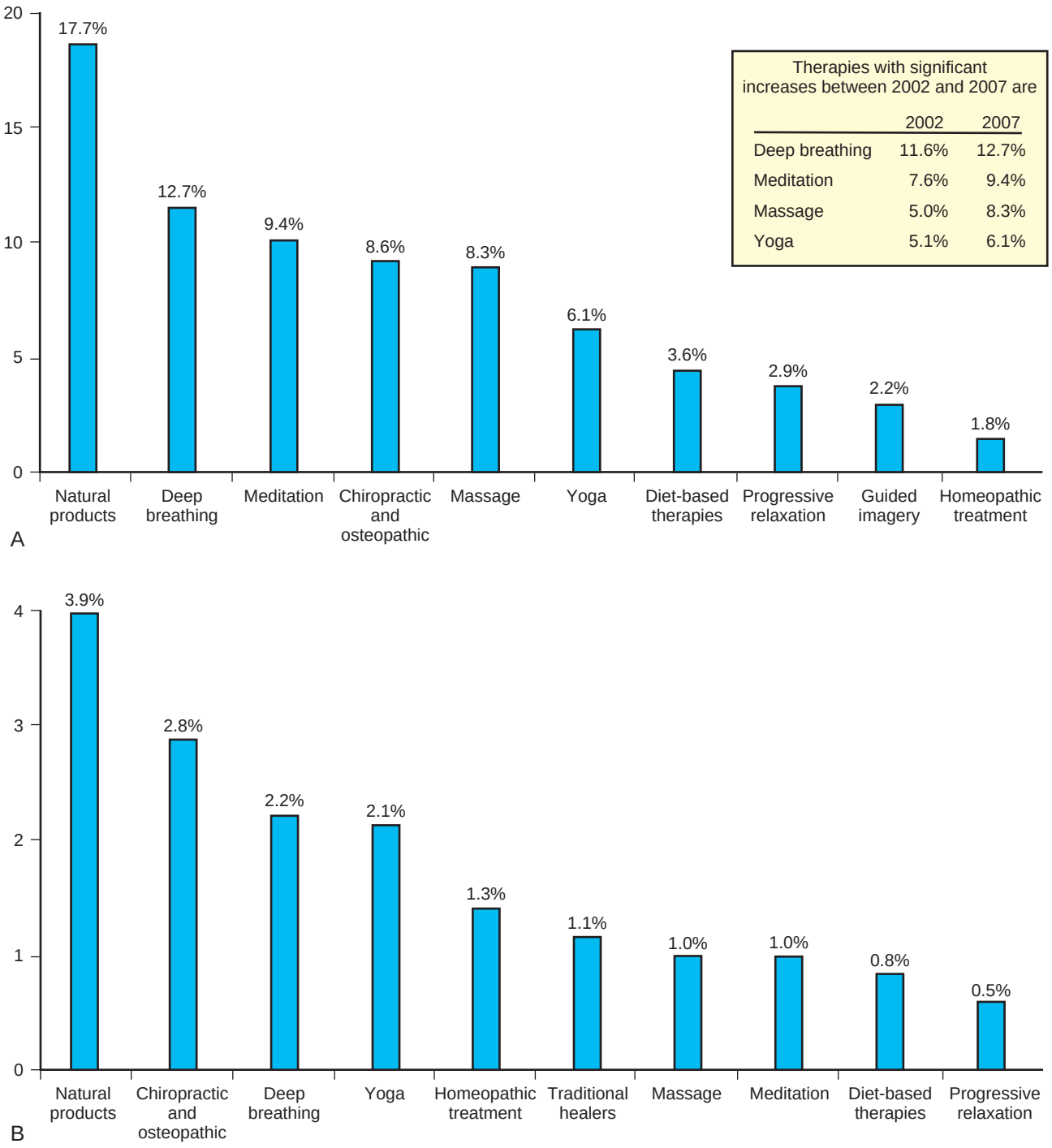


Figure 12-3 A, Ten most common complementary and alternative medicine (CAM) therapies among adults in 2007. **B,** Ten most common CAM therapies among children in 2007. (From Barnes PM, Bloom B, Nahin R. Complementary and alternative medicine use among adults and children: United States, 2007. *Natl Health Stat Rep.* December 2008;(12):1-23.)

been significant increases in some therapies, including acupuncture, deep-breathing exercises, massage therapy, meditation, naturopathy, and yoga (see Figure 12-3). Several factors may account for this growth, including increasing state licensure of some of the practices and greater public awareness of their use through the press and Internet resources. Characteristics of adult and pediatric CAM users are similar in that education, poverty status, geographic region, number of health conditions, physician visits in the prior year, and delaying or not receiving conventional care because of cost are all associated with CAM use. Overall reasons for CAM use fall into two equal categories: (1) treating a variety of health problems, especially pain, and (2) promoting general health and wellness. Much of CAM use is "self-care" and is mostly used with conventional care.

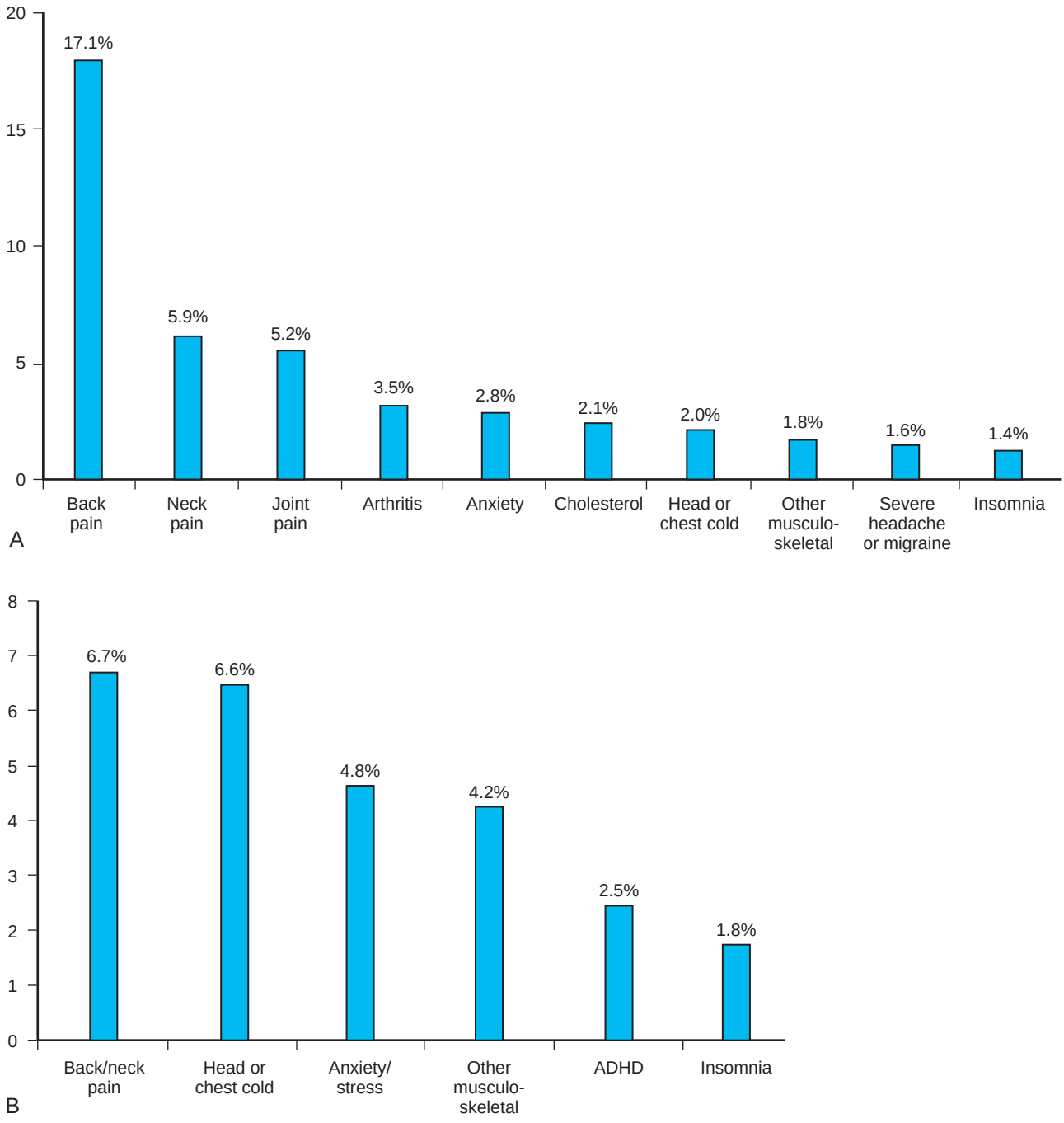


Figure 12-4 A, Disease or condition for which complementary and alternative medicine (CAM) therapies are most frequently used among adults in 2007. **B,** Disease or condition for which CAM therapies are most frequently used among children in 2007. *ADHD,* Attention-deficit/hyperactivity disorder. (From Barnes PM, Bloom B, Nahin R. Complementary and alternative medicine use among adults and children: United States, 2007. *Natl Health Stat Rep.* December 2008;(12):1-23.)

Important U.S. Reports

Key Points

- The White House Commission on complementary and alternative medicine (CAM) created a blueprint for public policy and health care transformation in 2002.
- The Institute of Medicine's 2005 CAM report and 2009 summit called for expanding research, education, and clinical application.
- CAM challenges conventional research methods.
- CAM creates opportunities for innovative studies.
- The National Institutes of Health (NIH) National Center for Complementary and Alternative Medicine 2010 Strategic Plan sets an agenda for more CAM research.

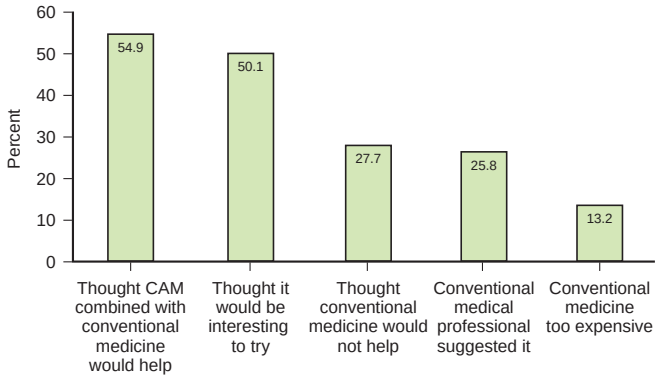


Figure 12-5 Reasons people use complementary and alternative medicine (CAM) therapies. (From Barnes PM, Powell-Griner E, McFann K, Nahin RL. Complementary and alternative medicine use among adults: United States, 2002. *Adv Data.* May 2004;(343):1-19.)

Table 12-4 Guiding Principles: 2002 White House Commission on Complementary and Alternative Medicine Policy

1. A wholeness orientation in health care delivery
2. Evidence of safety and efficacy
3. The healing capacity of the person
4. Respect for individuality
5. The right to choose treatment
6. An emphasis on health promotion and self-care
7. Partnerships are essential for integrated health care
8. Education as a fundamental health care service
9. Dissemination of comprehensive and timely information
10. Integral public involvement

Over the past two decades, several important reports have addressed CAM and integrative medicine in the United States. This section summarizes the major themes and recommendations.

WHITE HOUSE COMMISSION 2002 REPORT

The White House Commission on Complementary and Alternative Medicine Policy (WHCCAMP) 2002 report was the culmination of 18 months of in-depth work of a committee of 20 appointed commissioners. Their task was to provide the president, through the secretary of Health and Human Services, with a report containing legislative and administrative recommendations that would ensure a public policy that maximized the potential benefits of CAM to all. Specifically, the commission addressed the coordination of research to increase knowledge about CAM products; the education and training of health care practitioners in CAM; the provision of reliable and useful information about CAM practices and products to health care professionals; and guidance regarding appropriate access to and delivery of CAM. Table 12-4 lists the 10 guiding principles the commission endorsed for their process of making recommendations. The final report lists 29 recommendations and more than 100 action steps as a blueprint for shaping future CAM policy.

INSTITUTE OF MEDICINE 2005 REPORT AND 2009 SUMMIT

The Institute of Medicine (IOM) of the National Academy of Sciences acts as a private, nonprofit society of scholars engaged in research dedicated to the promotion of science and technology for the public good. Because of the American public's increasing use of CAM and the many concerns regarding safety, efficacy, and information access, a report was commissioned and a committee charged to explore the emerging scientific, policy, and practice questions. The 300-page report released in 2005 gave specific recommendations in the domains of research, education, and clinical care; new and innovative approaches to research were considered essential. The IOM Committee Chair placed a "call to action" to researchers (Bondurant and Sox, 2005, p 150):

Ignoring CAM is not an option. The widespread use of CAM by patients is a mandate to the scientific community to improve our relatively weak scientific understanding of CAM practices. Moreover, health professionals have a duty to their patients to bring these 2 worlds of contemporary medical practice together. The path to this outcome begins with adopting the same standards of evidence.

In 2009, IOM and the Bravewell Collaborative convened a 3-day summit, Integrative Medicine and the Health of the Public. More than 600 scientists, academic leaders, policy experts, health practitioners, advocates, and other participants from various disciplines examined the practice of integrative medicine, its scientific basis, and its potential for improving health. Note how the recurring themes and shared values listed in Table 12-5 resonate with the principles of family medicine and the foundations of the PCMH. Family physician Victor Sierpina shared a vision for integrative medicine and the physician of the future (Table 12-6).

NATIONAL CENTER FOR COMPLEMENTARY AND ALTERNATIVE MEDICINE STRATEGIC PLAN 2010

Now in its third cycle of 5-year strategic planning, NCCAM continues to explore CAM healing practices in the context of science, train CAM researchers, and disseminate authoritative information to public and professional communities. NCCAM's course for 2010-2014 is to create priority areas of CAM research to focus efforts that would best serve public need while meeting fiscal realities, as guided by four factors: (1) scientific promise, (2) extent and nature of practice and use, (3) amenability to rigorous scientific inquiry, and (4) potential to change health practices. A recent, new research priority is focused on symptom management, specifically the role of mind-body interventions in managing pain and common chronic disease symptoms. (Briggs and Killen, 2013)

Nahin and Strauss (2001) and Ahn and Kaptchuk (2005) discuss the unique challenges that CAM presents to conventional research approaches in evidence-based medicine.

Table 12-5 Recurring Perspectives from the Institute of Medicine Summit on Integrative Medicine and the Health of the Public

Vision of optimal health	Alignment of individuals and their health care for optimal health and healing across a full life span.
Conceptually inclusive	Seamless engagement of the full range of established health factors—physical, psychological, social, preventive, and therapeutic.
Life span horizon	Integration across the life span to include personal, predictive, preventive, and participatory care.
Person-centered	Integration around, and within, each person.
Prevention-oriented	Prevention and disease minimization as the foundation of integrative health care.
Team-based	Care as a team activity, with the patient as a central team member.
Care integration	Seamless integration of the care processes, across caregivers and institutions.
Caring integration	Person- and relationship-centered care.
Science integration	Integration across approaches to care (e.g., conventional, traditional, alternative, complementary), as the evidence supports.
Policy opportunities	Emphasis on outcomes, elevation of patient insights, consideration of family and social factors, inclusion of team care and supportive follow-up, and contributions to the learning process.

From Institute of Medicine (IOM). *Integrative medicine and the health of the public: summary of the February 2009 summit.* Washington, DC: National Academies Press; 2009, p 5.

Table 12-6 How the Physician of the Future Will Function

The Care Process Is …	**The Doctor's Role Will Be …**
Patient-centered	A navigator
Team based	Part of a multidisciplinary team
High touch, high tech	Grounded in the community
Genomic and personalized	Support of social and environmental policies promoting health
Preventive	
Integrative	
And Supports Patients Through …	**And Will Follow …**
Complementary and alternative practices	Evidence-based, outcome-focused practices
Belief that the body helps heal itself	Principles for creations of healing environments
	The lead of empowered patients

From Institute of Medicine (IOM). *Integrative medicine and the health of the public: summary of the February 2009 summit.* Washington, DC: National Academics Press; 2009, p. 43.

Many CAM study therapies are complex and heterogeneous compared with the more familiar single-drug trial of biomedicine. As such, innovative research strategies, such as those for sham acupuncture, will need to be continually developed. CAM may help the science of medicine to further evolve, as reflected on by Linde and Jonas (1999):

The continuing interface between orthodox and unorthodox medicine today provides the opportunity for new research strategies and methodologies to arise. By purposefully maintaining a creative tension between the established and frontier, we can advance scientific methods and more clearly define the boundaries and purpose of the scientific process for medicine.

Integrating Complementary and Alternative Medicine into Practice

Key Points

- Nutrition, mind-body medicine, and spirituality are core elements of integrative medicine practice.
- Strong evidence supports mind-body medicine for coronary artery disease, low back pain, and headache.
- Acupuncture is a safe and efficacious adjunctive treatment for several musculoskeletal conditions.
- Energy medicine researchers use current technologies to explore the frontiers of CAM.

Because the field of CAM and integrative medicine is so broad and includes so many different approaches and modalities, this section reviews core elements and then explores three common CAM modalities with evidence of efficacy: acupuncture, yoga, and homeopathy. Energy medicine, an important frontier of the CAM field, is also discussed.

CORE ELEMENTS OF INTEGRATIVE MEDICINE

Nutrition, mind-body medicine, and spirituality are considered core elements of an integrative medicine approach and often are applied during patient consultation. These elements also tend to be cost-effective and patient empowering. Considered the foundation of good health and enhanced healing, nutritional principles are key elements in most treatment plans.

The adage "food is medicine" is becoming ever more important as the United States, as well as other world populations, face impending epidemics of diabetes and obesity. Research has shown the health benefits and cost-effectiveness of the Mediterranean diet for primary and secondary prevention of metabolic syndrome (Kastorini et al., 2011). When the new food pyramid was released by the U.S. federal government (MyPyramid.gov), critics such as Walter Willett commented, "This is a huge lost

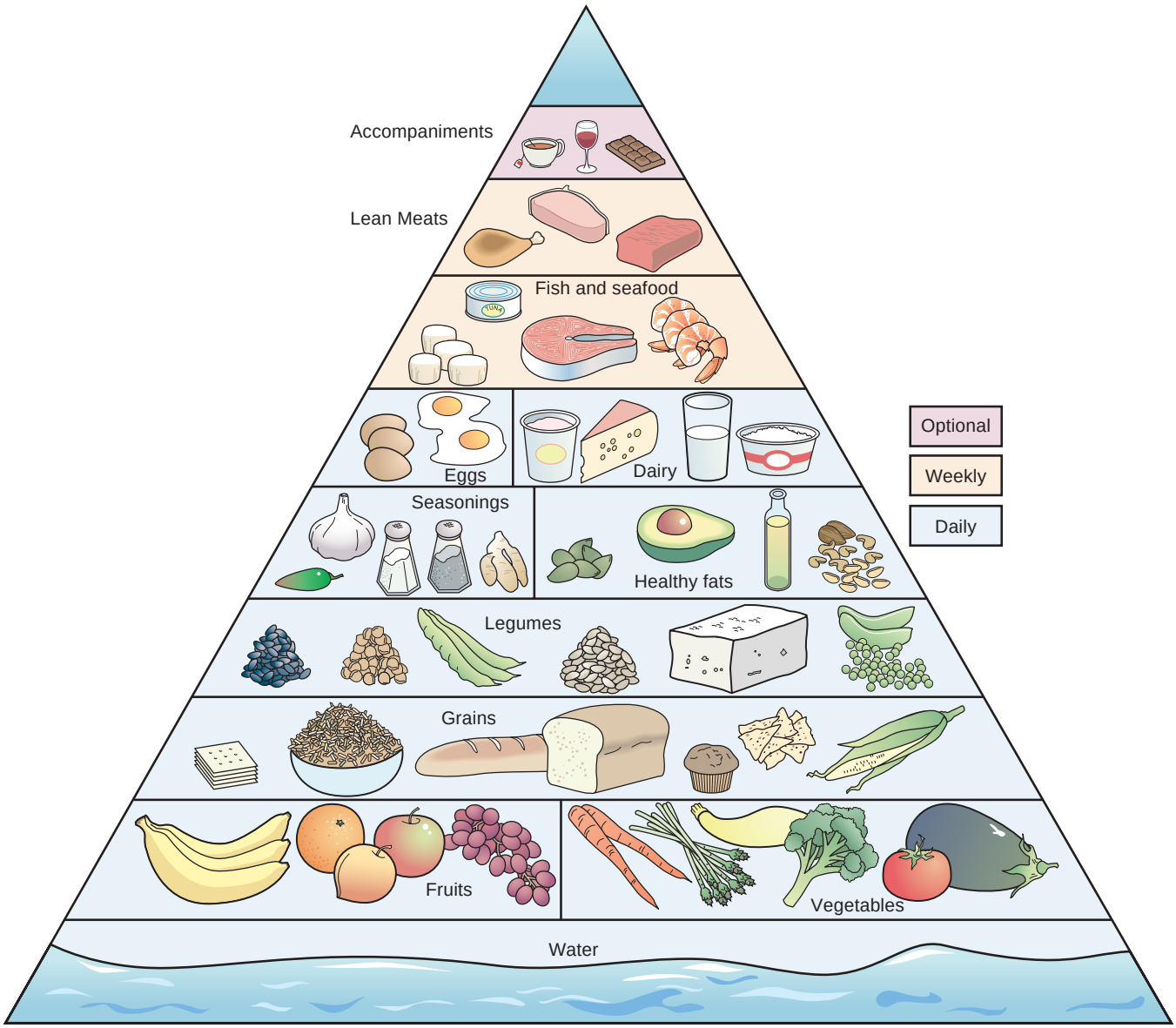


Figure 12-6 The Healing Foods Pyramid emphasizes "healing foods," which are known to have healing benefits or essential nutrients; plant-based choices, which create the base and may be accented by animal foods; variety and balance of color, nutrients, and portions sizes; a healthful environment; and "mindful eating" to savor and focus on the food being eaten. (Courtesy Monica Myklebust, MD, and Jenna Wunder, MPH, RD, University of Michigan Integrative Medicine Clinical Services, Regents of the University of Michigan. http://med.umich.edu/umim/food-pyramid/index.htm.)

opportunity to convey information about healthy food choices that could benefit Americans enormously. ... The pyramid tells nothing of healthy food choices" (Mitka, 2005, p 2581).

Other options are considered in the Healing Foods Pyramid (Figure 12-6). While developing the best nutrition advice for the diverse people seen at the University of Michigan's Integrative Medicine Clinic, family physician Monica Myklebust found various recommendations for the prevention and treatment of obesity, mood disorders, heart disease, diabetes, chronic pain, and inflammation. The result of her work is a user-friendly tool that brings all of these data together. Omega-3 fatty acids, antioxidants, medicinal seasonings, soy, chocolate, and tea are all considered. For example, green tea offers a variety of health benefits, with emerging evidence for prevention of cancer, stroke, and cardiovascular disease (Schneider and Segre, 2009). Health concerns regarding the sources of U.S. food and recommendations for organic and wild food are discussed. The Healing Foods Pyramid is available as a web-based interactive version (http://med.umich.edu/umim/food-pyramid/index.htm). The top is left open to be filled in by what individuals feel may complete and customize their pyramid.

A particular aspect of nutrition that has received increasing attention for its value in lessening inflammation is that of fish oil (i.e., omega-6 and omega-3 fatty acids). Omega-3 fatty acids consist of eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) and are mostly found in fatty fish, such as herring and salmon. Because inflammation plays a role in several common conditions, such as cardiovascular disease, asthma, arthritis, psoriasis, and inflammatory bowel disease, research has explored the role of omega-3 fatty acids in reducing symptoms and improving outcomes.

Practical applications for recommending fish oil in the primary care setting included the following (Oh, 2005):

1. The American Heart Association recommends 1 gram (g) per day for all patients with documented coronary artery disease through diet or through supplementation.
2. For patients with mild or persistent hypertriglyceridemia, use of 2 to 4 g per day of fish oil may lower levels by 20% to 50% to reach NIH National Heart, Lung, and Blood Institute (NHLBI) Adult Treatment Panel (ATP) III goals.
3. For those with rheumatoid arthritis, doses of 2.6 to 6 g per day for at least 8 to 12 weeks are optimal and may reduce or eliminate nonsteroidal antiinflammatory drug (NSAID) use.

Monitoring for clinical bleeding and for low-density lipoprotein (LDL) cholesterol and glycemic response should be considered for patients taking doses higher than 3 g/day, especially if they are diabetic. Unfortunately, because our waters are polluted with heavy metals, avoiding fish known to have high methyl mercury levels (especially by women who are pregnant and of childbearing age) is an important precaution when discussing fish oil use with patients (Williams, 2005). Along with fish oil consumption, other dietary modifications are also known to help lessen inflammation; Table 12-7 shows guidelines for prescribing an antiinflammatory diet (Rakel, 2003; Rakel and Rindfleisch, 2006).

Table 12-7 Guidelines in Prescribing an Antiinflammatory Diet

1. Omega-3 and omega-6 fatty acids are essential polyunsaturated fatty acids (i.e., they cannot be made by the human body).
2. The ratio of omega-6 to omega-3 fatty acids in the average Western diet has steadily increased in the past 100 years. The standard American diet has a ratio of omega-6 to omega-3 of more than 20:1, but the ideal range is less than 4:1.
3. To follow an antiinflammatory diet, take the following steps:
   a. Decrease red meat, poultry, and dairy intake.
   b. Increase the intake of omega-3 fatty acids, such as cold-water fish, flaxseed, walnuts, and green leafy vegetables.
   c. Even one meal of cold-water fish weekly reduces the risk of cardiac arrest. Consuming fish twice each week is ideal. If this is not possible, fish oil supplements can be taken at a dose of 500-2000 mg twice daily.
   d. An alternative is ground flax seeds or flaxseed oil. Flax should be freshly ground because it can spoil after exposure to light or heat. Supplementation can be provided with 500-2000 mg of flax oil twice daily.
   e. Reduce foods that contain omega-6 fatty acids, including the following:
      (1) Margarine.
      (2) Oils made from corn, cottonseed, grapeseed, peanut, safflower, sesame, soybean, or sunflower (avoid partially hydrogenated oils).
      (3) Foods with a long shelf life, such as crackers and chips.
   f. Cook with monounsaturated oils such as olive or canola oil.
4. Consider this dietary approach to treat the following:
   a. Heart disease or associated risk factors
   b. Inflammatory rheumatic disorders
   c. Autoimmune diseases
   d. Chronic pain
5. Low-carbohydrate, high-protein diets tend to have high omega-6 fat content and should be used with caution.
6. It may take up to 6 months to see the full clinical effects of an antiinflammatory diet.

From Rakel D, Rindfleisch A. Integrative medicine. In: Rakel RE, ed. *Essential family medicine: fundamentals and case studies*. Philadelphia: Saunders; 2006, pp. 132-141.

MIND-BODY MEDICINE

The area of CAM with perhaps the most extensive research base is mind-body medicine, which encompasses a diverse array of practices that overlap many traditions and whole systems of care. Astin and colleagues (2003, p 131) concluded, "There is now considerable evidence that an array of mind-body therapies can be used as effective adjuncts to conventional medical treatment for a number of common clinical conditions." They found strong evidence to support mind-body approaches in the treatment of low back pain, coronary artery disease, headache, insomnia, preparing for surgical procedures, and in the management of disease-related symptoms of cancer, arthritis, and urinary incontinence.

Given the relative ease of learning and employing such techniques, NCCAM has made research into mind-body medicine a priority. Mind-body medicine approaches may enhance healing and optimize health. They may be recommended to most patients for health maintenance and disease management and could easily be incorporated into a PCMH through group visits or health coaches. In addition, a study of 70 primary care physicians who participated in an intensive mindfulness education program over 1 year showed dramatic improvements in mindfulness skills, burnout, mood disturbance, and empathy (Krasner et al., 2009). An accompanying editorial noted that the study "demonstrates that training physicians in the art of mindful practice has the potential to promote physician health *through* work." Also, recognizing and enhancing the meaning derived from the practice of medicine using these skills may "protect against burnout and promote patient-centered care for the benefit of both physicians and their patients" (Shanafelt, 2009, p 1340). A recent abbreviated mindfulness intervention adapted for primary care clinicians was associated with reductions in indicators of job burnout, depression, anxiety, and stress (Fortney et al., 2013) and a multicenter study found that clinicians who rate themselves more mindful engage in more patient-centered communication and have more satisfied patients (Beach et al., 2013).

Online **eAppendix 12-2** highlights a well-known and well-studied mind-body technique called *mindfulness-based stress reduction* (MBSR) and includes a short audio sample of mindful breath work for the interested reader to try.

SPIRITUALITY

Another area thought to be integral to a whole-patient integrative medicine approach to care is spirituality. This broad and controversial subject is well reviewed (e.g., Sierpina and Sierpina, 2004); some key issues are considered here. Working definitions and terms from the Samueli Conference on Definitions and Standards in Healing Research (Dossey, 2003) include the following:

- ***Spirituality*** encompasses the feelings, thoughts, experiences, and behaviors that arise from a search for that

which is generally considered sacred or holy. Spirituality is usually considered to involve a sense of connection with an absolute, imminent, or transcendent spiritual force, however named, as well as the conviction that meaning, value, direction, and purpose are valid aspects of the universe.

- ***Religion*** is the codified and ritualized beliefs and behaviors of those involved in spirituality, usually taking place within a community of like-minded individuals.
- ***Prayer*** is communication with an absolute, imminent, or transcendent spiritual force, however named. Such communication may take a variety of forms and may be theistic or nontheistic in nature, as in some forms of Buddhism. *Intercessory prayer* is an appeal to such a force to influence another person or thing. *Healing prayer* is an appeal to such a force for the healing and recovery of self or others. *Directed prayer* is offered with a specific outcome in mind. *Nondirected prayer* is offered with no specific outcome in mind, such as, "Thy will be done," or "May the best outcome prevail."

Table 12-8 Spiritual Assessment Tools

FICA MNEMONIC

F: Faith or belief—What is your faith or belief?
I: Importance and influence—Is it important in your life? How?
C: Community—Are you part of a religious community?
A: Awareness and addressing—What would you want me as your physician to be aware of? How would you like me to address these issues in your care?

HOPE MNEMONIC

H: Hope—What are your sources of hope, meaning, strength, peace, love, and connectedness?
O: Organized—Do you consider yourself part of an organized religion?
P: Personal spirituality and practices—What aspects of your spirituality or spiritual practices do you find most helpful?
E: Effects—How do your beliefs affect the kind of medical care you would like me to provide?

THREE QUESTIONS

1. What helps you get through tough times?
2. Who do you turn to when you need support?
3. What meaning does this experience have for you?

Given recent statistics on prayer from the 2002 NHIS and Gallup Polls over the past six decades (showing that more than 90% of Americans believe in God or a universal spirit), it is not surprising that proponents and critics have agreed that taking a spiritual history is essential to a comprehensive and culturally sensitive medical consultation. Just as challenging as asking patients about substance abuse, domestic violence, and sexual practices, a spiritual history helps elucidate how spiritual beliefs or religious practices may impact health and health-related choices. Such discussions may be most relevant during times of a new diagnosis, loss of a loved one, onset of depression, or terminal illness. Continuity of care and sensitivity to the biopsychosocial aspects of a patient's life foster the rapport to facilitate such discussion. Such inquiry may also help engage support systems or identify deep conflicts. Although not all physicians may be comfortable addressing spirituality with their patients, referrals to colleagues in pastoral care and chaplaincy are options to consider.

Interviewing seven physicians recognized as leaders in the field of healing research, Egnew (2005, pp 258 and 255) found that "healing was defined in terms of developing a sense of personal wholeness that involves physical, mental, emotional, social and spiritual aspects of human experience." The central theme in the responses provided an operational definition of healing: "Healing is the personal experience of the transcendence of suffering."

Various models have been suggested as guides to taking the spiritual history (Table 12-8) (Anandarajah and Hight, 2001; Kinney, 1999; Puchalski and Romer, 2000).

ACUPUNCTURE, YOGA, AND HOMEOPATHIC REMEDIES

Three areas of CAM are most likely to be encountered in the family physician's office: acupuncture, yoga, and homeopathic remedies. As shown in Table 12-9, these three areas are components of whole systems or *nonallopathic* medical systems of care: *acupuncture* within traditional Chinese medicine (TCM), *yoga* as a part of Ayurveda, and *homeopathic remedies* as the mainstay of homeopathy. Many family physicians have pursued professional training in these fields and are now integrating new skills and perspectives into their practice. The Society of Teachers of Family Medicine (STFM) *Group on Hospital Medicine and Procedural Training* has proposed that acupuncture become an advanced procedure within the scope of family medicine training (Kelly, 2009).

Although challenging to research, trials have shown acupuncture efficacious as an adjunctive therapy in osteoarthritis of the knee (Berman et al., 2004) and as a complement to standard therapy for the debilitating effect of pelvic girdle pain during pregnancy (Elden et al., 2005). Cochrane reviews have shown that acupuncture benefits patients with chronic low back pain, neck pain, and headache (migraine and tension) (Kelly, 2009). A meta-analysis evaluating 33 randomized controlled trials (RCTs) of acupuncture for acute and chronic low back pain concluded that acupuncture effectively relieves chronic low back pain, although no evidence suggests that it is more effective than other active therapies (Manheimer et al., 2005). A more recent review found acupuncture a reasonable referral option for chronic pain (Vickers et al., 2012).

Excellent reviews of acupuncture's theory, efficacy, and practice (Kaptchuk, 2002; Nielsen and Hammerschlag, 2004) cite the 1997 NIH Consensus Development Panel findings on acupuncture. After reviewing all available evidence from RCTs up to 1997, the panel concluded that clear evidence shows that acupuncture is efficacious for adult postoperative and chemotherapy nausea and vomiting and for postoperative dental pain. The panel also reported that acupuncture should be considered a useful adjunct for addiction, stroke rehabilitation, osteoarthritis, headache, low back pain, tennis elbow, menstrual cramps, carpal tunnel, and fibromyalgia (NIH, 1998).

Yoga, a widely popular and rapidly increasing CAM practice in the United States, has its roots in ancient India and is a Sanskrit word that means "yoke" or "union." The original goal of practicing these postures was to purify and

Table 12-9 Nonallopathic Medical Systems

TRADITIONAL CHINESE MEDICINE

Philosophy: Qi and other substances flow through the body through various channels, or meridians. Yin and yang (i.e., passive and active) and the five elements (i.e., wood, fire, earth, metal, and water) have competing influences on various body parts. Excesses or deficiencies of these cause illness. Pain is blocked qi.

Diagnostics: A specific diagnosis is not needed. Information is gathered by the four kanbing: looking (i.e., observation of posture, coloring, gait, demeanor, appearance of the tongue); asking about the status of the 11 basic areas, including body temperature, sleep, fluid metabolism, pain, and digestion; listening to the body's sounds, including breathing, voice, and peristalsis; and palpation of the affected site and the pulse. The pulse is thought to have three parts that correlate with the status of different parts of the body.

Therapeutics: Acupuncture is the insertion of needles into various points along the qi meridians. Moxibustion is the burning of moxa *(Artemisia vulgaris)* on or near meridian points. Gua sha is pressing the skin with a hard, round-edged instrument to create petechiae. Cupping is the creation of a vacuum in a cup and applying the vacuum pressure to the skin. Tui na is manipulation or massage with specific hand movements. Plum blossom is a cluster of needles that is moved along a meridian. Herbal therapies typically are combinations of multiple herbs mixed specifically for the individual patient.

AYURVEDA

Philosophy: The concept emerged in India 5000 years ago, and it incorporates five elements and three types of energy, or doshas. *Vata* is the dosha associated with movement, *pitta* governs metabolism, and *kapha* maintains structure. Diet, lifestyle, and relationships shape a person's energy and define health status. Ancient texts divide illnesses according to subspecialties, many of which are the same as for biomedicine.

Diagnostics: Factors that may have weakened the person's defenses are considered, such as genetics, trauma, diet, habits, seasonal affects, climate, age, balance of the doshas, emotions, metabolism, and acts of God. A full physical examination includes evaluation of pulses, speech and voice, eyes, tongue, and the appearance of the urine and feces.

Therapeutics: Approaches include prevention, detoxification, reestablishment of one's unique constitutional balance. Foods, emotions, and behaviors are used to adjust dosha levels. Panchakarma is used to remove aggravated doshas and toxins. Components of panchakarma include therapeutic vomiting, use of purgatives or laxatives, nasal administration of medications, blood purification (traditionally by blood-letting, now more often with teas), and therapeutic enemas.

NATUROPATHY

Philosophy: The body is able to heal itself by means of the healing power of nature. Healing occurs through a diet of natural, unrefined foods; adequate exercise; avoidance of environmental toxins; proper elimination of body wastes; and positive thoughts and emotions. Key principles in patient care include doing no harm, taking a preventive approach, and focusing on maintenance of health rather than just on the treatment of disease. The naturopath's goals are to educate, empower, and motivate.

Diagnostics: Methods may draw from any number of approaches, including laboratory testing not commonly performed in a biomedical setting.

Therapeutics: Approaches can include nutrition, botanicals, homeopathy, Chinese medicine, physical medicine (e.g., ultrasound, massage, manipulation), hydrotherapy (e.g., baths, steams, wraps, colonic irrigation), and various detoxification regimens.

HOMEOPATHY

Philosophy: Homeopathy is based on the law of similars, which holds that medicines can produce the same symptoms in healthy people that they cure in those who are ill. Remedies are used in the smallest quantity possible, which can often mean they are diluted to the point that not even a molecule of the original therapeutic substance remains in solution.

Diagnostics: A detailed history is taken relating to the specific nature of symptoms. For example, otitis media is treated differently based on the mood of the child, which ear is sore, the nature of the fever, and the nature of the pain.

Therapeutics: A remedy that has elicited a similar set of symptoms in a healthy patient is given in minute quantity to the ill person. The degree to which a remedy is diluted is given as a Roman numeral. For example, a 6X solution has been diluted to one-tenth of its strength six times (i.e., to 10^{-6} of the original strength), and a 200C solution has been diluted to 1/100 of its original strength 200 subsequent times (i.e., to 10^{-400} of its original strength).

From Rakel D, Rindfleisch A: Integrative medicine. In: Rakel RE, ed. *Essential family medicine: fundamentals and case studies.* Philadelphia: Saunders; 2006, pp 132-141.

prepare the body for higher states of consciousness. *Hatha yoga*, as described in Table 12-10 along with other types of movement therapies, has many different styles and is the most popular form taught and practiced in the United States today. Because most yoga instructors are not medical professionals, it is recommended to refer a patient to a teacher with several years' experience. A study of the efficacy of yoga on pregnancy outcome ($N = 335$) concluded that an integrated approach to yoga during pregnancy was safe and that it improved birth weight and decreased preterm labor and intrauterine growth retardation with no complications (Narendran et al., 2005). A recent study of 90 patients with chronic low back pain who participated in a 24-week trial of yoga twice a week showed those receiving the yoga intervention experienced decreased levels of pain, functional disability, and depression (Williams et al., 2009). The International Association of Yoga Therapists (IAYT) is a worldwide organization for yoga teachers, therapists, and researchers (www.iayt.org). The Yoga Alliance (www.yogaalliance.org), formed in 1999, sets minimum training standards for yoga teachers. Both organizations provide sound resources for professionals and the public.

Perhaps the most controversial of CAM therapies, *homeopathy* seems to defy biomedicine's attempts to decipher its mechanism of action. Particularly perplexing is the concept that the more dilute the remedy, the more potent is its effect. Founded by the German physician Samuel Hahnemann (1755-1843), homeopathy is still widely accepted and practiced in Europe and is now experiencing a renaissance in the United States. A brilliant linguist and scholar, Dr. Hahnemann developed the Principle of Similars, in which "like cures like" based on his medical translation work and personal experience of malaria symptoms after taking *Cinchona* bark, which was then the treatment for the disease. A critical overview of homeopathy by Jonas and colleagues (2003) reviewed the research regarding specific conditions

Table 12-10 Commonly Used Movement Therapies

Therapy*	Description	Research
Hatha yoga	Focuses on the use of postures (asanas) and breathing exercises (pranayama); traditionally used in India to purify the body and maximize the impact of meditation practice; many different schools; must be used with caution by those with glaucoma, retinal detachment, or at high risk for muscle strain or fracture.	Most trials are quite small. Positive benefits likely for musculoskeletal and other types of pain; lowering autonomic nervous system sympathetic tone; decreasing histamine effects of FEV_1 in asthmatic patients; reducing blood pressure; improving headaches, diabetes, osteoarthritis, rheumatoid arthritis; overall improvement in balance, endurance, and vitality.
Tai chi	Developed more than 5000 years ago; movement and breathing, often associated with specific flowing movement patterns, are used to affect the flow of energy, or qi.	Useful adjunctive therapy for arthritis and cardiovascular disease. Helpful for improving postural stability and decreasing fall risk in older adults.
Qigong (Qi gong)	Part of traditional Chinese medicine; also used to cultivate qi; includes breathing exercises, meditation, and physical movement; used in the martial arts and to generate energy to be used in healing.	Most studies conducted in China. Potentially useful for hypertension, decreasing overall stroke and mortality rates compared with controls, decreasing peripheral vascular resistance, increasing bone density; improvement of blood flow to brain (e.g., adjunctive treatment for memory loss, dizziness, insomnia, vertigo); improvement of cardiac output, ejection fraction, and valve function.
Feldenkrais	Developed by Moshe Feldenkrais in the 1950s; gentle movements and manipulation enlisted to retrain the body with new movement patterns.	Limited randomized trial–based research. Used to promote flexibility and posture, decrease back pain, and improve vocal cord function.

From Rakel D, Rindfleisch A. Integrative medicine. In: Rakel RE, ed. *Essential Family Medicine: Fundamentals and Case Studies*. Philadelphia: Saunders; 2006, pp 132-141.

FEV_1, Forced expiratory volume in 1 second.

*Other therapies include *Alexander technique,* which uses minimal effort to maximize efficiency of muscle use and alleviate problems associated with poor posture, and *Pilates,* which also uses exercises and other techniques used to strengthen postural muscles.

and the placebo effect. After analyzing systematic reviews of clinical trials, the authors concluded, "Despite skepticism about the plausibility of homeopathy, some randomized, placebo-controlled trials and laboratory research report unexpected effects of homeopathic medicine. However, the evidence on the effectiveness of homeopathy for specific clinical conditions is scant, is of uneven quality, and is generally poorer quality than research done in allopathic medicine" (p 397).

Known for his groundbreaking research showing homeopathic treatment of allergic rhinitis more effective than placebo (Taylor et al., 2000), David Reilly of Glasgow, Scotland, commented on the increasing scientific validation for homeopathy over the past decade. Noting that studies reviewed show positive evidence for overall effect and citing the growing prospective, observational research that indicates beneficial outcomes, Reilly (2005) points out that homeopathy can offer therapeutic options when conventional care has failed or reached a plateau, no conventional treatments exist, conventional treatments are contraindicated, side effects of conventional treatments are not tolerated, and patients are reluctant to accept conventional care. An important distinction clouds other areas of medical research: "The two dimensions of care need to be considered: the direct effects of the remedy and the therapeutic impact of the method of approach on the patient" (p 30). Believing that the homeopathic approach is helping to reintroduce a holistic perspective in medical practice, Reilly concludes, "The evidence mosaic for homeopathy reinforces clinicians' and patients' experiential knowledge that this approach can make a valuable contribution to care, especially when applied with a whole person perspective and integrated with conventional knowledge" (p 31).

ENERGY MEDICINE: FRONTIER SCIENCE OF COMPLEMENTARY AND ALTERNATIVE MEDICINE

The practice of CAM presents many challenges to Western science. How does acupuncture work, and what is *qi*? How can dilute homeopathic remedies induce effects on biologic systems? What are the *chakras,* or energy centers, so integral to yoga and Ayurveda? These mysteries present us with opportunities for new discoveries and an expansion of our healing capacities **(eAppendix 12-3)**. Many scientists are showing how research in biophysics and biomagnetism is helping to elucidate the subtle energies of biologic systems, including those of humans. Advanced technologies such as functional magnetic resonance imaging and infrared thermography are demonstrating amazing images that seem to correlate with empiric knowledge **(eAppendix 12-4)**.

Open-minded scientists are helping to bridge the worlds of CAM and conventional medicine by linking research findings to those of clinical practice (Oschman, 2002). "Let us document each of these fascinating clues. We will connect the dots by describing an information system in the body that is the missing link for many phenomena that have seemed hopelessly inexplicable in the past. It is a system that is responsible for extraordinary feasts of perception, movement, and healing" (Oschman, 2003, p. xiv).

Conclusion

Complementary and alternative medicine is an evolving area of health care used by approximately 4 in 10 adults and 1 in 9 children in the United States. As a diverse system

Table 12-11 Precautions in Complementary and Alternative Medicine

1. *Primum non nocere* (first, do no harm).
2. Patients may encounter complications if they abandon effective, conventional therapies in favor of complementary and alternative medicine (CAM).
3. Medicolegal issues and certification or qualification requirements of practitioners are important topics, not covered in this chapter.

of varied approaches and philosophies of healing, CAM is usually incorporated into conventional health care as integrative medicine. CAM presents opportunities to expand the current research paradigm to meet the challenges of studying its multidimensional approach to health and healing. Prominent organizations such as the IOM and World Health Organization (WHO) have placed a call to action to the medical community to advance knowledge and clinical applications in this field. Family physicians, specialists in caring for the whole person though a continuous, healing relationship, are in the ideal discipline to advance the integration of safe and effective CAM into their repertoire to optimize the health of their patients (Table 12-11). Ultimately, complex terminology will subside as the essence of integrative medicine becomes good family medicine.

KEY TREATMENT

- Fish oil supplementation can benefit heart health (Bucher et al., 2002; Wang et al., 2004), hypertriglyceridemia (Balk et al., 2004), and rheumatoid arthritis (Fortin et al., 1995; MacLean et al., 2004) (SOR: A).
- Acupuncture should be considered as a treatment option for common painful conditions such as chronic low back pain (Furlan et al., 2005; Yuan et al., 2008), neck pain (Fu et al., 2009, Trinh et al., 2006), and headache (migraine, tension) (Linde et al., 2009a, 2009b) (SOR: A).
- Green tea is associated with decreased risk of stroke and cardiovascular disease (Kuriyama et al., 2006) and may help prevent cancer of the breast (Sun et al., 2006a), gastrointestinal tract (Sun et al., 2006b), and prostate (Kurahashi et al., 2008) (SOR: B).
- Yoga reduces functional disability, pain, and depression in people with chronic low back pain (Williams et al., 2009) (SOR: B).
- Mindful communication may improve physician well-being and attitudes associated with patient-centered care (Kearney et al., 2009; Krasner et al., 2009) (SOR: C).

Summary of Additional Online Content

The following content is available at www.expertconsult.com:

eFigures 12-1 to 12-10

E-APPENDIX 12-1 GLOSSARY OF COMPLEMENTARY AND ALTERNATIVE MEDICINE (CAM) TERMS

E-APPENDIX 12-2 MIND-BODY EXPERIENTIAL AND MINDFULNESS RESEARCH

E-APPENDIX 12-3 ENERGY HEALING MODALITIES

E-APPENDIX 12-4 HIGHLIGHTS OF ACUPUNCTURE RESEARCH AND FINDINGS

References

The complete reference list is available at www.expertconsult.com.

Web Resources

http://www.abpsus.org/integrative-medicine American Board of Integrative Medicine credentials physicians in the field of integrative medicine.

www.integrativemedicine.arizona.edu Arizona Center for Integrative Medicine. Offers innovative education in integrative medicine.

www.imconsortium.org Consortium of Academic Health Centers for Integrative Medicine. Includes 57 member institutions throughout North America who are advancing the field of integrative medicine in the domains of education, research, and clinical care.

www.nccam.nih.gov National Center for Complementary and Alternative Medicine, part of the National Institutes of Health (NIH). Offers excellent complementary and alternative medicine (CAM) resources for both patients and clinicians.

http://nccam.nih.gov/timetotalk/ "Time to Talk." NCCAM's educational campaign to encourage patients and clinicians to discuss their use of CAM. Download a toolkit for your office.

http://apps.who.int/iris/bitstream/10665/92455/1/9789241506090_eng.pdf World Health Organization (WHO) 10-year plan for Traditional and Complementary Medicine (T&CM).

EAPPENDIX

12-1 Glossary of Complementary and Alternative Medicine (CAM) Terms

Acupuncture Family of procedures involving stimulation of anatomic points on the body by a variety of techniques. American practices of acupuncture incorporate medical traditions from China, Japan, Korea, and other countries. The acupuncture technique that has been most studied scientifically involves penetrating the skin with thin, solid, metallic needles that are manipulated by the hands or by electrical stimulation.

Alexander technique Movement therapy that uses guidance and education on ways to improve posture and movement. The intent is to teach a person how to use muscles more efficiently to improve the overall functioning of the body. Examples of the Alexander technique as CAM are using it to treat low back pain and the symptoms of Parkinson disease.

Alternative provider, alternative practitioner Someone who is knowledgeable about a specific alternative health practice. This person provides care or gives advice about its use and usually receives payment for his or her services. For some practices, the provider may have received formalized training and has been certified by a licensing board or related professional association. For example, a practitioner of biofeedback (biofeedback therapist) usually has received training in psychology and physiology and may be certified by the Biofeedback Certification Institute of America.

Ayurveda System of medicine that originated in India several thousand years ago. In the United States, Ayurveda is considered a type of CAM and a whole medical system. As with other such systems, it is based on theories of health and illness and on ways to prevent, manage, or treat health problems. Ayurveda aims to integrate and balance the body, mind, and spirit (thus some view it as "holistic"). This balance is believed to lead to contentment and health and to help prevent illness. However, Ayurveda also proposes treatments for specific health problems, whether they are physical or mental. A chief aim of Ayurvedic practices is to cleanse the body of substances that can cause disease, and this is believed to help reestablish harmony and balance.

Biofeedback Technique that uses simple electronic devices to teach clients how to consciously regulate bodily functions, such as breathing, heart rate, and blood pressure, to improve overall health. Biofeedback is used to reduce stress, eliminate headaches, recondition injured muscles, control asthmatic attacks, and relieve pain.

Botanica Traditional healer who supplies healing products, sometimes associated with spiritual interventions.

Chelation therapy Chemical process in which a substance is used to bind molecules, such as metals or minerals, and hold them tightly so that they can be removed from a system, such as the body. In medicine, chelation has been scientifically proven to rid the body of excess or toxic metals. For example, a person who has lead poisoning may be given chelation therapy to bind and remove excess lead from the body before it can cause damage.

Chiropractic care Adjustment of the spine and joints to influence the body's nervous system and natural defense mechanisms to alleviate pain and improve general health. It is primarily used to treat back problems, headaches, nerve inflammation, muscle spasms, and other injuries and trauma.

Chiropractic manipulation Form of health care that focuses on the relationship between the body's structure, primarily of the spine, and function. Doctors of chiropractic, who are also called chiropractors or chiropractic physicians, use a type of hands-on therapy called manipulation (or adjustment) as their core clinical procedure.

Complementary and alternative medicine (CAM) Therapies not usually taught in U.S. medical schools or generally available in U.S. hospitals. Also called *integrative,* these therapies include a broad range of practices and beliefs such as acupuncture, chiropractic care, relaxation techniques, massage therapy, and herbal remedies. They are defined by the National Center for Complementary and Alternative Medicine as a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine.

Curandero Type of traditional folk healer. Originally found in Latin America, curanderos specialize in treating illness through the use of supernatural forces, herbal remedies, and other natural medicines.

Deep breathing Slow and deep inhalation through the nose, usually to a count of 10, followed by slow and complete exhalation for a similar count. The process may be repeated 5 to 10 times, several times a day.

Energy healing therapy Channeling of healing energy through the hands of a practitioner into the client's body to restore a normal energy balance and, therefore, health. Energy healing therapy has been used to treat a wide variety of ailments and health problems and is often used with other alternative and conventional medical treatments.

Espiritista Traditional healer who assesses a patient's condition and recommends herbs or religious amulets to improve physical or mental health or to help overcome a personal problem.

Feldenkrais Movement therapy that uses a method of education in physical coordination and movement. Practitioners use verbal guidance and light touch to teach the method through one-on-one lessons and group classes. The intent is to help the person become more aware of how

the body moves through space and to improve physical functioning.

Guided imagery Series of relaxation techniques followed by the visualization of detailed images, usually calm and peaceful in nature. If used for treatment, individuals will visualize their body free of the specific problem or condition. Sessions typically are 20 to 30 minutes and may be practiced several times a week.

Hierbero Traditional healer or practitioner with knowledge of the medicinal qualities of plants; also called *yerbera.*

Homeopathy System of medical practices based on the theory that any substance that can produce symptoms of disease or illness in a healthy person can cure those symptoms in a sick person. For example, a person with insomnia may be given a homeopathic dose of coffee. Administered in diluted form, homeopathic remedies are derived from many natural sources, including plants, metals, and minerals.

Hypnosis Altered state of consciousness characterized by increased responsiveness to suggestion. The hypnotic state is attained by first relaxing the body, then shifting attention toward a narrow range of objects or ideas as suggested by the hypnotist or hypnotherapist. The procedure is used to effect positive changes and to treat numerous health conditions, including ulcers, chronic pain, respiratory ailments, stress, and headaches.

Macrobiotic diet Low-fat diet that emphasizes whole grains and vegetables and restricts the intake of fluids; of particular importance is the consumption of fresh, nonprocessed foods.

Massage Manipulation of muscle and connective tissue to enhance function of those tissues and promote relaxation and well-being.

Meditation Group of techniques, most of which started in Eastern religious or spiritual traditions. In meditation, persons learn to focus their attention and suspend the stream of thoughts that normally occupy the mind. This practice is believed to result in a state of greater physical relaxation, mental calmness, and psychological balance. Practicing meditation can change how a person relates to the flow of emotions and thoughts in the mind.

Native American healer Traditional healer who uses information from the "spirit world" to benefit the community; patients especially seek to find relief or a cure from illness or to find spiritual guidance; also called *medicine man.*

Naturopathy Alternative medical system that proposes that a healing power in the body establishes, maintains, and restores health. Practitioners work with patients to support this power through treatments such as nutrition and lifestyle counseling, dietary supplements, medicinal plants, exercise, homeopathy, and treatments from traditional Chinese medicine (TCM).

Nonvitamin, nonmineral, natural products Taken by mouth, these natural products contain a dietary ingredient other than vitamins and minerals, intended to supplement the diet; examples include herbs or herbal medicine (as single herbs or mixtures), other botanical products (e.g., soy or flax products), and dietary substances (e.g., enzymes). Among the most popular are echinacea, *Ginkgo biloba,* ginseng, feverfew, garlic, kava, and saw palmetto; garlic has been used to treat fever, sore throat, digestive ailments, and arteriosclerosis.

Ornish diet High-fiber, low-fat vegetarian diet that promotes weight loss and health by controlling what is eaten, not by restricting the intake of calories. Fruits, beans, grains, and vegetables can be eaten at all meals; nonfat dairy products such as skim milk, nonfat cheeses, and egg whites are consumed in moderation. Products such as oils, avocados, nuts and seeds, and meats are avoided.

Osteopathic manipulation Full-body system of hands-on techniques to alleviate pain, restore function, and promote health and well-being.

Pilates Movement therapy that uses a method of physical exercise to strengthen and build control of muscles, especially those used for posture. Awareness of breathing and precise control of movements are integral components of Pilates. Special equipment, if available, is often used.

Progressive relaxation Technique used to relieve tension and stress by systematically tensing and relaxing successive muscle groups.

Qi gong Ancient Chinese discipline combining the use of gentle physical movements, mental focus, and deep breathing directed toward specific parts of the body. Performed in repetitions, the exercises are normally performed two or more times a week for 30 minutes at a time.

Reiki Energy medicine practice that originated in Japan. The practitioner places the hands on or near the person receiving treatment, with the intent to transmit *ki* (qi), believed to be life-force energy.

Shaman Traditional healer who is said to act as a medium between the invisible spiritual world and the physical world. Most gain knowledge through contact with the spiritual world and use the information to perform divination, influence natural events, and heal sick or injured persons.

Sobador Traditional healer who uses massage and rub techniques to treat patients.

Tai chi Mind-body practice that originated in China as a martial art. The person moves the body slowly and gently while breathing deeply and meditating (tai chi is sometimes called "moving meditation"). Many practitioners believe that tai chi helps the flow throughout the body of a proposed vital energy called *qi.* A person practicing tai chi moves her body in a slow, relaxed, and graceful series of movements. Persons can practice on their own or in a group. The movements make up what are called *forms* (or routines).

Traditional healer Person who employs any of a number of ancient medical practices based on indigenous theories, beliefs, and experiences and handed down from generation to generation. The methods employed by each type of traditional healer have evolved to reflect the different philosophical backgrounds and cultural origins of the healer.

Trager psychophysical integration Movement therapy in which practitioners apply a series of gentle, rhythmic rocking movements to the joints. They also teach physical and mental self-care exercises to reinforce the proper movement of the body. The intent is to release physical tension and increase the body's range of motion. An example of Trager psychophysical integration as CAM is using it to treat chronic headaches.

Vegetarian diets Vegetarian diets are totally devoid of meat, red or white. There are, however, numerous variations on the nonmeat theme. For example, some vegetarian diets are restricted to plant products only, whereas others

include eggs and dairy products. Another variation limits consumption to raw fruit, sometimes supplemented with nuts and vegetables. Finally, a number of vegetarian diets prohibit alcohol, sugar, caffeine, or processed foods.

Yerbera Practitioner with knowledge of the medicinal qualities of plants; also called *hierbero.*

Yoga A combination of breathing exercises, physical postures, and meditation to calm the nervous system and balance body, mind, and spirit. The sessions last about 45 minutes and usually are performed in classes once a week (or more often).

EAPPENDIX

12-2 Mind-Body Experiential and Mindfulness Research: Mindfulness Meditation Practice CD

Content

Awareness of breathing (approximately 15 minutes)
Bringing the breath into everyday life (approximately 15 minutes)

Production

Copyrighted 1999
Led by Saki F. Santorelli, EdD, Executive Director
Center for Mindfulness in Medicine, Health Care, and Society
University of Massachusetts Medical School
55 Lake Avenue North
Worcester, MA
http://www.umassmed.edu/content.aspx?id=41252

About the Center for Mindfulness

Directed by Dr. Saki F. Santorelli, the Center for Mindfulness is an innovative leader in mind-body medicine and the integration of mindfulness into key areas of modern life, including mainstream medicine, health care, academic medical and professional education, public and private school education, corporate and nonprofit leadership, and service to broad segments of society.

Established in 1995, the Center emerged as an outgrowth of the acclaimed Stress Reduction Clinic, the oldest and largest academic medical center-based stress reduction program in the world, founded by Dr. Jon Kabat-Zinn in 1979. For more than 30 years, the Center has pursued an active research program that has focused on understanding the potential efficacy of mindfulness and the mechanisms through which mindfulness may work, publishing many peer-reviewed papers as well as scientific abstracts and books. Each year the Center hosts an annual international scientific conference attended by professionals from six continents.

In the course of three decades, more than 20,000 people have completed the Stress Reduction Program. They have been referred by more than 5000 physicians and, as well, through self-referral. Likewise, more than 9000 health care professionals and educators have participated in training programs through *Oasis*—the Center's institute for mindfulness-based professional education and innovation. In parallel, the Center has developed a range of innovative programs for leaders in business, government, and nonprofit organizations, educators, attorneys and judicial officials, inmates and correctional staff, clergy, and Olympic and professional athletes.

This work has encouraged the creation of more than 250 *mindfulness-based stress reduction* (MBSR) programs worldwide and has inspired researchers across the planet to investigate the potential efficacy of MBSR and other mindfulness-based interventions. The work of the Center has been featured in the PBS Bill Moyers' documentary, *Healing and the Mind*, on NBC *Dateline*, and on ABC's *Evening News* and *Chronicle* programs, as well as on the *Oprah Winfrey Show*.

Bibliographic Selections from the Center for Mindfulness in Medicine, Health Care, and Society and Other Researchers

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EAPPENDIX

12-3 *Energy Healing Modalities**

Energy Modality	Description and Comments
Meridian-based therapies	Meridians are energy pathways located throughout the body. Points on a given pathway are interconnected and can influence one another. Energy imbalances along the meridians are restored using various methods.
Acupuncture	Needles are inserted at key meridian points.
Acupressure	Pressure is applied at key points.
Electroacupuncture	Electricity is passed through meridian points. Laser light, sound from tuning forks, and other sources of energy also may be used.
Emotional freedom technique, thought field therapy	Tapping of various meridian points is used to release stored negative emotional energy.
Energy field or chakra balancing	The technique is based on concepts of an "energy body." Changes in the energy body can reflect changes in the physical body, or *chakras.* The seven main chakras are energy vortices that project from the center of the body. Small chakras also exist at various locations. Energy fields surrounding the body (i.e., aura) are said to be influenced by the healer's actions.
Polarity therapy	Based on the work of Randolph Stone, this technique combines diet, exercise, and other techniques to optimize health of the energy field.
Reiki	Japanese in origin, there are now many different schools. Trainees are given a series of "attunements," which allow them to pass universal healing energy to others. Energy is believed to flow to where it is needed most.
Therapeutic touch	Developed in the 1970s by Krieger, a nurse, there are now more than 50,000 practitioners in the health care professions. The hands are used to balance energy flows and chakra function in the body.
Healing touch	Developed in the 1980s by Mentgen, a registered nurse, the technique is based on principles used in therapeutic touch and the work of Brennan, Bruyere, and others. It requires completion of standardized instruction.
Other healers' schools or techniques	Examples include the techniques of Barb Brennan and Rosalyn Bruyere. They focus on energetic healing with more descriptive approaches to energy healing based on the healer's own experiences and systems.
Other Energy Therapies	
Flower essences	Various flower remedies are believed to have different vibrations and health effects.
Eye movement desensitization	Rapid alterations of eye movements from left to right, or alternate tapping motions on the right and reprocessing (EMDR) left sides, are used to release energy imbalances.
Color therapy	Use of various colors influences the energy field.
Music or sound therapy	Sounds that correlate with various energy vibrations are used in healing.
Movement therapies	Tai chi and qi gong enlist various movements to alter energy patterns or the amount of energy the body is able to store.
Correlational therapies	Techniques are based on the idea that a certain part of the body reflects all other parts. Focusing on one specific area, it is possible to provide generalize healing. In *reflexology,* certain parts of the feet, which are believed to correlate with various body parts, are massaged or treated with essential oils. In *iridology,* diagnoses are made by looking at parts of the iris, which is believed to reflect the health status of various body parts.
Magnet therapy	Magnets are applied to various body parts.
Shamanic healing	Often classified as a "spiritual" versus an energy modality. The shaman is said to determine intuitively the source of a health problem, then enlists ritual, helpful spirits; journeys to the spirit world; and other techniques to bring about healing.

Modified from Rakel D, Rindfleisch A. Integrative medicine. In: Rakel RE, ed. *Essential family medicine: fundamentals and case studies*. Philadelphia: Saunders; 2006, pp 132-141.

*This list is not comprehensive. Many complementary and alternative medicine therapies can be considered to be based in part on energy. Overall medical systems, such as Ayurveda, traditional Chinese medicine (TCM), and homeopathy, base their approaches in part on energy. Yoga and various forms of meditation also may involve conscious movement of energy.

EAPPENDIX

12-4 Highlights of Acupuncture Research and Findings

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2. Langevin H, Yandow J. The relationship of acupuncture points and meridians to connective tissue planes. *Anat Rec.* 2002;269:257-265.
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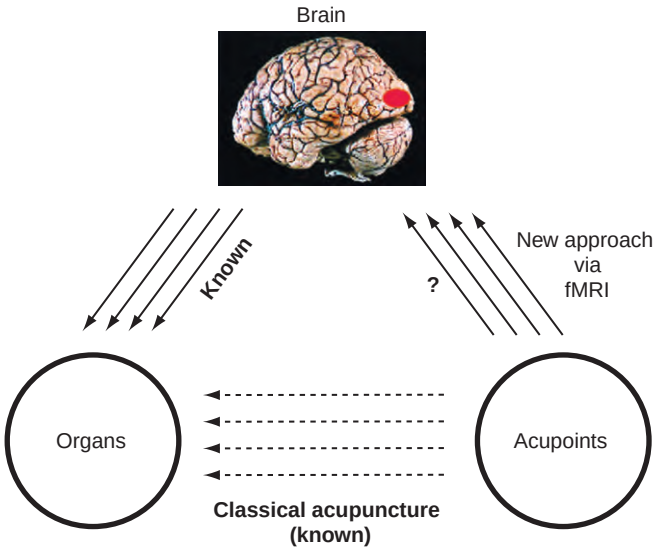
4. Cho ZH, Chung SC, Jones JP, et al. New findings of the correlation between acupoints and corresponding brain cortices using functional MRI. *Proc Natl Acad Sci USA.* 1998;95:2670-2673. All images courtesy National Academy of Sciences, USA. This was the first study to report a direct brain-acupoint correlation—that needling a specific acupuncture point on the body has specific effects in the brain. Recent developments of functional magnetic resonance imaging (fMRI), which is sensitive to changes in regional blood oxygenation as an index of neuronal activity, can be used for quantitative study of the correlation between various acupoints and specific functional areas of the brain (eFigure 12-4).



eFigure 12-4

Bladder meridian points on the lateral aspect of the foot (**A** and **B**) affect visual function as predicted by ancient acupuncture literature (eFigure 12-5).

fMRI shows visual stimulation (**A** = light flashed into eye) and acupoint stimulation (**B** = point VA1) compared with non-acupoint stimulation (**C** = control) (eFigure 12-6). Notice that the visual and acupoint stimulation evoke similar fMRI findings compared with non-acupoint stimulation.

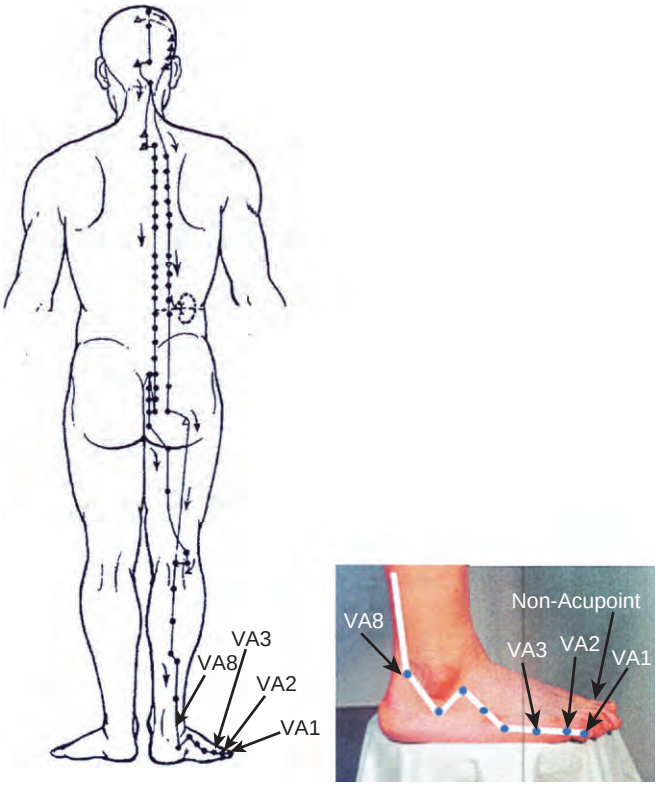
Activated areas resulting from acupoint stimulations of VA1, VA3, and VA8 (see eFigure 12-5) are in the primary visual cortex (i.e., occipital lobe). Results led to the hypothesis that acupuncture stimulates or activates the corresponding brain cortex through the central nervous system, modulating chemical and hormonal release of neurotransmitters to the diseased or disordered organs for treatment.

5. Schlebusch KP, Walburg MO, Popp FA. Biophotonics in the infrared spectral range reveal acupuncture meridian structure of the body. *J Altern Complement Med.* 2005;11:171-173. This study shows, for the first time, evidence of the existence of the acupuncture meridian structure in the human body. After moxibustion (i.e., burning of moxa, the herb *Artemisia vulgaris,* on or near meridian points) or similar light stimulation of the body in the range of 3 to 5 μm, light channels appear on the body. They appear to be identical to what are known as *meridians* in textbooks of traditional Chinese medicine. These findings appear to confirm the existence of acupuncture meridians, and they open a window on understanding the energy transfer dynamics of the human body. It is likely that living matter is not in the ground state, but permanently electronically excited.

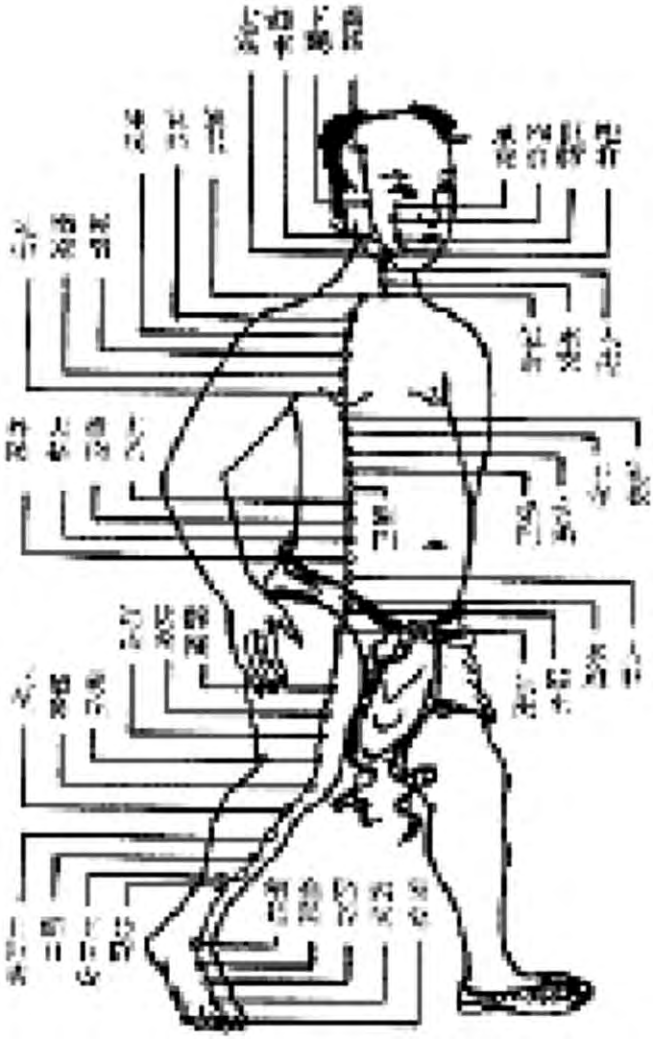
The following diagrams of the bladder and stomach meridians are given to help orientation to the infrared thermography that follows them (eFigure 12-7). The stomach meridian runs up front of leg and torso and into facial area bilaterally; only the right side is shown.

The infrared thermography images demonstrate light channels, which appear identical to the corresponding meridians (eFigures 12-8 and 12-9). The meridian structure is revealed after moxibustion. **A,** The heat source is near the patient's left leg. **B,** Changing sides reveals mirror meridian images.

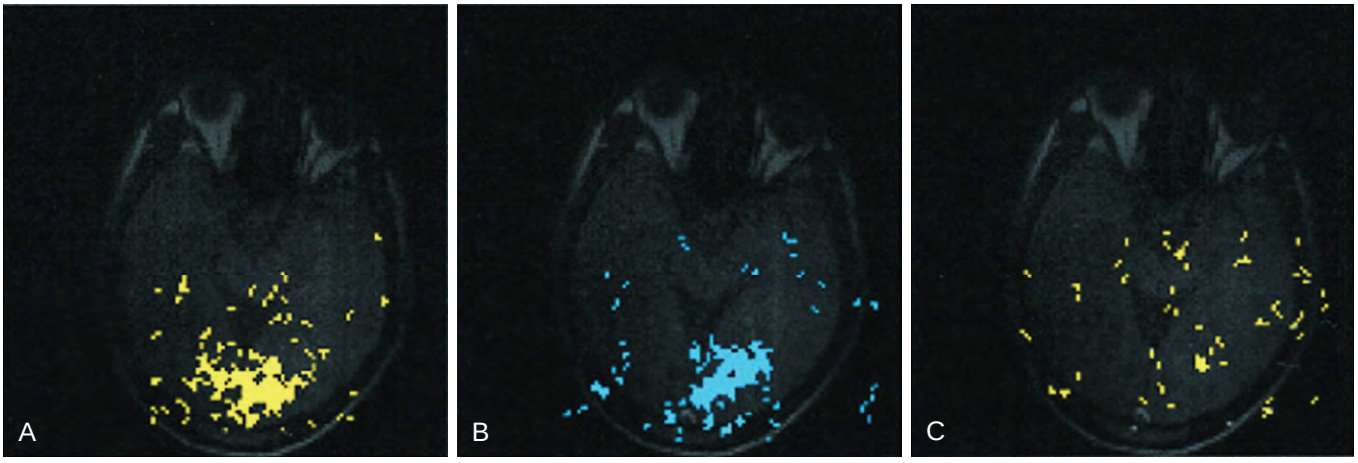
The bladder meridian runs down the back on either side of the spine and down the back of the legs. The left side is shown (eFigure 12-10). Structure along the bladder meridian after moxibustion.



eFigure 12-5



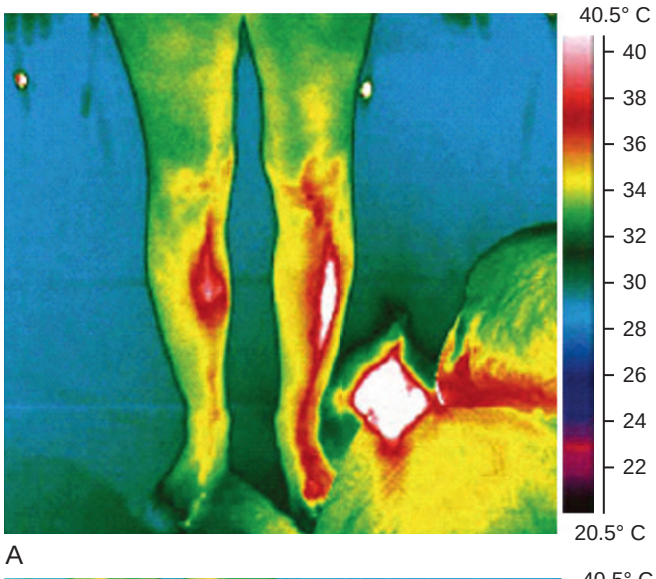
eFigure 12-7



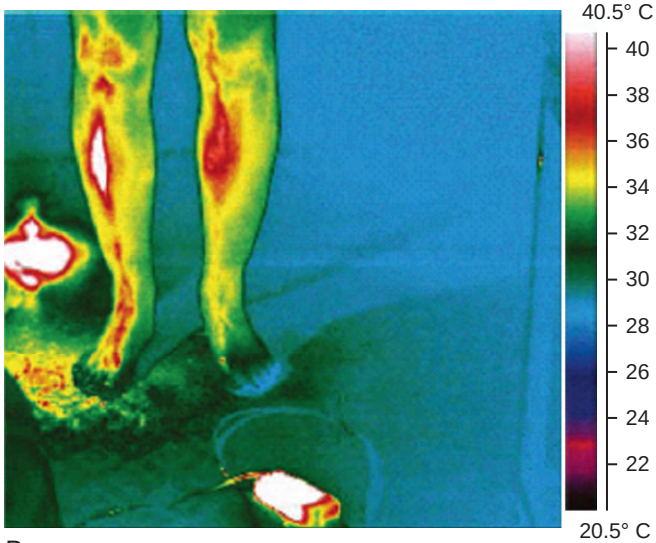
Visual | Acupoint (VA1) | Non-acupoint

Volunteer 1

eFigure 12-6

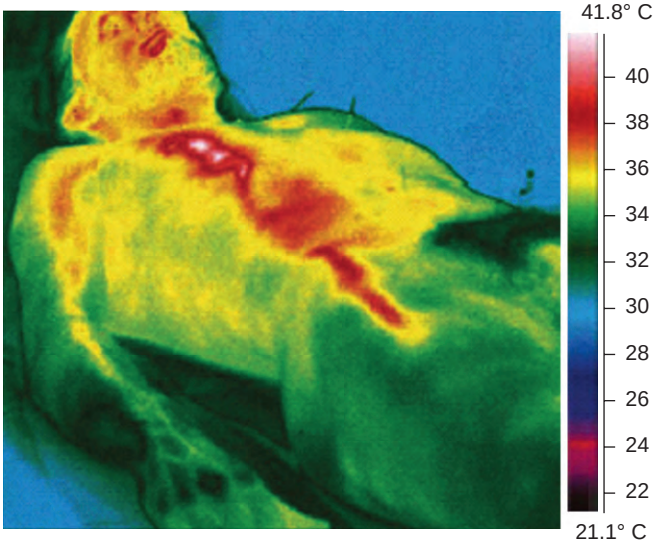


A

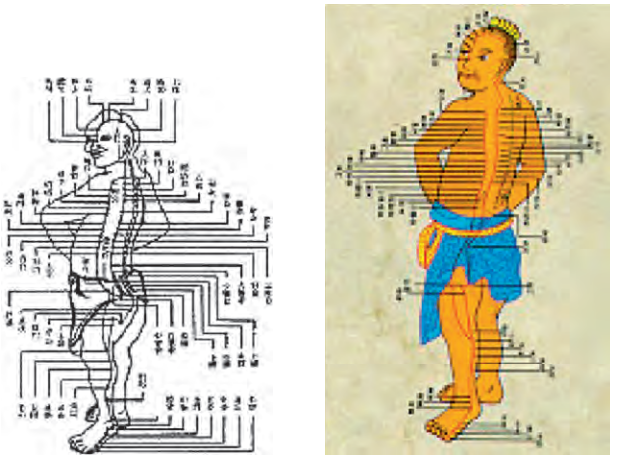


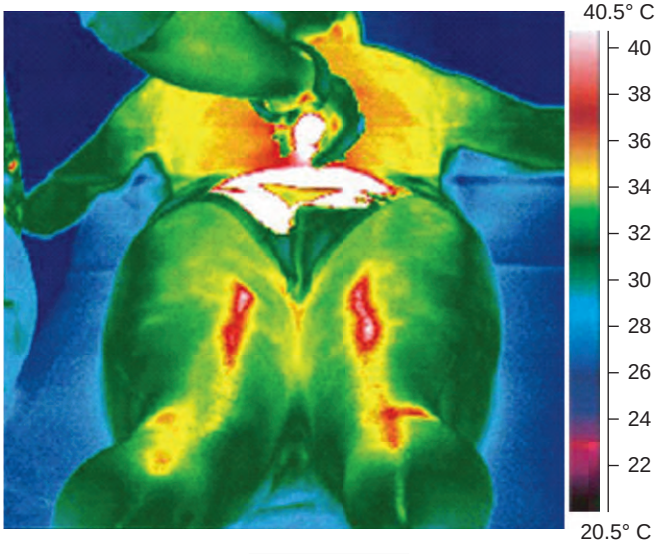
B

eFigure 12-8



eFigure 12-9





eFigure 12-10

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13 Establishing Rapport

ROBERT E. RAKEL

CHAPTER OUTLINE

Rapport comes from the French *en rapport,* which means "in harmony with." Rapport is most easily established during the patient's first visit, and achieving rapport enhances the likelihood that the patient will comply with the treatment plan. When rapport has been established, patients are more likely to forgive a less than perfect experience or an unexpected poor clinical outcome.

Even the most knowledgeable and skilled physician will have limited effectiveness if he or she is unable to develop rapport with patients. Unfortunately, rapport is one of those intangibles that is more than the sum of its parts. Rapport is not analyzed easily within any one body of knowledge. The basis of rapport, however, is the development of communication skills that instill in patients a sense of confidence and trust by conveying sincerity and an interest in their care and well-being. The patient's satisfaction and compliance with the physician's instructions (both measures of rapport) depend on the ability of the physician to communicate understanding, compassion, and genuine interest in the patient and to display a thorough approach to solving the patient's problems. Patient satisfaction also is related to the physician's efforts in educating patients about the disease process and motivating them to participate in their treatment.

Failure of communication between physician and patient also can affect the outcome of treatment, often as seriously as an error in treatment. More complaints against physicians result from a breakdown of the caring aspect of the doctor-patient relationship than from the technical quality of treatment.

Most complaints against physicians—and those that too frequently lead to legal action—are the result of a lack of communication between physician and patient. The potential for a serious problem always exists when a patient is inadequately informed regarding a diagnostic procedure, treatment, prognosis, or anticipated cost. The misunderstandings that result cause unnecessary expense and grief for both parties.

Similarly, the worries that result from distorted information can jeopardize the physician-patient relationship. When a patient is discussed on hospital rounds or with a colleague in the office, take care that the discussion is not within the patient's hearing distance or within that of other patients. Patients overhearing the conversation may believe the comments apply to them, or they may know the patient involved and relay the information in a distorted manner. Fragments of such conversations, overheard by the patient or others, are too easily taken out of context and can become the focus of fearful fantasies that only serve to increase uneasiness and apprehension.

Compassion, interest, and *thoroughness* are essential components of successful patient care. These features traditionally have been embodied in the term *bedside manner,* which also connotes qualities of concern, kindness, friendliness, wit, and cheerfulness, all of which result in an atmosphere of trust and confidence between physician and patient. The physician with the best bedside manner may be the one who makes no special effort to communicate these feelings but acts in a concerned, natural, and comfortable manner.

Oliver Wendell Holmes said that to be effective, the physician should "speak softly, be well-dressed, have quiet ways and have eyes that do not wander" (1883, p. 388). Lack of eye contact may be interpreted as a lack of concern. A good first impression is certainly great help in establishing rapport. It takes less than 7 seconds to form a first impression. You do not get a second chance to create a first impression. The physician should approach the patient in an assured, confident manner with a smile and a handshake if the occasion is appropriate.

Personal appearance is a significant part of nonverbal communication. Patients consider house staff who wear white coats with conventional street clothes as more competent than those who wear scrub suits. If white coats are worn, the patient sees only the collar, tie, and shoes, and it is therefore important to keep these items neat.

Posture is also important in conveying an image of confidence and competence. Standing erect, moving briskly with head up and stomach in, is better than slouching. Energetic people seldom slump; they sit upright and appear alert. A listless or lethargic appearance can be interpreted as lack of concern.

Before entering the examining room or hospital room to see a patient, review the record briefly and become familiar with the patient's name and its proper pronunciation. If the pronunciation is unusual or difficult, place phonetic markings on the chart as a reminder for future use. Repeat the patient's name when first given it to confirm the pronunciation, and then use the name twice in the first minute to help it register. Review the medical record for particular aspects of the previous visit that should be remembered and commented on, such as the illness treated at that time, family conditions, or other problems. Patients will believe that the well-informed physician is truly interested in them. Additional courtesy, such as opening the door and assisting

patients with their coats (especially elderly patients), shows a consideration that aids in establishing and maintaining rapport.

Respect

Patients should believe that their comments are being listened to, carefully considered, and taken seriously. They must believe that the physician values their comments and opinions before trusting him or her with information of a more personal nature. As long as the physician's attitude toward the patient embodies respect, concern, and kindness and a sincere effort is made to understand the patient's difficulties, the patient will overlook or forgive myriad other problems.

Oliver Wendell Holmes advised patients to "Choose a man who is personally agreeable, for a daily visit from an intelligent, amiable, pleasant, sympathetic person will cost you no more than one from a sloven or a boor, and his presence will do more for you than any prescription the other will order" (1883, p. 391).

A lack of confidence, rather than an excess of it, may lead physicians to appear aloof and unconcerned. Too often, physicians think that a godlike image of omnipotence is necessary for the maintenance of the patient's respect and confidence. It is usually a lack of self-confidence that causes physicians to retreat behind this protective image, which limits their ability to help. Secure physicians are freer to establish close personal relationships with patients without fearing their position will be threatened. A physician with a positive self-image is also willing to recognize and admit the limits of personal competence and feels comfortable seeking help from a colleague when such consultation is of value to the patient's care.

The bond of mutual respect is enhanced if the physician makes positive statements about other people. Patients find it difficult to respect a physician who is regularly detractive, making negative statements about other people or other physicians. Any comments that can be interpreted as "building yourself up by tearing someone else down" merely accomplish the reverse.

The effectiveness of physicians depends on the degree of their insight into the limitations of their personalities and the psychological defenses that distort their perceptions of patients. Physicians must recognize patients or situations that make them unreasonably angry or provoked (e.g., a whining, complaining individual who shows no interest in being rehabilitated, preferring a role of social dependency). The physician's emotions, if they go unrecognized, can serve as a barrier to the development of mutual respect. If the physician is aware of negative feelings toward a patient, an effort can be made to avoid showing signs of irritation or anger. It has been said that clenching of the physician's fist is a clinical sign of a hysterical patient. The physician should attempt to remain objective and analyze the situation for its diagnostic value.

Patients with trivial complaints or somatic manifestations of emotional disease sometimes are given less attention than those with clear-cut organic abnormalities. The frequency with which a physician complains about the triviality and inappropriateness of patients' problems has been found to be related to the volume of patients seen and the degree to which the physician feels overburdened. The more patients that physicians see and the more overloaded their practices, the more likely they are to describe patients' complaints as trivial, inappropriate, or bothersome. Physicians who have more time or take more time per patient, and who investigate the patient's complaints more thoroughly, frequently uncover significant factors and less often tend to view the complaints as trivial. Respect for patients involves taking their fears and apprehensions seriously and withholding value judgments. Patients who frequently seek help for nonspecific somatic and functional complaints may be depressed (Widmer et al., 1980).

Patient Satisfaction

A close relationship exists between rapport and patient satisfaction, and this chapter deals with the many facets of that relationship. It is important that the physician make an effort to understand what patients are "going through" (not only their pain and discomfort, but also the effect these have on their lives) and communicate this understanding to them.

Most studies indicate that patient satisfaction depends on information and the degree to which the patient understands the illness. Joos and associates (1993) found that patients whose desires for information and attention to emotional and family problems went unmet were significantly less satisfied with their physicians than those whose desires were met. Even patients with chronic diseases who had lived with the problem for years had questions they wanted answered. Their satisfaction was related more strongly to the desire for information and affective support than to whether the physician conducted examinations and tests. The greater the patients' satisfaction, the more likely they are to comply with treatment recommendations.

Although patient satisfaction is strongly associated with the length of the visit, it can be further enhanced by spending some time talking about nonmedical topics. Even brief chatting about the weather or something nonmedical can give the impression that more time was taken with the patient, thereby reducing the feeling of being rushed through the visit (Gross et al., 1998).

PATIENT DISSATISFACTION

In a typical business, only 4% of customers voice their dissatisfaction. The other 96% say nothing, and 91% never return. This has led to many practices conducting regular patient satisfaction surveys so that problems can be identified.

Communication

The patient should be able to gain access to the clinician on the phone, by e-mail, or by an early appointment without having to run an obstacle course created by an overly protective staff. Delay in returning a phone call may result in a patient remaining home all day waiting; if the call is not returned at all, the negative effect on rapport is great.

Unwillingness to make communication convenient for the patient usually results in a spiral of increasingly frequent attempts to reach the physician and mounting frustration for everyone. In contrast, physicians who give a high priority to communicating discover that most patients are considerate and even protective of the physician's time. At the beginning of a practice, patients do a certain amount of testing to determine a physician's accessibility; physicians who pass the test find that they are rarely inconvenienced by unnecessary calls or patient visits.

VERBAL COMMUNICATION

Much of the communication process in the clinical interview centers on verbal interchange. Symptoms, past medical history, family medical history, and psychosocial data are transmitted primarily by verbal means. The chief complaint is extremely important because it explains why patients believe they need the physician's help.

Patients who do not mention a concern and who withhold requests are less satisfied with their care and experience less improvement in their symptoms. Bell and colleagues (2001) found that 9% of patients had one or more unvoiced desires and were most hesitant to ask their physician for referrals and for physical therapy. These patients were also less likely to trust their physician. This is an important reason to be sensitive to subtle clues that the patient may be suppressing something important to them. What the patient does *not* say may be as important as what the patient says.

"Slips of the tongue" or major areas of omission (e.g., a married person who never mentions a spouse) may signify problem areas that, when explored, help establish the interviewer as a perceptive person who understands the underlying issues. The interviewer constantly must consider, "Why is the patient telling me that?" Even simple, casual remarks may be the patient's way of broaching issues of great concern; the man who says, "Oh, by the way, a friend of mine has been having some chest pain when he walks a lot. Do you think that sounds serious?" may actually be talking about his own concern that he is unable to face directly. A child may be brought to the office with a trivial problem so that the mother has a chance to discuss with the physician something that is troubling her; the child is a calling card, signaling the need to open the communication channel. The physician who is sensitive to these subtle clues and encourages the patient to discuss what is actually troublesome will find that the rapport established allows future interviews to be much more open and direct.

HAND-ON-THE-DOORKNOB SYNDROME

The patient's parting phrase is sometimes a clue to the primary reason for the visit, or it may reflect another issue of great concern that is emotionally threatening and could not be voiced until adequate courage was summoned at the moment of departure. It sometimes surfaces as a last, desperate attempt to communicate because, with a hand on door, escape is readily accessible if the physician's reaction is unfavorable. Reasons for this hidden communication by the patient are important and must be recognized and addressed. Because of fear of rejection or humiliation, the patient may test the physician with minor complaints before mentioning the real reason for the visit (Quill, 1989). The physician must be alert to any unusual behavior during an interview (e.g., slips of the tongue, unexpected responses, overenthusiastic denials) and should search further for the underlying reason for the visit when a patient presents with a trivial complaint that appears inappropriate. It is a good practice to ask the patient routinely at the end of a visit, "Is there anything we have not covered, or anything else you would like to ask me?"

Patients with a fear of cancer, for example, often are unable to voice their concern to the physician. Instead, they present with somatic complaints or contrived reasons that necessitate a complete examination. They are hopeful that the examination will allay their fears without it being necessary to express them openly. A female patient presenting for a complete physical examination actually may be concerned over the possibility of a carcinoma of the breast, which her elder sister might have had at the same age or for which a friend recently had surgery. Such situations emphasize the need for a complete family history and a discussion of any patient concerns in an effort to allow these feelings to surface. Attention then should be paid to alleviating the anxiety. Apprehension regarding cancer is widespread, and the only cure for this fear often is a therapeutic conversation with the physician.

Physicians in private practice who have established rapport during an ongoing relationship with patients communicate more easily than do physicians seeing a patient for the first time in an emergency department (ED). Korsch and Negrete (1972) showed that ED physicians did more talking than the patients, although their perception was just the opposite. This was attributed to interaction with unfamiliar patients by house staff in a setting where the stress level is high and the orientation therapeutic. However, Arntson and Philipsborn (1982) found that physicians in private practice for 26 years who knew their patients and saw them in a low-stress situation for diagnosis or health maintenance also talked more than the patients (twice as long). One difference in the two settings was a strong, reciprocal affective relationship between physician and patient in the private office. If either made an affective statement, the other would respond similarly, whereas in the ED, patients expressed twice as many affective statements as did the physicians.

VOCABULARY

The use of appropriate vocabulary assists in establishing rapport by ensuring easy and accurate communication. Phrasing questions in simple language appropriate to the patient's level of understanding and avoidance of medical jargon help establish a sense of working together. The patient's cultural background and educational level should be considered, and the physician should avoid using slang or a contrived accent because the patient will detect the artificiality and consider this patronizing.

Patients prefer to be enlightened, and they demand maximum insight into their care. It is best to start all explanations at a basic level and proceed only as rapidly as the patient's understanding permits. An analysis of 1057 audiotaped patient interviews with 59 primary care

physicians and 65 surgeons showed that in 9 of 10 cases, patients did not receive good explanations of proposed treatments or tests (Braddock et al., 1999).

Medical terminology should be avoided unless it is familiar to the patient. For example, some patients have interpreted "lumbar puncture" to mean "an operation to drain the lungs." No longer does the physician gain a therapeutic advantage by writing prescriptions in Latin or impressing the patient with medical terms.

Metaphors can be harmful and are often used without the physician being aware of the negative connotation, unknowingly raising the patient's anxiety level. Attempts to coerce a patient into having surgery with phrases such as "you are living on borrowed time" may cause anxiety and increase postoperative morbidity (Bedell et al., 2004).

Physicians should be sure of what patients mean to convey by their word selection and make certain they are operating at a common level of understanding. When the patient says he or she "drinks a little," inquire further to clarify "a little." If the patient "spits up blood," determine whether it is truly spitting or really vomiting. A major barrier to accurate interpersonal communication is the tendency of people to react to a statement from their own points of view, rather than attempting to interpret it from the speaker's vantage point. If a question exists regarding the clarity of the interpretation, it is best to repeat it to the speaker's satisfaction. Contract negotiators have found that when parties in a dispute realize that they are being understood and each party sees how the situation appears to the other, there is less need to exaggerate and act defensively. Korsch and Negrete (1972) found that some of the longest interviews between physician and patient were caused by failures in communication; they had to spend considerable time trying to "get on the same wavelength." An analysis of the conversations revealed that less than 5% of the physician's conversation was personal or friendly in nature, and that although most of the physicians believed that they had been friendly, fewer than half of patients had this impression.

NONVERBAL COMMUNICATION

Verbal communication occupies so much of daily social interaction that nonverbal communication often is ignored. However, much that is said is unspoken. Communications specialists have demonstrated convincingly that nonverbal messages play a major role in validating or contradicting verbal messages, with great influence as communication symbols in their own right. When there is conflict between the verbal and nonverbal, believe the latter.

Communication between two people is usually one-third nonverbal, although some say communication is 93% nonverbal and 7% verbal (Secrets of Body Language, 2008). What is said verbally often is emphasized nonverbally, and personal attitudes and emotions usually are communicated at the nonverbal level. Nonverbal communicative signals are under less censorship from conscious control than are verbal messages, so they are likely to be more genuine.

Charles Darwin held that there is a unique pattern of nonverbal actions for each emotion. In *Expressions of the Emotions in Man and Animals* (1872), Darwin suggested that emotional expressions are evolutionary remnants of previous adaptive behavior that persist even though currently useless. Snarling as a sign of aggression is one example. Although recent knowledge indicates that emotional expression is learned and genetically mediated, Darwin's idea of a unique pattern of actions has been shown for depression and anxiety and is likely in the future to be demonstrated for other emotional states.

PARALANGUAGE

Paralanguage is the voice effect that accompanies or modifies talking and often communicates meaning. It includes velocity of speech (e.g., fast, slow, hesitant), tone and volume of voice, sighs and grunts, pauses, and inflections. Urgency, sincerity, confidence, hesitation, thoughtfulness, gaiety, sadness, and apprehension all are conveyed by qualities of voice. McCaskey (1979) believes that the literal interpretation (i.e., definition) of words accounts for only 10% of communication between two people, whereas facial expression and tone of voice account for up to 90% of the communication.

There is a real difference between verbal and vocal information. The *verbal message* refers to the words literally transmitted. The *vocal message* includes the emotional quality, the tone of voice, and the frequency and length of pauses—information that is lost when the words are written. Tone of voice, for example, can reverse the meaning of words. Sarcasm is a common example of a contradiction between vocal and verbal messages. Comparative studies have shown that when the vocal and verbal messages transmit contradictory information, the vocal is more accurate.

Physicians should be alert to subtle changes of tone, such as when patients ask whether everything will be all right. Are they asking for reassurance, showing fear, or doubting the diagnosis? Rather than concentrating exclusively on *what* patients are saying, the astute physician will concentrate on *how* they are saying it.

In a study of recordings of surgeons who had been sued and those who had not, the sued group could be identified by their tone of voice. They sounded dominant, whereas the nonsued group sounded less dominant and more concerned. "In the end it comes down to a matter of respect, and the simplest way that respect is communicated is through tone of voice" (Gladwell, 2005, p. 43).

TOUCH

A close personal interest in the patient can be communicated by the appropriate use of touch. The most socially acceptable method in this country is a handshake, enabling the physician to establish early contact with the patient (Colgan, 2009). The handshake, properly used, can convey to the patient sincerity and interest as well as security and poise. It is an inoffensive intrusion into the other person's area of privacy and can be extended under certain circumstances to include the application of the left hand to the lower or upper arm. This technique is often used by politicians to emphasize sincerity and concern (Figure 13-1). A variation of the politician's handshake is the "double-hander," which some equate to a miniature hug.

Politicians also "gain the upper hand" by positioning themselves to the right of the other person so that when

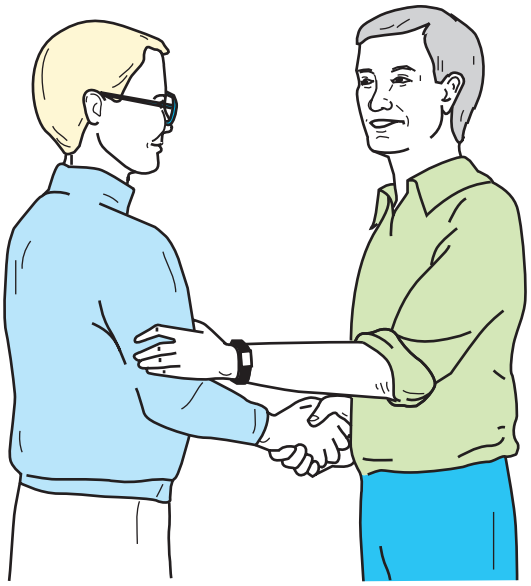

Figure 13-1 The politician's handshake.

shaking hands theirs is on top. Another way to show dominance is to make sure they go through a door last, often with a pat on the back. This shows that the one going through the door last is in charge. This was well illustrated when President Clinton welcomed the Israeli and Palestinian leaders into a building and each insisted the other go first. While this would be considered polite in the United States, in the Middle East it reflects a power struggle. The winner (the last one through the door) emphasizes this with a pat on the back as the other enters (Secrets of Body Language, 2008).

The handshake as a traditional greeting of friendship began by the raising of exposed hands by two approaching individuals to give evidence that they held no weapons. This proceeded to the grasping of hands or, in the Roman society, the forearms. In the United States, a firm handshake is most acceptable. Usually, the limp or "wet dishrag" handshake indicates lack of interest or insincerity, especially if it is rapidly withdrawn. A moist palm is a sign of nervousness or apprehension, and the "halfway there," fingers-only handshake indicates reluctance or indecision. However, the handshake continues to be modified culturally, and a person should be extremely wary of misinterpreting another person's handshake without understanding his or her cultural background.

In the past in China, the Confucian code of etiquette dictated that there should never be a touching of persons, and even today, Chinese officials may appear reluctant to grasp an extended hand; a Chinese man formerly shook his own hand (Butterfield, 1982). Some young people in the United States have modified the traditional palm-to-palm handshake to a grasping of the thumb and thenar eminence and continue to develop new variations reminiscent of the secret handshakes of fraternal groups.

Touching can be an effective method for communicating concern or compassion and can break down some of the defensive barriers to communication. Caution should be exercised, however, not to use it excessively or earlier than is socially permissible. If used without adequate preparation, touch can be interpreted as an invasion of privacy and a forward and inconsiderate act. During the physical examination, it is best to talk before touching by explaining to the patient what will be done next. Studies of primates have shown that touching gestures usually are considered nonaggressive and calming in nature. When used properly by the physician, touch can be facilitative and welcome.

The tremendous symbolic value of touch as a healing power was demonstrated during the Middle Ages, when people sought relief from scrofula (i.e., tuberculous lymphadenitis) through the king's touch, or royal touch, despite the notoriously low cure rates. This power has been transferred to physicians, and patients often feel better after a routine physical examination. Friedman (1979) stated that 85% of patients leaving a physician's office feel better even if they have not received medication or treatment, and 50% of patients in the waiting room feel better in anticipation of the help they will receive.

Touch, or "laying on of hands," may promote healing, especially if it is imbued by the patient with a special symbolic value. Franz Mesmer (1734-1815) was among the first to emphasize the medical importance of laying on of hands. Mesmer, however, believed that there was a magnetic power in his hands, which he called "animal magnetism" and which he applied to ailing individuals. His theory was unscientific, and although he became famous for successfully treating a number of hysterical patients, he finally was discredited by a committee that included Benjamin Franklin and Antoine Lavoisier. They found his treatments to be without magnetism and essentially useless. They did agree, however, that he had helped many people and had brought about many cures. They attributed these cures to unknown factors rather than to the animal magnetism he claimed. Mesmerism was the forerunner of hypnosis, initially called "artificial somnambulism," developed by Puységur, a disciple of Mesmer.

The magic of touch can be good medicine, especially when combined with concern, support, and reassurance. *Stroking,* a special kind of touching, describes a physical or symbolic recognition of a person's finer attributes. A stroke may be a kind word, a warm gesture, or a simple touch of the hand. Infants deprived of touch and stroking suffer mental and physical deterioration. Adults also require stroking to maintain a healthy emotional state. Stroking occurs when an interchange between two people leaves one or both with a good or fulfilled feeling.

Lightly touching someone's elbow for less than 3 seconds can give you up to three times the chance of getting what you want (Pease and Pease, 2004). Elbow touching works better in places where touching is not the cultural norm, such as Great Britain and Germany.

BODY LANGUAGE

It is said that body language is the unspoken truth. The astute physician will cultivate observational skills that enable the detection of hidden or subtle clues to diagnosis contained in the patient's nonverbal behavior. *Kinesics* is the study of nonverbal gestures, or body movements, and their meaning as a form of communication. However, specific gestures and their interpretation are of importance only

when judged in the context of the circumstances surrounding them. Body language alone does not reveal the entire behavioral image any more than verbal language does alone. Just as one word does not make a sentence or even have much meaning without the sentence, a single gesture has clinical relevance only as part of a sequence of actions. Although they have significance, individual signs are not reliable when they stand alone; they are meaningful only when considered in the context of a person's total behavioral pattern.

When there is *congruence* between the verbal and nonverbal message—when the gesture conveys the same message as the spoken word—communication and its meaning are probably in agreement. When a person indicates something different from the other, however, the *nonverbal* message usually is more accurate. Unless body language, tone of voice, and words spoken all match, look more closely for the reason.

Attempts by the patient to mask feelings can be detected readily by observing body behavior. True feelings are more likely to leak through conscious efforts to conceal feelings. Likewise, a physician's attempt at deception will be detected by patients and can destroy confidence and damage rapport. Positive verbal communication (e.g., "You're looking better today") accompanied by negative nonverbal cues will be interpreted by the patient as insincere. For example, a patient who is not told the true nature of a terminal illness usually knows it anyway and may distrust family, friends, and physician if they persist in the charade.

In a medical school commencement address, Alan Alda (star of TV's *M*A*S*H*) challenged new physicians to be able to read a patient's involuntary muscles as well as their radiographic studies. He asked, "Can you see the fear and uncertainty in my face? If I tell you where it hurts, can you hear in my voice where I ache? I show you my body, but I bring you my person. Will you tell me what you are doing and in words I can understand? Will you tell me when you don't know what to do?" (*Time*, May 28, 1979, p. 68). The physician will see the fear and uncertainty in the patient's face only if she or he is looking at the patient rather than the medical record. Alda's statement reflects the concern and compassion that patients desire. By using appropriate body language, the physician can convey this attention and concern in the most effective manner possible.

Body Position

The body position when sitting can show various degrees of tension or relaxation. The tense person sits erect with a fairly rigid posture. A person who is moderately relaxed has a forward lean of approximately 20 degrees and a side lean of up to 10 degrees. A very relaxed position (usually too relaxed for physicians interacting with patients) is a backward lean (i.e., recline) of 20 degrees and a sideways lean of more than 10 degrees.

Higher patient satisfaction is associated with a physician's forward body lean and rotation of the torso toward the patient. Larsen and Smith (1981, p. 487) found that "the patient also responds more favorably to the physician who relaxes his chin in his hands and gazes directly at the patient, rather than a physician who elevates his chin (unsupported) as if to imply a more superior status." Physicians whose communication styles have been considered patient oriented have been observed to change body position more frequently than physicians whose conversations were physician centered.

An attempt should be made, whenever possible, to sit rather than stand when interviewing a patient. Rapport is improved if the physician does not intimidate the patient by placing him or her in a submissive position. Patients feel more comfortable and less helpless speaking in a sitting position rather than prone. Sitting on the patient's bed is usually not recommended, but for some patients, it is an effective means of establishing closeness and conveying warmth in a relaxed yet attentive manner.

Mirroring

When good rapport exists between two people, each will mirror the other's movements. Some people unconsciously establish rapport with another by mirroring that person's movements or body posture (Key, 1980) (Figure 13-2). Disruptions in this mirroring may signal that one member

Figure 13-2 Joseph Califano *(left),* Secretary of Health, Education and Welfare, mirrors his boss, President Jimmy Carter, through his posture and gestures. (From Key MR, ed. *The relationship of verbal and nonverbal communication.* New York: Mouton; 1980, p. v.)

Figure 13-3 This woman signals attentiveness and seriousness by holding very still, cocking her head, and looking intently at the speaker. (From Scheflen AE. *Body language and the social order—Communication as behavioral control.* Englewood Cliffs, NJ: Prentice-Hall; 1972.)

disagrees with what the other has said or feels betrayed or insulted but cannot express this idea verbally. If the physician notices this sudden disruption of mirroring activity by the patient, more attention should be focused on the comment that led to the change of position. Renegotiation or further explanation may be indicated. A powerful way to establish rapport is to match intentionally the body language of another.

Head Position

Typically, the head is held forward in anger and back in defiance, anxiety, or fear. It is down or bowed in sadness, submissiveness, shame, or guilt. The head tilted to one side indicates interest and attention (Scheflen, 1972) (Figure 13-3); under certain circumstances, this can be a flirtation. The erect head indicates self-confidence and maturity. It is almost impossible to tilt the head in front of someone who is not trusted or of whom we are afraid.

When listening to a patient, the physician should show interest and concern by an attentive position, which is best illustrated by sitting forward in the chair with an interested, attentive facial expression and the head slightly tilted. Darwin was one of the first to notice that animals assume a head tilt when listening intently.

Face

The human face can create more than 7000 expressions using 44 muscles (Cleese, 2001); some say 10,000 expressions are possible (Ekman, 2003).

Darwin (1872) proposed that cultures throughout the world express similar emotions or states of mind with remarkably uniform body movements. His information was gathered from missionary friends working with aborigines, persons under hypnosis, infants, and patients with mental disease. He also studied blind and deaf persons who, without benefit of learning from others, were observed to raise eyebrows when surprised and shrug their shoulders to indicate helplessness.

Darwin held that the facial expression of emotion, when undisguised, is independent of culture and is identical throughout the world. The facial expressions of joy, sadness, and anger are the same in the Australian aborigine, the American farmer, and the Norwegian fisherman (Ekman, 2006). Various cultures, however, do disguise the facial expression in different ways. In American culture, the mouth is used most often to disguise feelings. A person in a social gathering may be smiling, although inwardly sad or angry. The eyebrows, eyes, and forehead are least affected by these cultural disguises and are the most consistently dependable indicators of emotion. The current popularity of Botox injections, however, may mask these expressions by showing no wrinkling of the forehead. "A 50-year-old person with no wrinkling has almost certainly had some kind of cosmetic procedure or treatment." (Hartley and Karinch, 2010, p. 88). As Shakespeare wrote, "I saw his heart in his face" (*The Winter's Tale,* Act I, Scene II).

Ekman and Friesen (1975) found that the facial expressions of fear, disgust, happiness, and anger were the same in countries with widely disparate languages and cultures. They used composite facial photographs to show how each part of the face contributes to the expressions of emotion, especially surprise, fear, disgust, anger, happiness, and sadness. In American culture, when people want to disguise their true feelings and convey a more socially acceptable impression, they do so by smiling. This may be especially true in patients who are sad or depressed. Figure 13-4 is a composite showing sadness in the eyes, brow, and forehead being masked by a smile.

Smile

A genuine smile can be helpful in quickly establishing a friendly atmosphere and developing a warm, interpersonal relationship. A grin can be the physician's most effective weapon for breaking down resistance or apprehension in patients, especially children or young adults. A number of studies have shown that patients are more positively disposed to physicians who smile. The smile must be genuine, however; patients can easily spot a phony smile.

Smiles are controlled by the zygomatic major muscles that connect to the corners of the mouth and the orbicularis oculi muscles. The latter are not under conscious control and reveal a true smile that involves characteristic creases around the eyes (crow's feet). A genuine smile lights up the whole face; one that does not is more likely a deception (Ekman et al., 2005). In Figure 13-5, *A*, the man on the left has a broad nonenjoyment smile whereas on the right there is true enjoyment shown by the eyes. Similarly, in Figure 13-5, *B*, the genuine smile on the right pulls back both the mouth and the eyes. An excellent overview of facial expressions can be viewed on the DVD *The Human Face* by John Cleese (2001).

Micro-Expressions

Ekman and Friesen (1975) describe micro-expressions as a valuable indication of masking or deception. "Micro-expressions are caused by the face's all too rapid efficiency in registering inner feelings" (Morris, 1977, p. 110). Most facial expressions last more than 1 second, but micro-expressions last only about one-fifth of a second (Ekman, 2003). This is approximately the time it takes to blink an

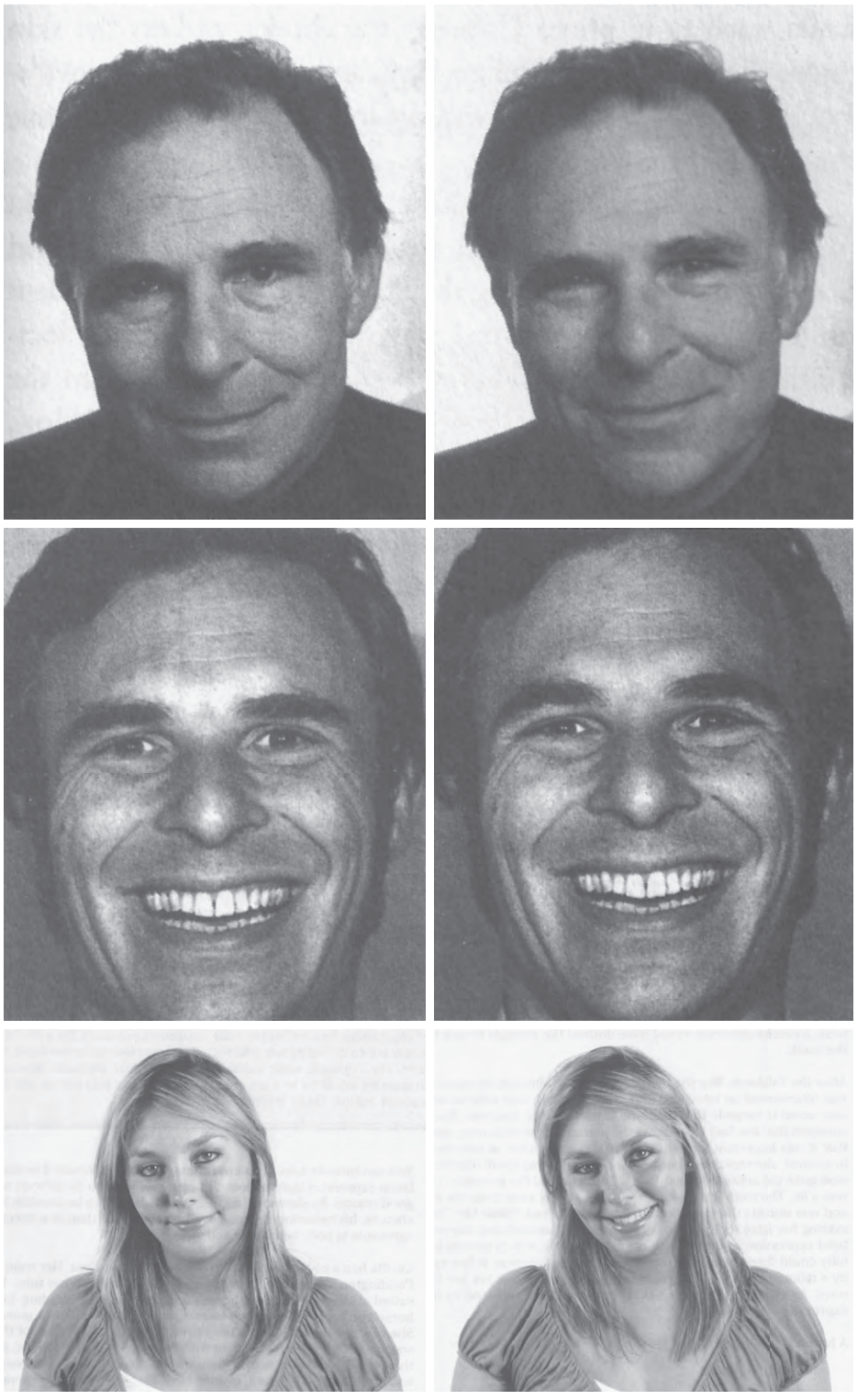

Figure 13-4 A, The man on the right has a true smile, his eyes are narrower, cheeks are higher and their contour has changed. **B,** Both have a broad smile but the one on the left has a broad, nonenjoyment smile while the one on the right shows true enjoyment. **C,** Compare the insincere smile on the left with a genuine smile on the right that pulls back both the mouth and the eyes. (A and B, From Ekman P. *Emotions revealed: recognizing faces and feelings to improve communication and emotional life*. New York: Henry Holt; 2003, pp. 207, 208; C, From Kuhnke E. *Body Language for Dummies*. Chichester, England: Wiley; 2007, pp. 66-67.)

Figure 13-5 Sadness shown in the eyes and forehead (the mouth is neutral). The importance of the eyelids can be seen because the person on the right (**B**) is obviously sadder than the one on the left (**A**) but differs only in that a sad lower eyelid has been substituted for a neutral lower eyelid. (From Ekman P, Friesen WV. *Unmasking the face: a guide to recognizing emotions from facial clues.* Englewood Cliffs, NJ: Prentice-Hall; 1975.)

eye, and micro-expressions easily can be missed if the physician is not carefully observing the patient. Micro-expressions tend to occur when emotion is concealed unwittingly by repression or deliberately by suppression. They are seen when the patient begins to show a true facial expression, senses this, and immediately neutralizes or masks the expression. Some micro-expressions are complete enough to show the true emotion felt, but most often, they are squelched to such an extent that the physician has only a clue that the patient is concealing some emotion.

Most expressions last about 2 seconds (0.5 to 4 seconds). Surprise is the briefest expression (Ekman, 2003).

Eyes

The eyes are probably the principal organs of expression. They are so important to a person's appearance that when anonymity is desired, only the eyes need to be covered. The eyebrows have been shown to have 40 different positions of expression and the eyelids have 23. Consider the magnitude of possible combinations when all facial elements are involved as indicators of expression. The message conveyed by each position can be further modified by the length of a glance and its intensity.

In most cultures, good rapport is enhanced when one's gaze meets the other's 60% to 70% of the time. When we talk, we maintain eye contact about 40% of the time and 80% when listening. Ninety percent of the gaze will be in a triangular area between the eyes and the mouth (Pease and Pease, 2004). On meeting, two people will scan each other's face for about 3 seconds, then briefly gaze downward. An upward eye break may be disconcerting or convey a lack of interest (Lewis, 1989) (Figure 13-6).

The eyes can give more information for some emotions than others. Knapp (1978) found that the eyes were better than the brow, forehead, or lower face for the accurate portrayal of fear but were less accurate for anger and disgust. Even the lower eyelid alone can convey considerable information. In Figure 13-5, it is apparent that the person in *B* depicts more sadness than the one in *A*, but the pictures differ in only one respect: the lower eyelid.

It has long been known that *pupils* dilate when the person sees something pleasant and contract when something unpleasant is viewed. This involuntary signal can be a valuable indication of what is really going on. Asian jade dealers wore dark glasses so that no one could see their pupils dilate when they discovered an especially valuable piece of jade. Likewise, a magician doing card tricks can tell when a preselected card is seen by a subject because of the sudden pupil enlargement. In one experiment (Hess, 1975), the pupils of males dilated when the men were shown photographs of nude females and constricted for nude males. Homosexuals demonstrated the opposite. Dilated pupils also can indicate that listeners are interested, whereas constricted pupils suggest that they do not like what is being said (or viewed).

Sincerity is expressed with the eyes. The best method for conveying sincerity is frequent eye contact, a technique most appropriately used when listening to the other person. One trait of good listeners is that they constantly look at the speaker. A listener who does not maintain eye contact but continues to look down or away from the speaker may be shy, depressed, or indicating rejection of the speaker or the comments being made. One patient said, "I had one student doctor who looked at his toes instead of me. If he ever opens

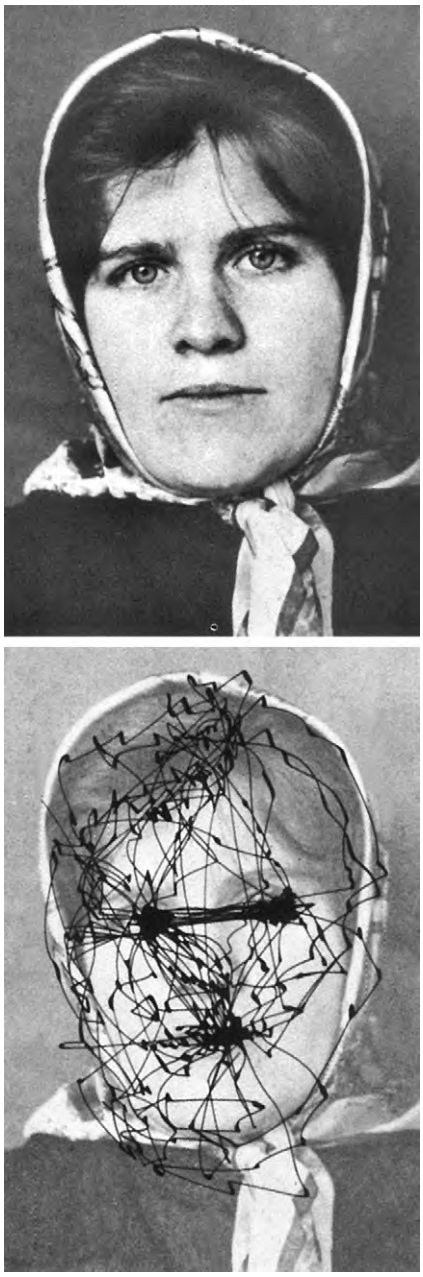

Figure 13-6 Record of eye movements made by a person looking at a photograph of a young girl's face.

a practice, I don't believe I would trust him." Conversely, speakers frequently may break eye contact when talking and are permitted a distant stare when formulating ideas and selecting phrases. However, they still should try to make frequent, although less prolonged and intense, eye contact.

A special form of human-to-human awareness is conveyed by eye contact. Prolonged eye contact, or staring, can be offensive. Monkeys can be provoked to combat by a person staring at them because it represents a threat of aggression. Under other circumstances, however, staring can be flirtatious, emphasizing that the meaning of eye behavior depends on other factors in the situation.

The acceptability of eye contact varies significantly among different cultures. In the United States, focusing the eyes on the speaker indicates respect and attention, regardless of the age of the individuals involved. However, Mexican Americans tend not to maintain as much eye contact while listening as do other Americans and may look away from the speaker more often. This is not a sign of disrespect or inattention. In Latin American countries, a younger person may be thought disrespectful if his or her eyes meet those of the adult who is speaking. A physician could be considered seductive in that culture if he or she maintained steady eye contact while talking to a patient. In the United States, it is impolite to maintain eye contact with a stranger for more than 3 seconds, but Europeans believe that longer periods of eye contact are normal. The physician needs to consider the patient's cultural background when interpreting the meaning of eye contact behavior. Looking away from the speaker from time to time may be a sign of respect and sensitivity rather than the opposite. At the same time, the physician's failure to look a patient in the eye can be dehumanizing and can cause the patient to feel more like an object than a person. Patients are most comfortable when the physician looks at them approximately 50% of the time and are uncomfortable when eye contact is avoided. Some feel that rapport is improved if a person's gaze is met 60% to 70% of the time (Kuhnke, 2007).

The frequency of eye contact also can provide clues to whether the patient is anxious or depressed. The eyes of anxious patients blink frequently or dart back and forth. They look at the interviewer as frequently as low-anxiety patients but maintain eye contact for less time on each gaze. Similarly, the patient may interpret the physician's lack of eye contact as indicative of anxiety or discomfort, even rejection.

Frequent blinking of the eyes can be a sign of pressure or stress. In a political debate between Senator Bob Dole and President Bill Clinton in 1996, Dole blinked an average of 105 times per minute, showing more pressure than Clinton's 48 times per minute.

Depressed patients maintain eye contact only one-fourth as long as nondepressed patients. Downward contraction of the mouth and a downward angling of the head are also cues to depression. As with the anxious patient, there is no difference in frequency of eye contact in the depressed patient; the difference is only in the duration of contact.

Patients with abdominal pain caused by organic disease are more likely to keep their eyes open during palpation of the abdomen than those with nonspecific pain (Gray et al., 1988). The patient with genuine abdominal tenderness may apprehensively watch the physician's hand as it approaches the tender area.

Hands

The hands will be droopy and flaccid with sadness, fidgety or grasping in anxiety, and clenched in anger. When a speaker joins her or his hands, with fingers extended and fingertips touching, it is called *steepling* and indicates confidence and assurance in the comments being made (Figure 13-7). It can be taken to extremes if held too high and convey arrogance instead of self-assurance (Kuhnke, 2007).

Palms usually are held in the palm-in position. Turning the palms outward can be a subtle courting behavior (usually used by women), but it more likely indicates a warm and friendly greeting (Davis, 1975).

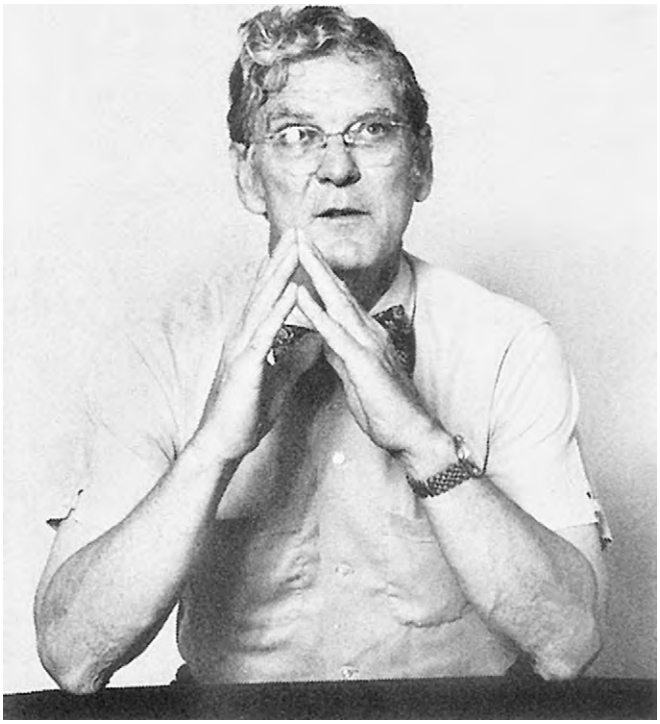

Figure 13-7 Steepling.

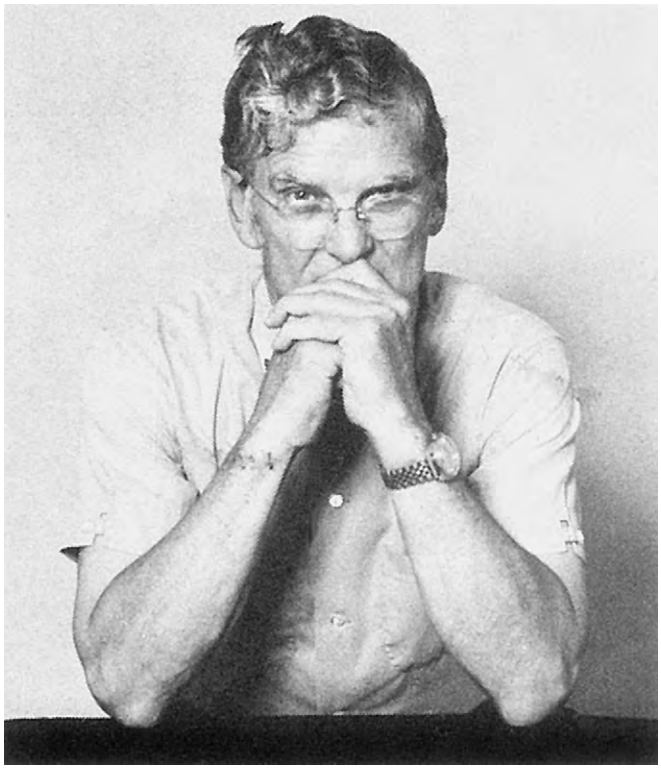

Figure 13-8 The defensive or "doubting Thomas" position.

The hands of an anxious patient can be observed to shake when holding a pen, to twitch, or to be braced unnaturally. The white-knuckle pose of tightly locked fingers can be an effort to mask anxiety.

Hands can be a subtle indicator of the urge to interrupt. Be alert for this sign in a patient so that important information will not be suppressed, and the patient can be given every opportunity to supply valuable information. Indications of this urge to interrupt are a slight raising of the hand or perhaps the index finger only, pulling at the earlobe, or raising the index finger to the lips. The latter gesture also may indicate an attempt to suppress a comment and should alert the physician to inquire further and elicit the hidden information. A patient listening in "The Thinker" position, with the index finger across the lips or extended along the cheek, or one sitting with elbows on the table and hands clenched in front of the mouth, although listening intently, may not believe or understand the physician's words (Figure 13-8). The physician should take additional time to amplify the issue or explain the diagnosis or treatment regimen further.

Arms

Although folded arms are found in all cultures, this is considered a discovered action rather than an inborn trait because it is a natural position of comfort that is as easily discovered by the African tribesman as the New York banker. It is the subtle ways in which the arms are held that can give clues to underlying emotions. Crossed arms can be a defensive posture, indicating disagreement with another's view, or it can be a sign of insecurity. It can also be nothing more than a position of comfort and should, as with all other signs, be considered in the context of the individual's total behavior.

Notice the manner in which the arms are crossed. Are they relaxed in the normal position of comfort, or are they in a self-hugging posture, reflecting insecurity or sadness and indicating a need for reassurance? Anger can be seen in clenched fists that are held tightly against the body in a holding-back manner, preventing them from hitting (Figure 13-9). If the patient has assumed a position of resistance or defensiveness, sitting with arms and legs crossed and perhaps with body turned away, search for the reason for this defensiveness and try to eliminate it. Perhaps a recommendation that the patient stop smoking is threatening and difficult to accept. In that case, it is important to make an additional effort to explain the rationale for the recommendation; do not hurry over it with a brief comment or admonition.

Men who are under stress will often cross their hands in front of them as if protecting their genitals, called the fig-leaf position or "protecting the precious." Women may cross arms over their abdomen referred to as "egg protecting" (Hartley and Karinch, 2010).

Legs

Although crossing the legs is a common position of comfort, it can also indicate a shutting out of or protection against the outside world. If crossed legs in a patient confirm the total kinesic picture of resistance, including crossed arms and other signals discussed earlier (Figure 13-10), make every effort to identify the reason for the resistance and correct it before proceeding further. Likewise, locked ankles can indicate defensiveness. Diagnostic information obtained from a resistant patient is likely to be incomplete, and instructions are unlikely to be followed.

Figure 13-9 The resistant position, suggesting suppressed anger.

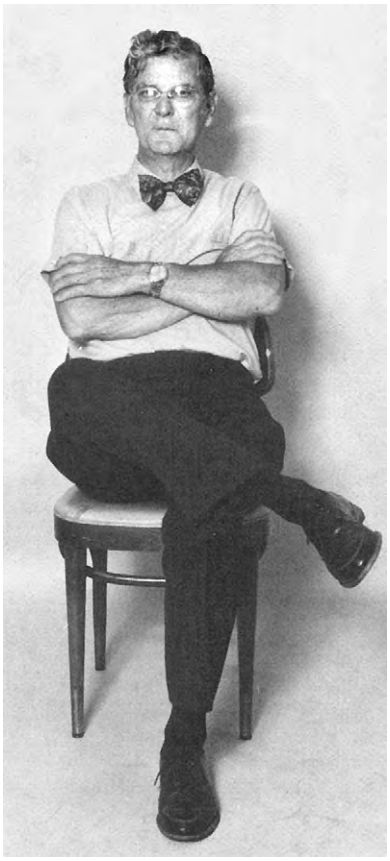

Figure 13-10 The defensive position.

When seated, a person's legs are pointed in the direction of interest and if disinterested will point away. Similarly, when legs are crossed, the upper knee dictates the direction of interest.

Notice the position of the feet and their movement. As with fidgety hand movements, anxiety is associated with the fidgety, constantly moving foot. An anxious or scared person may sit forward in the chair with feet placed in the ready-to-run position, with one foot in front of the other. The angry person is more likely to place the feet widely apart in a position of stability, whereas the feet of a sad person tend to move in a slow, circular pattern.

Gestures

The thumbs-up sign in the United States means "good going," but in some Islamic countries, it is the equivalent of an upraised middle finger. Similarly, the extended hand with palm forward means "stop" in the United States, but in West Africa, it is an insult greater than the upraised middle finger.

Joining the thumb and index finger in a circle to indicate "OK" is an insult in many Latin American countries and in France means zero or worthless. In Texas, raising the index and little finger with the middle two fingers folded down is the "Hook 'em Horns" gesture of the University of Texas Longhorns, but in parts of Africa this gesture is a curse and in Italy it means your spouse is unfaithful.

American television and the movies have dulled these differences worldwide, although some still exist. In the 1978 movie *Inglorious Bastards* (remade in 2009) the American posing as a German was detected because he displayed the number 2 using index and middle fingers, whereas Europeans would hold up the thumb and index finger with the thumb being number 1.

Preening

Preening gestures, such as the male pulling up socks, adjusting a tie, or combing hair and the female adjusting clothing or using a mirror to review makeup, may not necessarily be seductive in nature but can be an attempt to establish rapport and good interpersonal relations. If the preening is intended to be flirtatious, however, the woman may cross her legs, place a hand on her hip, caress her leg, or stroke the arm or thigh in some fashion. The flirtatious male typically uses gaze holding and head tilt to accentuate normal preening gestures or may stretch to make himself look larger. Both genders may use "accidental" touching as a flirting signal. When someone's attention is completely focused on the other, legs, knees, and feet are usually extended in the direction of the other. The physician should remain alert to the accentuation of normal preening gestures into courtship actions to identify the seductive patient and deal with the issue early, before unknowingly encouraging the patient to proceed further along this course.

Respiratory Avoidance Response

The respiratory avoidance response involves a frequent clearing of the throat when no phlegm or mucus is present. All animals exhibit a respiratory avoidance response as a

Figure 13-11 The nose rub, a variation of the respiratory avoidance response.

means of clearing something unpleasant or undesirable from the respiratory tract. This action also can be a nonverbal indication of disgust or rejection. When physicians find themselves doing this, they should observe the accompanying circumstances and notice whether posterior pharyngeal mucus is truly present.

Nose Rub

Another component of the respiratory avoidance response is the nose rub (Figure 13-11). This involves a light or subtle rub of the nose with the index finger and signals rejection of a statement being made by the subject or by another individual. The nose rub to relieve an itch is usually vigorous and involves a repeated series of rubs, whereas that of the respiratory avoidance response is soft and consists of one or two light strokes, often involving nothing more than a light flick of the nose. Morris (1977, p. 111) described the nose flick as "a reflection of the fact that a split is being forced between inner thoughts and outward action." It can be associated with lying or with the struggle to appear calm while suppressing anger or discomfort. During Bill Clinton's testimony to the grand jury regarding his affair with Monica Lewinsky, he rarely touched his nose when telling the truth, but when he lied he gave a split-second frown, then touched his nose. During the testimony he touched it 26 times (Pease and Pease, 2004). Variations of the nose rub include pulling at the earlobe, scratching the side of the neck or rubbing one eye. Someone aware of the nose rub will often notice it

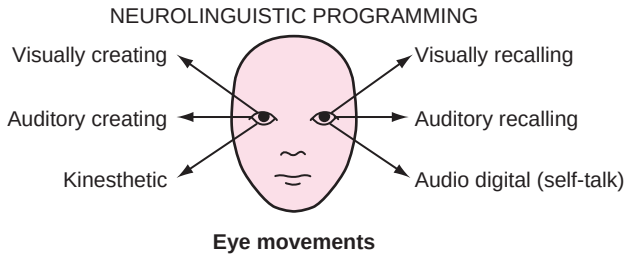

Figure 13-12 Neurolinguistic programming.

in themselves and realize they are uncomfortable with what is being said by themselves or others. Watching for this during interviews on television may indicate the person being interviewed is uncomfortable with the question, or the person asking may realize it is a "testy" point.

This sign can be quite useful in patient interviewing. For example, the physician may ask a patient, "How are things at home?" The patient may answer, "Fine," but then clears his or her throat and lightly rubs the nose with the index finger. He or she is actually saying, "I don't like what you are asking me," or "I feel uncomfortable with my answer; things really aren't going very well at home." If there is a cause to pursue the issue further, a simple comment such as "Really?" or "You mean not even an occasional argument?" may lead to a flood of information masked by the previous response.

Verbal-Nonverbal Mismatch

Another indication that what a patient is saying may be in conflict with what is being felt is a verbal-nonverbal mismatch, such as when the patient answers "fine" to "how are things between you and your husband?" while looking sad and avoiding eye contact (Quill, 1989). If the patient answered negatively to the question, "Have you ever had a venereal disease?" and at the same time exhibited a nose rub, this topic should be followed up with a similar inquiry later, perhaps while doing the physical examination, when the patient may feel more comfortable after better rapport has been established.

Other clues that the patient may not be telling the truth or that there are repressed feelings are asymmetric facial expressions and a prolonged smile or expression of amazement. Almost all authentic facial expressions fade after 4 or 5 seconds (Ekman, 1985).

Neurolinguistic Programming

Neurolinguistic programming (NLP) involves the eye movements performed while thinking and depends on whether a person is thinking visually, aurally, or kinesthetically. A right-handed person who is visually oriented will look up and to his or her left when recalling something visually, but up and to the right if creating something visually or, in other words, making it up or lying. Similarly, a right-handed person will look sideways to his or her left when recalling sounds and sideways to the right when imagining sounds (Ritch, 2004). A person who is looking up and to his or her right (i.e., your left) probably is imagining things he or she has never seen before. This technique is used by police investigators when interviewing suspects. A left-handed person will respond in opposite directions (Brooks, 1989; Zellmann, 2004) (Figure 13-12).

Figure 13-13 The "body bubble" surrounding strangers in a queue. (Courtesy Magnum Photos, New York.)

DETECTING LYING

In addition to looking up and to the right to create an image or a fact, a person who is lying is also likely to do the following:

- Cover the mouth with hand.
- Rub or flick the nose.
- Scratch the neck.
- Pull at the ear, or rub behind the ear.
- Rub one eye.
- Blink excessively (although absence of blinking is also possible).
- Have a micro-expression indicating something is different than what is said.
- Avoid making eye contact.
- Use arms and hands less.
- Be defensive rather than aggressive.
- Change manner or posture abruptly.

The liar will also rarely touch the other person or point a finger at them or others, and the story will not include negative details (Lieberman, 1998). The liar is not comfortable with silence and may speak more than normal to convince the other. Persons suspected of lying should be encouraged to talk because verbal and nonverbal clues will then be easier to detect (Vrij, 2005). Liars are also likely to slouch, unlike a confident person, who will sit upright. Remember that it takes a combination of verbal and nonverbal clues to detect lying, and no single action is likely to be dependable other than to raise doubt or suspicion.

PROXEMICS: SPATIAL FACTORS

Proxemics is the study of how people unconsciously structure the space around them. This structuring varies with every culture. North Americans, for example, maintain a protective "body bubble" of space about 2 feet in diameter around them when they interact with strangers or casual acquaintances. Violators of that space are considered intruders and cause the person to become defensive (Figure 13-13). In the Middle East, no such bubble exists, and it is proper to invade this area. In fact, not to do so may be interpreted as unfriendly and aloof. Arabs prefer to stand close enough to touch and smell the other person. Americans, however, if forced to stand close together, as on a crowded subway, will use their eyes (i.e., distant gaze) to maintain a more proper distance. An arm's length is a good measure of the appropriate personal distance for most people. A wife can stand inside her husband's bubble, but she will be unhappy if another woman invades this sphere of privacy, and vice versa.

Robert Frost said, "Good fences make good neighbors." In suburbs and small towns, people are more likely to talk to each other while in their backyards if a fence indicates the boundary than if there is a communal yard (McCaskey, 1979). Marking the boundary helps maintain territoriality and actually brings the neighbors closer together than when there is no fence.

Intimate space has been classified as that ranging from close physical contact to 18 inches, *personal space* from 18 inches to 4 feet, *social space* from 4 feet to 12 feet, and *public space* from 12 feet and beyond (Lambert, 2008). Placing a desk between two people shifts personal space to social space. The office desk also can be a barrier to communication when it is placed between the physician and patient, thereby emphasizing the illusion of the physician's importance and power. There may be occasions when this is desired, but it usually is not necessary in a family physician's office. Office furniture should be arranged so that a minimum number of obstacles lie between physician and patient.

Automobiles magnify the size of one's personal space up to 10 times. Compare the relationship of two people having a conversation with that of "road rage" when one invades the other's space by cutting in front of them.

HIDDEN OR MASKED COMMUNICATION AND PATIENTS' EXPECTATIONS

Although the average person has a symptom about every 6 days, he or she visits a physician only once every 4 months. Some people visit a physician much more frequently than others for the same symptom. The group who visits more frequently tends to have a higher level of anxiety, fear, grief, or frustration. It is the physician's responsibility to search for, identify, and treat organic disease if it is present, but in about one half of cases, none will be found. It is equally important to identify the reason for these visits—the basis for the heightened concern or increased anxiety. A person may see a minor symptom as a potential catastrophe if she or he thinks it may be a sign of cancer similar to that causing a parent's death. Is the patient really there "just for a blood pressure check," or because of concern about the condition of his or her coronary arteries since a friend recently had an acute myocardial infarction? If the physician deals only with the symptoms, the real concerns may go undetected, and the result will be a dissatisfied and noncompliant patient.

Barsky (1981, p. 492) cautioned, "Patients who express dissatisfaction with their medical care should be questioned about this, as they may be dissatisfied because their real motivation in seeking care has not been illuminated." He also advised the physician to investigate the patient's current life stresses when visits are made if there is no change in clinical status.

Patients may come to a physician because of what they imagine is causing their symptoms rather than because of the symptoms themselves. Identifying what patients hope can be done for them—focusing on their expectations for the visit—often reveals hidden reasons for the visit. The physician should be sure to address the patient's expectations and make certain that the interpretation is correct. Rapport and satisfaction will be enhanced if the physician identifies and satisfies the patient's expectations for the visit. Dissatisfaction results when these expectations go unmet.

LISTENING WELL

A good family physician must be a good listener. Of all the communication skills essential to rapport, the ability to listen well is probably the most important. All the information in the world about body language, vocal messages, and nonverbal cues is of limited value unless it helps the family physician be a better listener.

As Lown (1996) states, "In the brief time available to take a history, the aim is to obtain, in addition to essential facts, insight into the human being. This seems easy, but listening is the most complex and difficult of all the tools in a doctor's repertory. One must be an active listener to hear an unspoken problem" (p. 10). The appearance of readiness to listen is aided by bending forward and maintaining eye contact. The physician can discourage a patient from talking by looking away or writing in the medical record. Well-chosen questions can be rendered useless by inappropriate nonverbal behavior. Even great questions are of no value if you do not know how to listen.

For many people, the opposite of talking is not "listening" but rather "waiting to talk." It is impossible to listen attentively when you are planning what to say next. Besides, learning to listen is more difficult than learning to ask good questions (Dimitrius and Mazzarella, 1999).

The average listening efficiency of most people is only 25% because we do not concentrate on what is being said. Effective listening requires focus on what is being said and on voice tone, facial expression, and body movements. Hearing what someone says and truly listening to what they are saying is quite different (Zellmann, 2004).

Analyses of physician-patient interviews reveal that, on average, the physician rather than the patient does most of the talking, although when questioned, physicians usually imagine the reverse. In general, the less the physician says during an interview, the more the patient will say.

Boredom is one of the most difficult states to conceal. It is very difficult to appear attentive and interested if you are bored, and it takes considerable effort to appear interested (Dimitrius and Mazzarella, 1999).

SILENCE

Silence can be as effective a means of eliciting further information as direct questions. The timing is important, however, and silence should be used as a technique only when the physician is relatively certain that there is more information to follow the last statement. A shift of position or a nod and a smile, properly timed and coupled with silence, can be more effective than an encouraging comment. Nonverbal encouragement to continue is less distracting and may be more facilitative than the verbal form.

Attorneys use silence in the courtroom to get witnesses to say more than they had intended. They wait silently as if the witness has not given a complete answer, and usually they do receive additional information. Silence can be effective as long as the patient feels more inclined to fill the void than the physician. This is of value, however, only when there is more information to be obtained. It is said that Charles DeGaulle thought that silence was the ultimate power tool, and in his speeches, he gained control by looking at the audience, never breaking eye contact, and saying nothing.

INTERRUPTION

The patient may be following a line of thought and may be about to open up more but must stop and refocus if the physician captures the patient's attention with a question. The physician should interrupt a patient's statement only if it is necessary to change the conversation to a new topic, clarify an issue, elicit information not produced spontaneously, offer reassurance, or reduce patient anxiety.

Physicians usually use closed-ended questions to interrupt the patient and thereby inappropriately control the interview. Beckman and Frankel (1984) found that 69% of patients (52 of 74) had only 18 seconds to complete their initial complaint before being interrupted by their physician. This usually occurred after the patient stated only a single concern, and it effectively halted the further flow of information from the patient. This prematurely terminates opportunities for patients to present their primary concerns. Only one of the 52 patients subsequently returned to and completed the opening statement. In these recorded

office interviews, only 23% of the patients were permitted to complete their list of problems uninterrupted; when they were, the complete statements usually took less than 60 seconds, and none required more than 2.5 minutes.

HUMOR

The art of medicine consists of amusing the patient while nature cures the disease.

—VOLTAIRE

Humor can be helpful in establishing rapport and can strengthen the physician-patient relationship. It can be used to "break the ice" and is most useful if it communicates the feeling that "we are all in this together." Humor is an effective way for physicians to appear human while supporting and empathizing with their patients. Physicians who score high in empathy also tend to have a good sense of humor (Hampes, 2001). Empathic humor can promote a stronger physician-patient relationship and enhance the effectiveness of other, more traditional as well as nontraditional forms of therapy (Berger et al., 2004).

Care must be taken, however, because humor can be a two-edged sword that can cut either way if used inappropriately. The least risk is when the humor is self-deprecating or focused on neutral topics such as the weather or parking. It can even alienate the patient if they feel the joking around is inappropriate at the very time they want serious attention paid to their problem.

More research is needed on the value of humor in medicine so that we will know when and how to use it effectively. Norman Cousins, former editor of the *Saturday Review*, had ankylosing spondylitis. He received 3 hours of pain relief after watching comedy videotapes of *The Three Stooges* and *Abbott and Costello* but obtained only one-half hour of pain relief from an oral analgesic. Some physicians write prescriptions for patients to laugh out loud three times each day. In India, more than 600 Laughter Clubs convene for 15 to 20 minutes at the beginning of each day to laugh out loud. Even a fake laugh makes one feel better throughout the day. Laughter boosts the immune system and even forced laughter leads to a good feeling and relieves stress and anger (Cleese, 2001).

Physicians who express interest in patient opinions and who use humor more often are sued less often. Tasteful humor can reduce anxiety and create a bond of friendship, but humor used inappropriately can magnify the distance between patient and physician, especially if it belittles the patient.

See eAppendix 13-1 online for interviewing effectively (including facilitating techniques) and eAppendix 13-2 for care with caring.

Summary of Additional Online Content

The following content is available at www.expertconsult.com:

eAppendix 13-1 Interviewing Effectively

eAppendix 13-2 Care with Caring

References

The complete reference list is available at www.expertconsult.com.

Web Resources

www.blifaloo.com/info/flirting-body-language.php Male and female flirting signals, eye contact, and mirroring. Also contains a link to "How to Detect Lies" plus tips on improving memory.

www.changingminds.org Covers a variety of body language message clusters, including aggressive, attentive, deceptive, romantic, and submissive.

www.wikihow.com/Read-Body-Language Good overview of the major components of body language; includes a video demonstration.

EAPPENDIX

13-1 *Interviewing Effectively*

The patient history is the most likely assessment activity to provide a diagnosis. The final diagnosis is evident in almost 80% of cases after the history alone and in an additional 12% of cases after the history and physical examination; laboratory testing is required to make the diagnosis in only 11% of cases (Schmitt et al., 1986).

The skilled family physician can spend 10 minutes with a patient, but the patient may think it was 20 minutes. This is much better than the physician who spends 20 minutes but leaves patients thinking that he was in a hurry and that they were encroaching on his time. Overly brief or abrupt conversations in the office or at the bedside can damage rapport severely. Physicians signal how much time they plan to spend by a variety of nonverbal cues, and patients rarely have the courage to counter this by asking for more time. The physician who hurriedly asks, "How are you?" while flipping through a chart with only a quick glance at the patient destroys communication. Even the busiest physicians can accomplish much quickly by giving full attention to the patient: Patients remember the outstanding physician who truly communicated with a relaxed posture and attentive manner in whatever time was available.

Analysis of taped physician-patient encounters in a pediatric clinic revealed that many of the mothers were dissatisfied because the physician paid too little attention to their concerns and apprehensions about their children. Their attitude had little relation to the amount of attention the physician actually paid to the infant, which was usually adequate (Korsch and Negrete, 1972).

Even in an established family practice where essentially none of the patients was dissatisfied with the physician, 54% of the patients either forgot to mention something of concern or misunderstood facts about diagnosis or treatment (Snyder et al., 1976). Of the 84 patients, 29 forgot to tell the physician something that was bothering them. This illustrates the wisdom of concluding every interview with the statement, "Is there anything else bothering you that we haven't discussed?"

When meeting a new patient, the method used to address the patient during the introduction can help establish rapport by conveying an atmosphere of mutual respect. Greet the patient warmly with a handshake and a smile while maintaining eye contact. Giving the patient undivided attention for just 60 seconds conveys the impression that you are truly interested. Use the patient's name during the introduction, during the interview, and on leaving. An appropriate introduction would be, "Good morning, Mrs. Brown, I'm Dr. —," or, "Good morning, Mrs. Brown. I'm —, a second-year medical student, and I'll be taking your medical history and examining you today." It is also better to show concern for the patient with an opening statement such as, "How can I help you?" rather than, "What brings you here today?"

Facilitating Techniques

In addition to the nonverbal facilitating techniques of silence and body positioning, patients can be encouraged to talk further with simple comments such as, "And then?" or by repeating a portion of the statement just made:

Patient: *I have been very nervous lately.*
Doctor: *Nervous?*

Confrontation

Confrontation, wisely used, can help establish communication and rapport. Statements such as, "You look unhappy," or "You appear very anxious," are based on the physician's observation of the patient. If the physician has been unable to establish rapport, it may help to approach the issue openly and frankly: "We don't seem to be communicating very well. Can you tell me what is wrong?" This is also a useful maneuver when a previously good relationship suddenly turns sour.

Summarization or Paraphrasing

Summarization is a brief restatement of what the patient has said and gives the interviewer and the patient a chance to correct errors or misunderstanding. It demonstrates the physician's interest in the patient's history and his or her effort to collect the facts accurately. A summary gives the patient an opportunity to add more details but also lets him or her know that the physician was listening. The physician can restate what the patient has said and emphasize the important points to ensure clear understanding. Summarization ensures that both parties are using the same definitions and minimizes inappropriate assumptions. "Let me see if I have understood you correctly," or, "Am I understanding this correctly?" are good ways to introduce a paraphrase.

Summarizing is also a subtle way of focusing on the important facts in the history without asking closed-ended questions that may inhibit the patient. A summary also can be used to change the subject when the physician wants to move on to another topic.

Concluding a History

In an effort to avoid leaving gaps in the history or allowing patients' concerns to go unattended, it is wise to conclude every complete history with, "Is there anything else you would like to mention?" or "Is there anything that we have

not discussed?" This excellent practice is of little value, however, if at the same time the physician puts away pen and pad, closes the chart, and starts edging toward the door.

Open-Ended Questions

Probably the single most valuable rapport-promoting element of verbal communication is the use of open-ended questions at the onset of an interview. "Tell me more about it" is an interview technique and a state of mind. The physician who understands that no checklist of yes-or-no questions can possibly portray the patient as a unique human will create an atmosphere of sensitivity and interest that contributes greatly to the early establishment of rapport. Once the broad outlines of the patient's unique situation are indicated, detailed questioning moves along quickly.

An open-ended question does not suggest what you would like the answer to be, and the patient may include additional information that was unexpected. Even if you need specific information, a good rapport builder is to start with a few open-ended questions and become more focused as you go (Dimitrius and Mazzarella, 1999).

Specific questions beget specific answers and rarely anything more. However, the physician may want to use this technique on occasion, as when dealing with the verbose, rambling patient who refuses to stick to the point, or when specific information is needed. When more general or hidden data are sought, however, the physician must choose questions and gestures that offer the maximal potential for obtaining information. To be effective, open-ended questioning requires that the physician appear relaxed and ready to listen regardless of the amount of pressure from waiting patients. After it becomes apparent that more time is necessary than is available, a new appointment is made to ensure adequate time.

Signals That Discourage Communication

While appearing to respond affirmatively and facilitate the conversation, people in fact can turn off the speaker if they frequently comment "yes" in a manner that conveys disinterest or impatience. Everyone has experienced the person who says "yes" before the sentence is finished or the point made. Patients can be subdued and reduced to silence in a similar manner, intentionally or unintentionally.

Confidentiality

Confidentiality is a cardinal principle of professionalism. Effective communication requires that the patient feel secure in the knowledge that all information will be kept strictly confidential. It is the ethical responsibility of each physician to maintain this bond of confidentiality. The family physician must appreciate this intimate and confidential bond and avoid any threat to its dissolution. Hippocrates said, "And whatever I shall see or hear in the course of my profession, as well as outside my profession in my intercourse with men, if it be what should not be published abroad, I will never divulge, holding such things to be holy secrets" (Strauss, 1968, p. 325).

Assurance that all information and actions will be kept confidential is especially important when dealing with adolescents. They may not be aware of this basic ethical principle in the medical profession or realize that it applies to them. They may be reluctant to share information and trust completely for fear that parents or peers may find out.

Complex problems of confidentiality can arise for the physician who cares for several members of the same family. Family members often can provide important information that supplements what the clinician learns directly from the patient. Unfortunately, information sometimes may be offered only on the promise that it will not be disclosed to the patient. Secrets rarely can be kept for long; the patient sooner or later learns what has been confided, straining the bonds of trust. In general, it is best not to be a party to secrets but rather to find a way to discuss sensitive material. If rapport is to be maintained, the physician must diplomatically explore the possibility of dealing with such problems in a constructive manner as soon as the patient's situation permits.

Rapport with Families

No patient exists in a social vacuum. Visible or invisible, family and friends provide a social environment that exerts an important influence on the clinical course of disease. Because the family usually has a stronger emotional influence on the patient than the physician, effective communication with the patient's family is an important element in successful patient care. Their positive support is necessary if the physician's plan of management is to be carried out. Family support of the physician's treatment regimen can help ensure that a patient remains on a prescribed diet, takes medication as instructed, rests appropriately, or maintains a proper exercise program. An unsupportive family attitude can negate or severely jeopardize previous gains in treatment.

Family, friends, and colleagues can be valuable sources of important information regarding the patient's illness beyond that given by the patient, including facts that were forgotten, repressed, or even unknown to the patient. Communication should be established through the most responsible family member (other than the patient). However, it is important that such discussion be known to patients, and that a summary of the discussion be shared with them by the physician to avoid a misunderstanding or conflict of ideas when patient and family interact. If the patient and the family have different sets of information, they may become suspicious of future communications with the physician.

Communication with concerned family and friends need not be time-consuming. If a serious or prolonged illness is involved, a family conference can outline what can be expected and what will be done. It is usually possible to identify one family member as the communication channel to whom future reports will be given, avoiding frequent and repetitious calls. Many clinicians find that optimal control

and satisfaction are achieved by initiating the calls themselves on a regular schedule.

Lack of understanding of the family's concerns and inadequate communication with family members are major factors leading to malpractice suits. Devaluing the patient or family views and failing to understand their concerns was a major reason mentioned by plaintiffs (Beckman et al., 1994). The most common complaint was the feeling of being deserted by the physician and feeling alone when the physician would not return calls or return to the bedside as promised, especially after an adverse event.

Rapport with Children

Working with children is one of the delights of practice. Children have a quality of freshness and directness that adults often lack. There are no secret formulas for interacting with the young, although there are cautions to be observed. Most procedures are not uncomfortable if the physician exercises patience, but forced gaiety and false promises that "it won't hurt" immediately are perceived as dishonest, and once trust is destroyed, it may never be regained by any physician. Examining the ear of the mother or an older sibling, for example, before examining the child often allays anxiety. Let the child handle the stethoscope or otoscope. Simple rewards also can make the physician's office a place of interest for the child. Accompanying other members of the family on visits to the physician helps the child gain familiarity with the office and staff. The physician who spends a few extra minutes with children and family early in the professional relationship will reap enormous dividends in years to come.

EAPPENDIX

13-2 Care with Caring

"One of the essential qualities of the clinician is interest in humanity, for the secret of the care of the patient is in caring for the patient." This statement by Francis Peabody (1930, p. 57) could serve as the maxim for establishing patient rapport. While continuing to emphasize the curing aspects of medicine, family medicine places increased emphasis on its caring aspects. Caring is the opposite of apathy and implies the application of human tenderness and compassion to the curing of individuals. It involves respect for the individual and enables the physician to motivate patients to participate in their care. Physicians must convince patients that they care and are sincerely interested in providing help.

"Caring without science is well-intentioned kindness, but not medicine. Conversely, science without caring empties medicine of healing and negates the great potential of an ancient profession. The two complement and are essential to the art of doctoring" (Lown, 1996, p. 223). It has been said that more mistakes in medicine are made by those who do not care than by those who do not know. The caring implies an empathetic relationship between physician and patient. Empathy is the capacity of physicians to understand what the patient is experiencing, and it is best accomplished if physicians place themselves in the role of patients in an effort to understand their feelings. The capacity to understand another person's feelings is the foundation of the physician-patient relationship.

Chekov, a physician himself, believed that medical students should spend one half of their time learning what it feels like to be ill. Although this may be an extreme method for developing empathy, it is important that the student, before becoming immersed in the technical and cognitive aspects of medicine, be able to identify with the patient's feelings, fears, apprehensions, and expectations so that the knowledge acquired during medical school can be applied meaningfully in the context of these needs. Exposing students to patients in the first year of medical school, before they have been preoccupied with the diagnosis and treatment of disease, offers them an opportunity to focus on the process of communication under the watchful gaze of an instructor. Barriers to effective communication then can be identified. For example, a student may have difficulty permitting a patient with terminal cancer to talk about impending death. More than one student has been known to convey discomfort nonverbally by conducting the interview standing at the foot of the hospital bed, adjacent to the door and ready to escape.

Although a physician may be able to cure a disease only occasionally, the physician always can console the patient. An unknown French author admonished the medical profession "to cure sometimes, to relieve often, to comfort always." The family physician provides personalized patient care and attempts to minimize the often frightening and dehumanizing experience to which patients are subjected in our highly structured modern medical system. The physician must strive constantly to preserve personal dignity for the patient, especially when his or her identity is threatened by a strange and somewhat frightening hospital environment. Care *for* a patient is more personal than the care *of* a patient.

Most patients have some degree of stress related to their presenting complaint, and it is important that family physicians convey a sense of caring when attempting to resolve the problem. As Fuller (1993) stated, "On a daily basis, I assess the disease process and adjust the medical management as needed, but my joy comes from listening carefully, helping people to identify their stressors, providing my best advice when I think it is appropriate, but always offering my caring and understanding. ... I am both rewarded and fascinated to observe that people feel better just by recognizing that I care." One of his patients said it best: "No one cares how much you know, until they know how much you care."

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14 Interpreting Laboratory Tests

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CHAPTER OUTLINE

The use of the clinical laboratory to evaluate patients for the presence or absence of disease involves all medical and surgical specialties. Physicians in all areas of medical practice are dependent on laboratory testing to arrive at a correct diagnosis. Because many factors increase the uncertainty associated with a test result, physicians need to understand the limitations of interpreting test results.

Clinical decision making using diagnostic laboratory testing is based on the assumption that a given test is accurate and precise. Diagnostic test *accuracy* is the ability of a test to distinguish patients with a disease from those who are disease free (Leeflang et al., 2008). Test accuracy is not necessarily fixed; accuracy may vary among patient populations and with different clinical conditions. *Precision* is a measure of the reproducibility of a test measurement when the same specimen is rechecked under the same circumstances. Sources of imprecision include biologic variability and analytic variability. *Biologic variability* is the variation in a test result in the same person at different times because of physiologic processes, constitutional factors, and extrinsic factors (McClatchey, 2002) (Table 14-1). *Analytic variation* refers to the variation in repeated tests on the same specimen and relates to analytic technique and specimen processing. With current technology, biologic variation plays a larger role than analytic variation in most laboratory tests.

The Concept of "Normal"

The result of a laboratory test is compared with a reference standard, which traditionally has indicated values that are seen in healthy persons. Using the terms "normal results" or "normal range" implies that there is a clear distinction between healthy and diseased persons, when in reality there is considerable overlap.

The current standard of comparison for laboratory results is the *reference range,* which is frequently defined by results that are between chosen percentiles (typically the 2.5th to 97.5th percentiles) in a healthy reference population. Several problems are encountered when deriving a reference range. Often, the reference population is not representative of persons being tested. Differences in gender, age distribution, race, ethnicity, or the setting (hospitalized vs. ambulatory patients) between the reference population and the person receiving the test may be present. The person being tested should be tested under similar physiologic conditions (e.g., fasting, sitting, resting) as the reference population. The size of the reference population may be too small to include a representative range of the population.

Two statistical methods, parametric and nonparametric, are generally used to define the reference intervals. The *parametric* method applies when the results of the sample population fit a normal gaussian distribution, with a bell-shaped curve around the mean. In this case, the 2.5th and 97.5th percentiles can be calculated using statistical formulas. When the reference values do not follow a normal distribution, *nonparametric* methods are used, arranging the results from the reference subjects in ascending order, and identifying values between the 2.5th and 97.5th percentiles as within the reference range.

Reference ranges for a particular test can be the manufacturer's suggested reference range or may be modified because of differences in the population using the laboratory. The Clinical Laboratory Improvement Act (CLIA) of 1998 has defined three requirements for reference values: the normal or reference ranges must be made available to the ordering physician; the normal or reference ranges must be included in the laboratory procedure manual; and the laboratory must establish specifications for performance characteristics, including the reference range, for each test before reporting patient results. Using the manufacturer's reference range is valid when the analytic processing of the test is the same as that done by the manufacturer and when the population being tested is similar to the reference population used to define the reference range. When selecting a reference range that includes 95% of the test results, 5% of the population will fall outside the reference range for a single test. When more than one test is ordered, the probability increases that at least one result will be outside the reference range. Table 14-2 compares the number of independent tests ordered with the probability of an abnormal result being present in healthy persons.

Evaluating a Test's Performance Characteristics

Given that tests are not totally accurate or precise, one must have a way to quantify these shortcomings. A test's ability to discriminate diseased from nondiseased persons is defined by its sensitivity, specificity, and positive and negative predictive values. Table 14-3 shows how each is calculated. Sensitivity and specificity are inherent technical aspects of a test and are independent of the prevalence of disease in

Table 14-1 Biologic Variables That Affect Test Results

Biologic rhythms	Circadian Ultradian Infradian
Constitutional factors	Age Gender Genotype
Extrinsic factors	Posture Exercise Diet Caffeine use Medication Alcohol use Pregnancy Intercurrent illness

From Holmes EA: The interpretation of laboratory tests. In McClatchey KD, ed. *Clinical laboratory medicine*. 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2002, p 98.

Table 14-2 Probability That a Healthy Person Will Be Labeled as Abnormal with Multiple Test Ordering

Number of Independent Tests	Probability of an Abnormal Result (%)
1	5
2	10
5	23
10	40
20	64
50	92
90	99
Infinity	100

From Burke MD: Laboratory tests. Basic concepts and realistic expectations. *Postgrad Med*, 1978;63:55.

Table 14-3 Diagnostic Test Performance Characteristics

Finding	Disease Present	Disease Absent
Test positive	True positive (TP)	False positive (FP)
Test negative	False negative (FN)	True negative (TN)

Sensitivity = TP/(TP + FN); Specificity = TN/(TN + FP)
Positive predictive value = TP/(TP + FP); Negative predictive value = TN/(TN + FN).

the population tested. However, given that diseases have a spectrum of manifestations, sensitivity and specificity are improved if the population is heavily weighted with patients who have advanced (vs. early) illness.

Sensitivity is defined as the percentage of persons with the disease who are correctly identified by the test. *Specificity* is the percentage of persons who are disease-free and correctly excluded by the test. The *positive predictive value* is defined as the percentage of persons with a positive test who actually have the disease, whereas the *negative predictive value* is the percentage of persons with a negative test who do not have the disease. Predictive value is influenced by the sensitivity and specificity of the test and the *prevalence* (the percentage of people in a population who at a given time have the disease).

Separating Diseased from Disease-Free Persons

Under ideal circumstances, sensitivity and specificity approach 100%. In reality, they are lower. The best currently available test to decide who is diseased or disease-free could be imperfect and have sensitivities and specificities in the 80% range. Moreover, discrepancies between a test's efficacy and its effectiveness are common. *Efficacy* is a test's performance under ideal conditions, whereas *effectiveness* is its performance under usual circumstances. Tests under development are evaluated under highly rigorous criteria, but in clinical practice, inadvertent error can be introduced into the technical performance or interpretation of the test results. Also, test values for the diseased and disease-free populations overlap.

A cutoff value may be chosen to separate "normal" from abnormal (Figure 14-1). This decision is arbitrary and involves selecting a balance between sensitivity and specificity. The receiver operating characteristic (ROC) curve is a graphic analysis used to identify a cutoff that minimizes false-positive and false-negative results (Figure 14-2). The sensitivity and specificity are calculated for a number of cutoff values, with the variables *1-Specificity* plotted on the *x* axis and *Sensitivity* plotted on the *y* axis. Each point on the curve represents a cutoff for the test. A perfect test would have a cutoff that allowed both 100% sensitivity and 100% specificity. This would be a point at the upper-left corner of the graph. The most efficient cutoff for a single test is the one that gives the most correct results, represented by the value that plots nearest to the upper-left corner of the graph.

The optimal cutoff depends on the purpose of the test and essentially is a risk/benefit analysis. In situations where disease detection is most important, the cutoff may be chosen that maximizes sensitivity at the expense of decreasing specificity. If disease exclusion is the goal, sensitivity and negative predictive value need to be maximized. It is important that negative results be *true* negatives as opposed to false negatives, so that a negative test has correctly excluded the individual as having disease. Similarly, if disease confirmation is the goal, specificity and positive predictive value are critical. It is important that positive results are *true* positives and not false positives, so that healthy persons are not misidentified, especially when treatments (e.g., surgery) have serious risks.

The predictive value of a test is directly related to the pretest probability of disease. When the prevalence of disease is high in the population, a positive test result is expected and a negative result is not expected, because the disease is common. Similarly, when the prevalence is low, a negative test result is anticipated because few people have the disease. These characteristics of predictive value become clinically useful when one compares the outcome of a positive or negative test result with the pretest probability of disease (Figure 14-3). Prevalence (pretest probability of disease) is plotted against predictive value for a positive and negative test. Note that a test result loses its ability to discriminate those who have disease from those who do not at the extremes of prevalence. If disease probability is low, a positive or negative result does not change the posttest

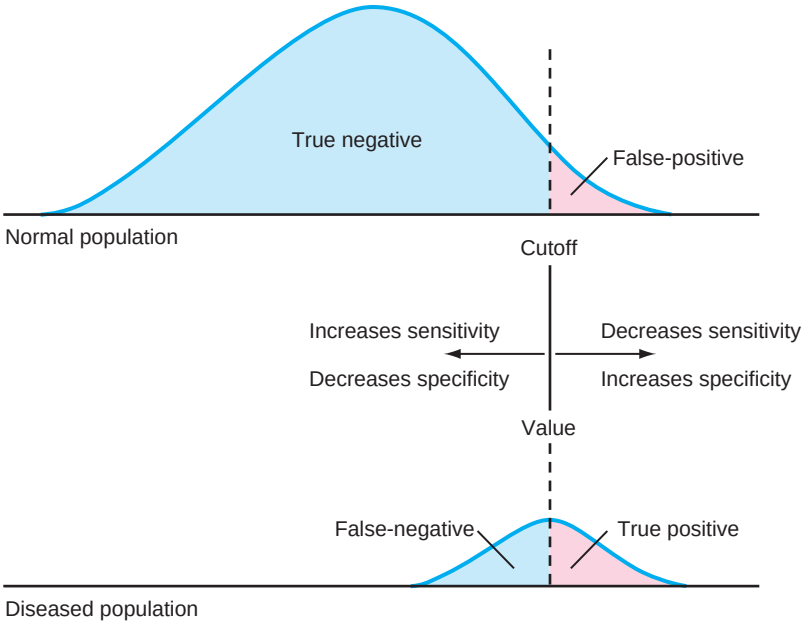

Figure 14-1 Effect of changing a test's cutoff value on disease classification. (Modified from Cebul RD, Beck LH. *Teaching clinical decision making*. Westport, CT: Praeger; 1985, p. 4.)

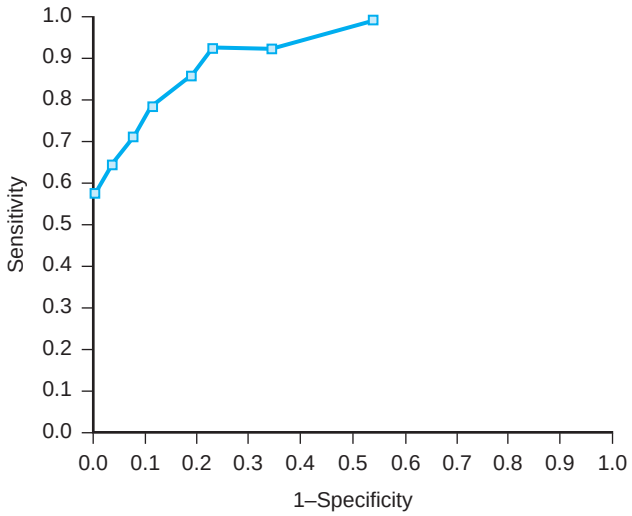

Figure 14-2 Receiver operating characteristic (ROC) curve showing the effect of changing the cutoff values for separating disease from no disease. (From Tetrault GA. Laboratory statistics. In Henry JB, ed. *Clinical diagnosis and management by laboratory methods*. 20th ed. Philadelphia: Saunders; 2001.)

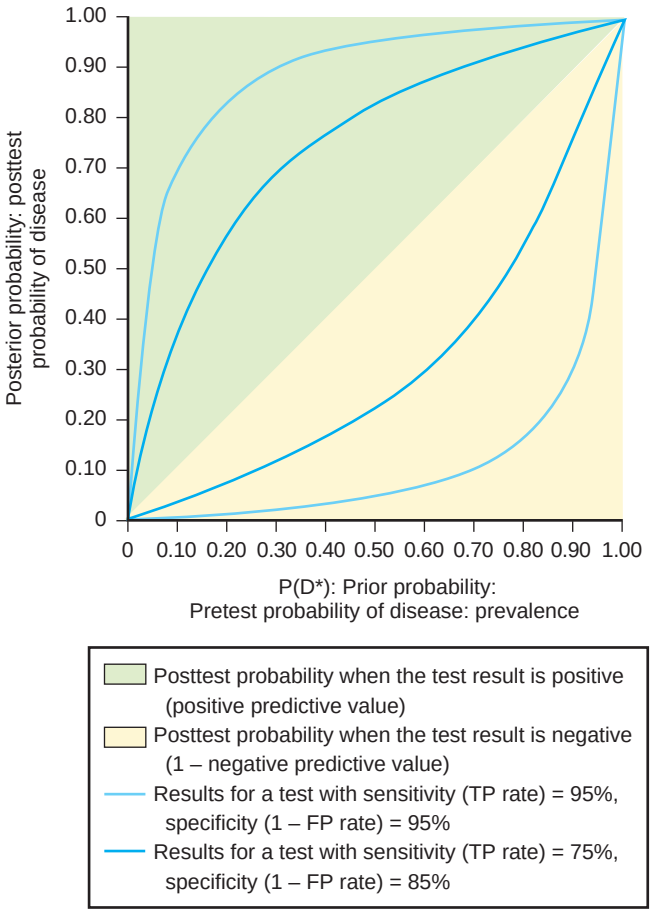

Figure 14-3 The relationship between pretest and posttest probability of disease based on a positive or negative test result. *FP,* False-positive; *TP,* true positive. (From Sackett DL, Haynes RB, Guynett GH, et al. *Clinical epidemiology*. 2nd ed. Boston: Little, Brown; 1991, p. 92.)

probability much—it is still low. Conversely, if disease probability is high, the posttest results, whether positive or negative, do not substantially alter an already high probability of disease being present. The predictive value has the greatest power to discriminate those with disease from those who are disease free in the mid-pretest probability range, near 50%. A positive test result suggests a higher posttest probability of disease than a negative result.

MULTIPLE TEST ORDERING

For many diseases, more than one test is available for diagnostic or screening purposes. The dilemma then becomes whether a positive result on several tests must be present before the diagnosis is confirmed, or whether a single

positive test is sufficient to label the person as diseased. The various possibilities will have an impact on sensitivity and specificity if the tests are viewed separately. Consider the example in which two tests are available for the diagnosis of a disease. Three combinations can lead to an affirmative diagnosis:

1. If one of the two tests is positive, the diagnosis is made.
2. A positive result for both tests is required before the diagnosis is confirmed.
3. The second test is performed only if the first is positive, and the person is labeled as diseased only if the second is also positive.

The first combination will increase sensitivity and decrease specificity in comparison with each test alone, and the second combination will decrease sensitivity and increase specificity. These effects on sensitivity and specificity for multiple test ordering are similar to shifting the cutoff point for a single test.

The value of performing a second test only when the first is positive generally comes into play when the first test is significantly less expensive and easier to administer than the second test but is less specific, although highly sensitive. The second test is highly sensitive and specific but more costly to perform on large populations, especially for screening purposes. An example is the enzyme-linked immunosorbent assay (ELISA) and Western blot test for human immunodeficiency virus (HIV) testing. The ELISA has a high sensitivity and is relatively inexpensive and easy to perform, but it is less specific. The Western blot test has high sensitivity and specificity, but it is more expensive and more difficult to perform. Using the ELISA first identifies almost everyone with the disease, whereas the Western blot excludes the fraction of persons incorrectly labeled as having disease (false positives) by the ELISA test. This testing sequence has improved sensitivity and specificity over each test alone and is more cost-effective than initially performing both tests.

CONSIDERATIONS FOR ORDERING TESTS

In addition to diagnostic accuracy, the other important consideration in test ordering is the ultimate effect on the patient. What actions will be taken, based on the test results? What are the expected benefits or harms that might occur, based on a positive or a negative result? Will ordering a particular test be more likely to help than harm the patient? Unfortunately, at present, randomized controlled trials (RCTs) that examine the outcomes of test-and-treatment strategies are not available for most clinical situations. Thoughtful systematic reviews of diagnostic test accuracy, linked with clinical evidence examining treatment options, may be the best available evidence to help guide decisions on diagnostic testing (Cornell et al., 2008).

The following section presents an overview of 40 commonly ordered tests. Each section discusses the physiologic significance of the test, a typical range of reference values, and a listing of some common disease states that might explain an abnormal result. The reference ranges for each test are intended as guides and may differ from the reference ranges used by different laboratories, depending on the reference population and the test methodology.

Table 14-4 Causes of Decreased Albumin Levels

Reduced Absorption	Decreased Synthesis
Malabsorption Malnutrition	Chronic liver disease
Protein Catabolism	**Increased Losses**
Infection Hypothyroidism Burns Malignancy Chronic inflammation	Nephrotic syndrome Cirrhosis Protein-losing enteropathies Hemorrhage
Dilutional	
Syndrome of inappropriate antidiuretic hormone secretion (SIADH) Intravenous hydration	

ALBUMIN

Albumin is a transport protein that is produced mainly in the liver and maintains osmotic pressure. Albumin has a long half-life (20 days) and a small (approximately 5%) daily turnover. In humans, albumin levels increase from birth up to age 1 year, thereafter remaining stable at approximately 3.5 to 5.5 grams per deciliter (g/dL) throughout adult life. Albumin levels are reduced with advancing liver disease, nephrotic syndrome, protein-losing enteropathy, malnutrition, and some inflammatory diseases (Table 14-4). Elevations of serum albumin are unusual except in dehydration.

In severe acute infection, reduced albumin production combined with increased catabolism causes a reduction in serum albumin levels beginning in 12 to 36 hours and reaching a maximum nadir in about 5 days. As a marker for malnutrition, however, albumin levels decline relatively late. Albumin levels are most helpful in the evaluation of edema, liver disease, and proteinuria.

The difference between the serum albumin level and the albumin in ascites fluid, the serum-ascites albumin gradient (SAAG), can help differentiate portal hypertension from other causes of ascites. SAAG greater than 1.1 g/dL is seen with portal hypertension; SAAG less than 1.1 g/dL suggests another cause of the ascites, such as peritoneal inflammation or malignancy.

Most of the albumin filtered through the kidneys is reabsorbed, so significant urinary albumin is a sign of abnormal renal function. Large amounts (>300 mg/dL) of albumin can be detected on standard urine dipsticks. *Microalbuminuria* is defined as a persistent increase of urinary albumin that is below the detectable range of the standard dipstick test. Microalbuminuria is a marker for early diabetic nephropathy and also predicts macrovascular disease. Urinary albumin can be assayed from a spot urine specimen, which is corrected by the urine creatinine, or a 24-hour urine collection. A 24-hour urinary albumin excretion in mg/day equates to the same numeric value for the spot urine albumin (mg)/creatinine (g) ratio. Therefore the reference ranges for each test are normal less than 30, microalbuminuria 30 to 300, and clinical albuminuria greater than 300. Factors that may interfere with the test accuracy include strenuous or prolonged exercise, upright posture, hematuria, menses, genital or urinary infections, congestive heart

Table 14-5 Causes of Increased Alkaline Phosphatase Levels

Bone origin	Paget disease Osteomalacia Rickets Hyperparathyroidism Metastatic disease
Liver origin	Extrahepatic biliary obstruction *Pancreatic cancer* *Biliary cancer* *Common bile duct stone* Intrahepatic obstruction *Metastatic liver disease* *Infiltrative diseases* *Hepatitis* *Primary biliary cirrhosis* *Sclerosing cholangitis* *Cirrhosis* *Passive hepatic congestion*
Other causes	Drugs *Phenobarbital* *Phenytoin* *Chlorpropamide* Hyperthyroidism Temporal arteritis

failure, uncontrolled hypertension or uncontrolled hyperglycemia, and high protein or high salt intake.

ALKALINE PHOSPHATASE

Alkaline phosphatase (ALP) is found in a wide variety of tissues, including the liver, bone, intestine, and placenta. The reference value for ALP depends on age and gender, with higher levels in childhood, adolescence, and pregnancy. A typical reference range in an adult is 25 to 100 U/L. In adults, the source of an elevated ALP is the liver, bone, or medication (Table 14-5). Mild ALP elevations (one to two times above reference range) can occur with parenchymal liver disease, such as hepatitis or cirrhosis. Marked ALP elevations occur with infiltrative liver disease or intrahepatic or extrahepatic biliary obstruction. A persistently elevated ALP level can be an early sign of primary biliary cirrhosis. In cholestatic liver disease, bilirubin and *γ-glutamyltransferase* (GGT) levels are increased as well, with less prominent elevations in aminotransferase levels. To confirm a hepatic source of an elevated ALP level, one can simultaneously measure GGT, which is elevated in obstructive liver disease but not with bone disease. Imaging studies of the liver, by sonography or computed tomography (CT), can define an anatomic basis for obstruction in the setting of an elevated ALP level of hepatic origin.

AMINOTRANSFERASES

Liver chemistry tests are widely used to assess for liver disease. Common markers of hepatocellular damage are the aminotransferases, *aspartate aminotransferase* (AST) and *alanine aminotransferase* (ALT). While AST is also found in other tissues, such as the heart, skeletal muscle, and blood, ALT is more specific for liver. The aminotransferases are released by hepatocytes with cell injury or death. While the current reference range is approximately 10 to 40 U/L for AST and 15 to 40 U/L for ALT, some advocate that the current upper limit of normal for ALT should be lowered (Pacifico et al., 2013). Studies examining healthy people with normal body mass index (BMI), normal glucose and lipid values, and no hepatotoxic medication find that the 95th percentile for ALT is 30 IU/L in men and 19 IU/L in women. The magnitude of the elevation of aminotransferases and the ratio of AST to ALT can help suggest the cause of liver disease but does not necessarily correlate with the severity of underlying liver disease or the prognosis. In fact, normal or minimally elevated aminotransferases may be seen in patients with end-stage liver disease. Mild elevation (more than five times the upper limit of normal) of the ALT or AST, with ALT greater than AST, is frequently found with chronic liver disease, including chronic viral hepatitis, fatty liver, and medications. Probably the most common cause of persistently elevated unexplained aminotransferases is fatty infiltration of the liver. Less common causes of mildly elevated aminotransferases with ALT greater than AST include autoimmune hepatitis, hemochromatosis, α-1-antitrypsin disease, Wilson disease, metastatic disease, and cholestatic liver disease. Mild aminotransferase elevations with AST greater than ALT are more suggestive of alcohol-related liver disease but can also occur with cirrhosis and fatty liver. With alcoholic hepatitis, AST levels typically are approximately twice ALT levels, but the AST levels rarely are greater than 300 U/L. Marked elevations (greater than 15 times upper limit of normal) of AST and ALT suggest significant necrosis, such as seen in acute viral or drug-induced hepatitis, in ischemic hepatitis, or as can occur with acute biliary obstruction (Green and Flamm, 2002). When AST is elevated without elevation of ALT, one should consider extrahepatic causes, particularly myocardial or skeletal muscle sources. When AST and ALT are elevated approximately the same, a hepatic origin is most likely. eTable 14-1 compares the differences in liver function tests between hepatocellular and obstructive disorders.

Lactate dehydrogenase (LDH) is elevated in liver disease but is nonspecific; it is also found in skeletal muscle, cardiac muscle, blood, and some pulmonary disorders. Measurement of LDH rarely adds useful information to the evaluation of liver disease. GGT is a microsomal enzyme that is inducible by alcohol and certain drugs, including warfarin and some anticonvulsants. Although not specific for alcohol abuse, GGT is the most sensitive liver enzyme for alcohol abuse.

AMYLASE AND LIPASE

Pancreatic disease, particularly *acute pancreatitis,* is often associated with elevations in amylase and lipase. Table 14-6 lists common causes of elevated amylase and lipase. Lipase measurements are recommended over amylase measurements to diagnose acute pancreatitis because of their greater sensitivity and specificity. Reference ranges vary among assays. Amylase and lipase values increase 3 to 6 hours after the onset of acute pancreatitis, both peaking at approximately 24 hours. Amylase levels fall to normal in 3 to 5 days; lipase levels return to normal in 8 to 14 days. Because of exocrine insufficiency caused by recurrent pancreatitis, amylase levels tend to be lower when alcohol is the cause of pancreatitis, as opposed to gallstone or drug-induced pancreatitis. Pancreatitis is likely when the amylase

eTable 14-1 Pattern of Liver Function Elevation

Test	Hepatocellular Disorders	Obstructive Disorders
Bilirubin	+	++
Aminotransferases	+++	+
Alkaline phosphatase	+	++
γ-Glutamyltransferase	+	++
Albumin	Decreased	Normal

Table 14-6 Causes of Elevated Amylase and Lipase Levels

Amylase	Lipase
PANCREATIC DISEASES	
Acute pancreatitis	Acute pancreatitis
Chronic pancreatitis	Chronic pancreatitis
Pancreatic pseudocyst	
Pancreatic cancer	
Pancreatic trauma	
NONPANCREATIC DISEASES	
Salivary gland disorders	Diabetic ketoacidosis
Intestinal perforation, ischemia, or obstruction	Small bowl obstruction
Diabetic ketoacidosis	Acute cholecystitis
Perforated peptic ulcer	Renal failure
Ruptured ectopic pregnancy	
Renal failure	
Macroamylasemia	
Pregnancy	

is elevated to three times the upper limit of normal. When lipase levels are more than five times normal, pancreatitis is virtually always present. A normal amylase value, however, does not exclude pancreatitis, especially when induced by hypertriglyceridemia.

ANTINUCLEAR ANTIBODIES

Antinuclear antibodies (ANAs) are autoantibodies against parts of the cell's nucleus. When associated with symptoms of connective disease, such as arthritis, Raynaud phenomenon, or fever, ANA testing can help diagnose certain collagen vascular disorders (eTable 14-2). The likelihood that an ANA test will help with diagnosis depends on the pretest probability of disease. ANA tests are reported as negative (no staining) or positive at the highest cutoff of dilution of the serum that shows immunofluorescent nuclear staining. If positive, the description of the pattern is noted. When the ANA test is positive, testing for specific nuclear antigens should be guided by the clinical findings.

Although the ANA is 95% sensitive for *systemic lupus erythematosus* (SLE), it is not specific and is seen in other diseases. Higher titers are more specific for SLE but may be seen in the other autoimmune diseases. About 20% of normal people have an ANA titer of 1:40 or higher, and 5% have a titer of 1:160 or higher. In a series of referrals to a rheumatology clinic for a positive ANA, no patients with an ANA of less than 1:160 were diagnosed with ANA-associated rheumatic diseases. (Abeles and Abeles, 2013). Less than 5% of patients with definite SLE have a negative ANA titer. Because of the high prevalence of positive ANAs in normal people, physicians need to reserve the diagnosis of SLE for patients who have clinical findings compatible with SLE. ANA titers correlate poorly with relapses, remission, and severity of disease and are not helpful in monitoring the course or response to therapy. ANA testing should be ordered when a connective tissue disease is considered, but it is not generally helpful in the evaluation of nonspecific complaints, such as fatigue, widespread pain, or low back pain (Solomon et al., 2002).

For patients with a positive ANA titer, further testing for specific nuclear antibodies can be obtained, guided by the pattern and titer of ANA staining and the clinical findings. Patients with low titer ANA who do have additional clinical findings that suggest an ANA-associated disease should have no further testing. The interpretation of testing for specific nuclear antigens can also be difficult; most of the "specific" antigens are not 100% specific for a particular disease and need to be interpreted in the clinical context. The anti-DNA test is highly specific for SLE, with about 95% specificity but only 50% to 60% sensitivity.

BILIRUBIN

Bilirubin is produced by catabolism of heme in extrahepatic tissues. Hepatocytes conjugate the bilirubin, and it is then excreted into bile. Blood bilirubin levels are a function of production rate and biliary excretion. Total bilirubin is a combination of lipid-soluble *unconjugated* bilirubin and water-soluble *conjugated* bilirubin. Total bilirubin is less than 1.5 mg/dL and is normally primarily unconjugated bilirubin. The initial step in the evaluation of an elevated bilirubin level is to distinguish conjugated (direct) from unconjugated (indirect) hyperbilirubinemia.

Probably the most common cause of unconjugated hyperbilirubinemia is *Gilbert syndrome,* a benign condition that affects up to 5% of the population. In Gilbert syndrome, only the unconjugated bilirubin is elevated; the rest of the liver enzymes are normal. Other causes of unconjugated hyperbilirubinemia include hemolysis, ineffective erythropoiesis (as in megaloblastic anemias), or a recent hematoma. With normal hepatic function, hemolysis is not associated with bilirubin levels greater than 5 mg/dL. In an asymptomatic person with mildly elevated unconjugated hyperbilirubinemia (<4 mg/dL), a presumptive diagnosis of Gilbert syndrome can be made if there are no medications that cause elevated bilirubin, there is no evidence of hemolysis, and the liver enzymes are normal (Green and Flamm, 2002). Conjugated hyperbilirubinemia generally occurs with defects of hepatic excretion, including extrahepatic biliary obstruction, intrahepatic cholestasis, cirrhosis, hepatitis, and toxins.

BLOOD UREA NITROGEN AND CREATININE

Measurements of blood urea nitrogen (BUN) and creatinine have been used to estimate renal function. The reference range for BUN level is 7 to 18 mg/dL. Elevations in BUN, however, are not specific for intrinsic renal disease and can be seen with hypovolemia, increased protein intake, corticosteroid use, hypercatabolism, and gastrointestinal bleeding. With volume deletion, urea is reabsorbed by the tubules, and the BUN is elevated proportionately more than creatinine. The BUN-to-creatinine ratio can help differentiate prerenal and postrenal causes of renal insufficiency from intrinsic renal disease. Ratios of 10:1 suggest intrinsic renal pathology; ratios greater than 20:1 suggest prerenal or postrenal causes. BUN can also be reduced in severe liver disease, malnutrition, and with the syndrome of inappropriate antidiuretic hormone secretion (SIADH).

eTable 14-2 Conditions Associated with Positive Antinuclear Antibody Test

ANA very useful for diagnosis
Systemic lupus erythematosus
Systemic sclerosis
ANA somewhat useful for diagnosis
Sjögren syndrome
Polymyositis-dermatomyositis
ANA very useful for monitoring or prognosis
Drug-associated lupus
Mixed connective tissue disease
Autoimmune hepatitis
ANA not useful or has no proven value for diagnosis, monitoring, or prognosis
Rheumatoid arthritis
Multiple sclerosis
Thyroid disease
Infectious diseases
Idiopathic thrombocytopenia purpura
Fibromyalgia

ANA, Antinuclear antibody.

From Solomon DH, Kavanaugh AJ, Schur PH, et al. Evidence-based guidelines for the use of immunologic tests: antinuclear antibody testing, *Arthritis Rheum*. 2002;47:434-444.

Currently creatinine is the most widely used laboratory test to estimate glomerular filtration rate (GFR). A product of muscle metabolism, serum levels of creatinine are related to muscle mass, age, gender, race, and dietary meat intake. At normal renal function, most of the urinary creatinine excretion is from glomerular filtration, with about 5% to 10% from tubular secretion. As GFR declines, a larger proportion of creatinine excretion is from tubular secretion. Some drugs, including cimetidine, trimethoprim, fenofibrate, and salicylates, can block the secretion of creatinine and falsely elevate creatinine levels, particularly in the setting of a low GFR. Creatinine levels increase as renal function is reduced in a parabolic fashion: At higher levels of renal function, large drops in GFR are reflected with small changes in creatinine; at lower levels of renal function, small changes in GFR are reflected in larger changes in creatinine. Although serum creatinine has long been used to estimate renal function, current guidelines from the National Kidney Foundation recommend using *estimated* GFR (eGFR) from serum creatinine to report kidney function. Many clinical laboratories now automatically report the eGFR using the Modification of Diet in Renal Disease (MDRD) equation. This equation uses age, serum creatinine, and gender to estimate the GFR, expressing GFR in mL/min/1.73 m^2. The MDRD eGFR is reasonably accurate when estimating eGFRs less than 60 mL/min; however, it may underestimate eGFR at higher GFRs (Ferguson and Waikar, 2012). In addition, the equations were developed in persons with chronic kidney disease and may not accurately calculate GFR in elderly, nonwhite, or healthy persons.

CALCIUM

The total calcium level is a measurement of free (also called *ionized*) calcium, protein-bound calcium, and a chelated fraction. Approximately 50% of total calcium is ionized, 40% to 50% is bound to albumin, and 5% to 20% is bound to other ions. Only the free or ionized portion of calcium is physiologically active. Because of the binding of calcium with albumin, simultaneous measurements of calcium and albumin need to be performed to interpret calcium abnormalities. For every 1 g/dL that serum albumin is decreased below 4 g/dL, the estimated serum calcium is corrected by adding 0.8 mg/dL to the measured calcium level. An alternative is to measure ionized calcium levels in patients with abnormalities of serum albumin. The reference range for serum calcium is 8.5 to 10.5 mg/dL and for ionized calcium, 4.65 to 5.28 mg/dL. A single serum calcium measurement is not precise enough to reliably diagnose hypercalcemia; an initial abnormality of calcium should be repeated. Both dehydration and prolonged tourniquet use can cause elevated calcium levels.

The etiology of *hypercalcemia* is either hyperparathyroidism or malignancy in more than 90% of hypercalcemic patients. In the ambulatory setting, most patients with hypercalcemia have hyperparathyroidism. Thiazides can also cause mild hypercalcemia; the typical patient is an older woman. The intact *parathyroid hormone* (PTH, parathormone) levels can differentiate hyperparathyroidism from other causes of hypercalcemia. Nonhyperparathyroid causes of hypercalcemia will give low or "normal" intact PTH levels in a setting of hypercalcemia, whereas the PTH level will be increased in hyperparathyroidism. Typically the hypercalcemia of hyperparathyroidism is modest, with calcium levels less than 11 mg/dL and minimal symptoms. Hospitalized patients are more likely to have malignancy as a cause of hypercalcemia. Calcium levels greater than 13 mg/dL are usually associated with malignancy. Occasionally, patients with a family history of hypercalcemia show a reduction in calcium excretion and have familial hypocalciuric hypercalcemia. Other causes of hypercalcemia are related to increased gastrointestinal (GI) absorption, increased bone resorption, and decreased renal excretion (Table 14-7).

Table 14-7 Causes of Calcium Abnormalities

Hypercalcemia	
Hyperparathyroidism (primary and secondary)	Granulomatous diseases
Malignancies	Sarcoidosis
Breast, lung, prostate, renal, myeloma, T-cell leukemia, lymphoma	Tuberculosis
Drugs	Chronic renal failure
Thiazide diuretics	Immobilization
Milk-alkali syndrome	Hyperthyroidism
Vitamin D intoxication	
Hypocalcemia	
Hypomagnesemia	Drugs
Hypoparathyroidism	*Loop diuretics*
Malabsorption of calcium or vitamin D	*Phenytoin*
Acute pancreatitis	*Phenobarbital*
Rhabdomyolysis	*Cisplatin*
Hyperphosphatemia	*Gentamicin*
Chronic renal failure	*Pentamidine*
Transfusion of multiple units of citrated blood	*Ketoconazole*
	Calcitonin
	Bisphosphonates

Perhaps the most common cause of a low total calcium level is a *low albumin level.* When hypocalcemia is found, one should establish that the serum albumin is normal. If serum albumin is also reduced, one should perform the above correction or obtain an ionized calcium level. Another important cause of hypocalcemia is *hypomagnesemia,* which can lead to PTH resistance or reduced PTH secretion. Correction of the magnesium deficiency usually results in correction of the hypocalcemia. Other causes of hypocalcemia are listed in Table 14-7.

CARCINOEMBRYONIC ANTIGEN

Carcinoembryonic antigen (CEA), an oncofetal glycoprotein antigen, is used in the evaluation of patients with adenocarcinomas of the GI tract, especially colorectal cancer. CEA may be elevated in benign as well as malignant diseases (eTable 14-3). CEA is not recommended as a screening test for occult cancer (including colorectal) because of its low sensitivity and specificity. Its main value is in monitoring for persistent, metastatic, or recurrent colon cancer after surgery. A preoperative elevation should return to normal in 6 to 12 weeks (CEA half-life, 2 weeks) if all disease has been resected (Duffy et al., 2013). CEA has an approximate 60% sensitivity for detecting recurrence in the patient whose postoperative CEA value has returned to normal. The adult reference range for CEA is 2.5 ng/mL or less for

nonsmokers and 5.0 ng/mL or less for smokers. The degree of CEA elevation correlates with tumor bulk at diagnosis and therefore with prognosis. Values less than 5 ng/mL before therapy suggest localized disease and favorable prognosis, whereas levels greater than 10 ng/mL suggest extensive disease and a worse prognosis. About 30% of patients with metastatic colon cancer have normal CEA levels. Benign diseases do not usually produce CEA levels greater than 5 to 10 ng/mL. For an individual patient, repeat testing or longitudinal monitoring should be conducted at the same laboratory with the same methods because of variability among assays. A 20% to 25% increase in plasma concentration is considered a significant change. A rising CEA level may detect recurrent disease 2 to 6 months before it is clinically apparent.

COAGULATION STUDIES

The most common coagulation studies, *prothrombin time* (PT) and *partial thromboplastin time* (PTT), are used to evaluate patients with clotting disorders or to monitor patients taking heparin or oral anticoagulants. PT, a simple and inexpensive test for evaluating the extrinsic coagulation pathway, is the time in seconds for citrated plasma to clot after the addition of calcium and thromboplastin. Test accuracy depends on proper collection and instrument technique. Common uses include monitoring anticoagulant therapy with warfarin, evaluating liver function (because the liver synthesizes most of the clotting factors), and screening for coagulation disorders of the extrinsic system. PT is prolonged by defects in factors I (fibrinogen), II (prothrombin), V, VII, and X. Previously, PT measurements exhibited variability across laboratories because of differences in thromboplastin sensitivity. To correct for the type of thromboplastin used, the *international normalized ratio* (INR) is used to report PT results for patients taking oral anticoagulants. The INR is calculated as follows:

$$\text{INR} = (\text{Patient PT}/\text{Control PT})^{\text{ISI}}$$

The ISI is the international sensitivity index of the thromboplastin used at the local laboratory. Provided by the test's manufacturer, ISI reflects the responsiveness of the thromboplastin used in the PT test. The reference range for the PT and the INR in a non-anticoagulated patient is approximately 11 to 13 seconds and 0.9 to 1.1, respectively. The PT is prolonged with vitamin K deficiency, including those with fat malabsorption syndromes, recent broad-spectrum antibiotic use, and premature infants. In addition, severe liver disease, alcoholism, deficiencies of clotting factors, and circulating anticoagulants can prolong the PT. The PT is not affected by platelet disorders or platelet count. The target INR varies with specific indications. In general, an INR goal of 2.5 (range, 2.0-3.0) is generally accepted for the treatment of venous thromboembolic disease and atrial fibrillation, and 3.0 (range, 2.5-3.5) for patients at risk for arterial thromboembolism, including those with mechanical heart valves.

The *activated* PTT (aPTT, or simply PTT) is used to evaluate the intrinsic coagulation pathway, monitoring heparin therapy, screening for hemophilia A and B, and detecting clotting inhibitors. PTT is the time in seconds for citrated plasma to clot after a contact activator is added to plasma and incubated at 37° C for 5 minutes. Thromboplastin and calcium are added and the time to clot formation is recorded, which should be within 10 seconds of the control. PTT is abnormally prolonged in most patients with coagulation disorders (approximately 90%) and is therefore the best screening test in persons suspected of having a clotting disorder. PTT screens for all coagulation factors that lead to thrombin formation except VII and XIII. These factors include factors I, II, V, VIII (antihemophiliac), IX (Christmas), X, and XII (Hageman). PTT is useful to evaluate patients with a known, suspected, or active bleeding disorder; consumptive coagulopathy (e.g., disseminated intravascular coagulation); disorder of fibrin clot formation; or fibrinogen deficiency. In addition, PTT is prolonged with deficiency of the Fletcher (prekallikrein) and Fitzgerald factors, warfarin or heparin therapy, lupus anticoagulant, and vitamin K deficiency. PTT is significantly shortened by hemolysis, is affected by high or low hematocrit, but is not affected by platelet dysfunction or count. A prolonged PT or PTT can be caused by either a factor inhibitor or a deficiency of a clotting factor. To differentiate the two, a mixing study can be performed. When the abnormality is corrected after mixing with normal blood, a factor deficiency is likely. Failure to correct after mixing suggests the presence of a factor inhibitor.

When monitoring heparin therapy, the most widely used target for anticoagulation is a PTT 1.5 to 2.5 times the upper limit of normal. However, because of the great variation in thromboplastins used in different PTT assays, PTT results vary widely among laboratories. At present, there is no standardization similar to the INR for PTT results. Therapeutic heparin levels, as measured by antifactor Xa units, are approximately 0.3 to 0.7 antifactor Xa IU/mL. With plasma concentrations of heparin at 0.3 antifactor Xa IU/mL, investigators have found that mean PTT values ranged from 48 to 108 seconds, depending on the laboratory methods used. The American College of Chest Physicians recommends that each laboratory determine the PTT range that corresponds to a therapeutic heparin level (Garcia et al., 2012).

COBALAMIN (VITAMIN B_{12}) AND FOLATE ACID DEFICIENCY

Vitamin B_{12} or folate deficiency may be suspected when a macrocytic anemia (mean corpuscular volume [MCV] >100 fL) or pancytopenia is present. Vitamin B_{12} deficiency, but not folate deficiency, is also associated with neurologic symptoms, including paresthesias, numbness, ataxia, and cognitive decline. The megaloblastic anemia is identical for both folate and vitamin B_{12} deficiency. *Megaloblasts* are enlarged blastic cells (precursors to the erythroid and myeloid cell lines) found in the bone marrow and caused by aberrant DNA synthesis. The peripheral blood smear typically shows the presence of oval macrocytes, hypersegmented neutrophils (>5% neutrophils with five lobes or any neutrophil with six lobes). The reticulocyte count is usually decreased.

The clinician must distinguish folate from vitamin B_{12} deficiency, because supplementing one will not correct the symptoms from deficiency of the other—that is, folate replacement will not improve the neuropsychiatric

eTable 14-3 Conditions Associated with Elevated Carcinoembryonic Antigen Level

Disease	Patients with Elevated CEA (%)
Carcinoma of entodermal origin (colon, stomach, pancreas, lung)	60-75
Colon cancer	
Overall	63
Dukes stage A	20
Dukes stage B	58
Dukes stage C	68
Lung cancer	
Small cell carcinoma	About 33
Non-small-cell carcinoma	About 67
Carcinoma of nonendodermal origin (e.g., head and neck, ovary, thyroid)	50
Breast cancer	
Metastatic disease	≥50
Localized disease	About 25
Acute nonmalignant inflammatory disease, especially gastrointestinal tract (e.g., ulcerative colitis, regional enteritis, diverticulitis, peptic ulcers, chronic pancreatitis)	Variable
Liver disease (alcoholic cirrhosis, chronic active hepatitis, obstructive jaundice)	Variable
Renal failure, fibrocystic breast disease, hypothyroidism	Variable
Healthy persons	
Nonsmokers	3
Smokers	19
Former smokers	7

CEA, Carcinoembryonic antigen.

Table 14-8 Cobalamin (Vitamin B_{12}) and Folate Deficiency

Most Common Cause	Vitamin B_{12} Deficiency	Folate Deficiency
Inadequate intake	Strict vegetarian diet (rare) Alcoholism, elderly patients	Malnutrition Alcoholism
Increased need	Pregnancy, lactation	Pregnancy, lactation, infancy Neoplasia, hyperthyroidism, hemolysis
Defective absorption or storage	Decreased intrinsic factor (e.g., pernicious anemia, congenital deficiency of intrinsic factor, gastrectomy) Zollinger-Ellison syndrome Pancreatitis Ileal mucosal disease (e.g., sprue, regional enteritis, surgery, lymphoma) Tapeworm infestation, other parasites Bacterial overgrowth in blind-loop syndrome Drugs (e.g., colchicine, aspirin, metformin)	Malabsorption caused by: Drugs (e.g., anticonvulsants, antituberculosis agents, oral contraceptives, folate antagonist) Jejunal mucosal disease (e.g., amyloidosis, sprue, lymphoma, surgery) Liver disease (cirrhosis, hepatoma)

abnormalities caused by vitamin B_{12} deficiency. The neurologic signs and symptoms of vitamin B_{12} deficiency may precede hematologic abnormalities. Vitamin B_{12} and folate deficiency often coexist because some causes overlap (Table 14-8).

The reference range for vitamin B_{12} is often listed as 200 to 900 pg/mL; however, it is now recognized that a significant portion of patients with vitamin B_{12} levels of 200 to 400 pg/mL have symptoms of vitamin B_{12} deficiency. Vitamin B_{12} levels may be falsely elevated in patients with anti-intrinsic factor antibodies, folate deficiency, and pregnancy. Because vitamin B_{12} is a cofactor in the conversion of methylmalonic acid to succinyl coenzyme A (CoA) and homocysteine to methionine, deficiencies of vitamin B_{12} will lead to increased levels of methylmalonic acid and homocysteine. Folate is required in the conversion of homocysteine to methionine, but not in the conversion of methylmalonic acid to succinyl CoA. Folate deficiency is associated with elevated homocysteine, but not methylmalonic acid. Testing for methylmalonic acid and homocysteine is often recommended to confirm if patients with levels in the low-normal range actually have vitamin B_{12} or folate deficiency. However, one study examining patients in the ambulatory care setting with symptoms compatible with vitamin B_{12} deficiency found significant intraindividual variability in vitamin B_{12}, methylmalonic acid, and homocysteine levels. More importantly, they found that many patients with symptoms compatible with vitamin B_{12} deficiency and normal vitamin B_{12}, methylmalonic acid, and homocysteine had a clinical response to pharmacologic doses of vitamin B_{12} (Solomon, 2005). Because of the limitations of vitamin B_{12} assays in diagnosing vitamin B_{12} deficiency, some recommend a clinical trial of vitamin B_{12} with predetermined clinical endpoints in patients with compatible clinical findings (Stabler, 2013).

Folate levels greater than 4 ng/mL are considered normal; levels of 2 to 4 ng/mL are indeterminate, and levels less than 2 ng/mL are diagnostic of folate deficiency in the absence of recent fasting. A person in negative folate balance will become serum deficient before tissue folate stores decrease; therefore, a low serum folate level indicates a negative folate balance, but not necessarily tissue folate deficiency. Intake of folate may normalize serum levels initially, so serum folate levels should be determined before a hospitalized or potentially deficient patient is fed, takes vitamins, or is given a transfusion. In a person with borderline folate levels, either measurement of homocysteine or red blood cell (RBC) folate levels may be helpful to confirm the diagnosis.

COMPLETE BLOOD COUNT

The complete blood count (CBC) measures circulating blood cells, including RBCs, white blood cells (WBCs), and platelets (eTable 14-4). Current technology uses electronic cell counters that can count and size the cells, providing an estimate of cell volume (MCV) and variation in cell size (red cell distribution width [RDW]), and give a five-part WBC differential, including neutrophils, lymphocytes, monocytes, eosinophils, and basophils (Tefferi et al., 2005). Typically, peripheral blood smears are prepared for manual review only when requested or when automated hematology analyzers flag abnormal results. By analyzing large numbers of cells, current instruments can generate more accurate data than by manual review for most parameters. Indications for manual review of a blood smear include the evaluation of hemolysis, RBC inclusions, myelodysplasia, megaloblastic changes, thrombocytosis, thrombocytopenia, leukocytosis, and immature or abnormal cells (Bain, 2005).

Red Blood Cells

A mild *anemia* is the most common abnormality found on a CBC. Factors that help determine whether further testing should be performed include the degree of anemia and the presence of other abnormalities in the CBC. The first step is to classify the anemia, based on MCV, as microcytic (<80 fL), normocytic (80-100 fL), or macrocytic (>100 fL). With a *microcytic* anemia, the most important test is the ferritin level, which suggests iron deficiency anemia when less than 30 ng/mL. With a *normocytic* anemia, potentially treatable causes should be excluded (e.g., recent bleeding, hemolysis, renal insufficiency, vitamin deficiency). Other causes of a normocytic anemia (e.g., anemia of chronic disease, primary bone marrow disorders) may need a bone marrow biopsy for definitive diagnosis. For a *macrocytic* anemia, important determinations are the medication history, alcohol use, and vitamin B_{12} or folate deficiency.

Erythrocytosis refers to a hematocrit above the reference range. In *true* erythrocytosis, the total circulatory RBC mass is increased, whereas in *relative* erythrocytosis, the RBC mass is normal but the plasma volume is decreased, so the

eTable 14-4 Complete Blood Count Components

Test	Description	95% Reference Range Conventional	Reference Range International
Hemoglobin (Hb)	Measure of oxygen-carrying capacity of blood expressed as grams per unit volume (usually deciliters; g/dL).	M: 13.5-17.5 g/dL F: 12.0-16.0 g/dL	135-175 g/L 120-160 g/L
Hematocrit (Hct)	Measure of solid elements of blood (mostly RBCs), as percentage of whole blood (remainder is plasma). Hct = MCV × RBC. Expressed in %, usually about three times Hb. Both Hct and Hb usually are low in anemia but may not be apparent early in acute blood loss, because plasma volume needs about 12-24 hours to equilibrate.	M: 39-49% F: 35-45%	0.39-0.49 0.35-0.45
Red blood cell (RBC) mass	Erythrocyte count; true measure of cells/L.	M: 4.3-5.7 × 10^6 cells/μL F: 3.8-5.1 × 10^6 cells/μL	4.3-5.7 × 10^{12}/L 3.8-5.7 × 10^{12}/L
Red cell indices	MCH, MCHC, MCV. *Note:* In early anemia, MCV may change before Hb and Hct.		
Mean corpuscular hemoglobin (MCH)	Hb divided by RBC; represents the content (weight) of Hb in average RBC; not as useful as MCHC.	26-34 pg/cell	0.40-0.53 fmol/cell
Mean corpuscular hemoglobin concentration (MCHC)	Hb divided by Hct, concentration of Hb per unit volume of packed RBCs. Appearance of erythrocytes on peripheral smear is affected by Hb concentration in cell; low, hypochromic; normal, normochromic; high, hyperchromic.	31.37% Hb/cell or g Hb/dL RBCs	4.81-574 mmol Hb/L RBCs
Mean corpuscular volume (MCV)	Hct × 1000 divided by the RBC count; reflects RBC size; small, microcytic; normal, normocytic; large, macrocytic. *Note:* Presence of microcytosis and macrocytosis in same sample may result in normal MCV.	80-100 fL 1fL (femtoliter) = 10^{-15} L = 1 cubic micrometer (μm^3)	80-100 fL
Red cell distribution width (RDW)	Estimate of RBC size variability (anisocytosis); standard deviation (SD) of RBC size divided by MCV.	11.5-14.5	11.5-14.5
Reticulocyte count (%)	Expressed as percent of reticulocytes per 1000 RBCs counted.	0.5-1.5%	0.005-0.015 (number fraction)
Reticulocyte count (absolute)	Reticulocyte (%) × RBC count; more meaningful expression of erythropoiesis.	50 × 10^3/μL	50 × 10^9/L
Platelet count		150-450 × 10^3/μL	150-450 × 10^9/L

Table 14-9 Classification of Erythrocytosis

RELATIVE ERYTHROCYTOSIS
Diminished plasma volume
ABSOLUTE ERYTHROCYTOSIS
Genetic disorders
Familiar polycythemia
High oxygen affinity hemoglobins
Primary marrow disorders
Polycythemia vera
Secondary conditions with appropriately increased erythropoietin, secondary to hypoxia
Chronic pulmonary disease
Right to left shunts
Sleep apnea syndrome
High altitude
Carbon monoxide poisoning
Secondary conditions with inappropriately increased erythropoietin production
Renal carcinoma
Hepatocellular carcinoma
Cerebellar hemangioma
Post-renal transplant
Polycystic kidney disease
Drugs
Androgens
Exogenous erythropoietin

hematocrit is elevated. With true erythrocytosis, elevated erythropoietin levels suggest a secondary cause and can help distinguish secondary erythrocytosis from polycythemia vera (Table 14-9).

White Blood Cells

The WBC count is often requested to support a diagnosis of infection or an inflammatory process, or to monitor the course of a disease or response to treatment. The cell types that make up the WBC count include neutrophils (segmented and band forms), lymphocytes, monocytes, eosinophils, and basophils. *Bands* are immature neutrophils, and *segmented* forms are mature neutrophils. To diagnose neutropenia, the *absolute neutrophil count* (ANC) should be determined by multiplying the total WBC count by the percentage of bands plus mature neutrophils (segmented forms). With severe neutropenia, the ANC drops below 500 cells/mm^3, and the patient is at increased risk for infections. Causes of neutropenia include drug reactions, bacterial and viral infections, hematopoietic diseases, cachexia, hypersplenism, and autoimmune diseases. Lymphopenia is present when the lymphocyte count is less than 1500 cells/mm^3 in the adult or 3000 cells/mm^3 in children. Causes of lymphopenia include immunosuppressant drugs, corticosteroid therapy, viral infections (including HIV), and genetic immunodeficiencies.

Leukocytosis, or an elevated WBC count, occurs when the total WBC count is greater than 10,000 cells/mm^3. An elevated WBC count may be the result of a reactive process (leukemoid reaction) or leukemia. Leukemoid reactions can result from infections, toxic conditions, neoplasms, myeloproliferative diseases, and other hematologic disorders. The first step in the evaluation of leukocytosis is to determine what type of WBC is elevated. Leukocytosis may be caused by neutrophilia, eosinophilia, basophilia, monocytosis, or lymphocytosis (Table 14-10).

Table 14-10 Common Causes of Leukocytosis or Leukopenia Stratified by White Blood Cell Type

Leukocytosis	
Neutrophilia	Infections, leukemia, rheumatic and autoimmune disorders, neoplastic disorders, chemicals, trauma, endocrine and metabolic disorders, hematologic disorders, drugs
Eosinophilia	Infectious diseases, parasitic infections, allergic diseases, myeloproliferative and neoplastic diseases, cutaneous diseases, gastrointestinal diseases
Basophilia	Allergic reactions, chronic myeloid leukemia, myeloid metaplasia, polycythemia vera, ionizing radiation, hypothyroidism, chronic hemolytic anemia, splenectomy
Monocytosis	Infections, neoplastic disorders, gastrointestinal disorders, sarcoidosis, drug reactions, recovering from marrow suppression
Lymphocytosis	Viral infections, lymphocytic leukemia, other infectious diseases, neoplastic disorders
Leukopenia	
Neutropenia	Overwhelming bacterial infection, viral infection, drug reaction, ionizing radiation, hematopoietic diseases, hypersplenism, anaphylactic shock, cachexia, autoimmune disease
Eosinopenia	Acute stress (usually physical), acute inflammatory states, Cushing's syndrome, corticosteroids
Basopenia	Sustained treatment with glucocorticoids, acute infection or stress, hyperthyroidism
Monocytopenia	Onset of steroid therapy; hairy cell leukemia
Lymphopenia	Immunodeficiency disorders, adrenocortical hormone excess, chemotherapeutic drugs, irradiation, impaired drainage of intestinal lymphatics, advanced lymphomas and carcinomas, anorexia

From Speicher CE. *The right test*. 3rd ed. Philadelphia: Saunders; 1998, pp. 281-283.

Platelets

Platelets, cellular fragments of the bone marrow precursor-cell megakaryocytes, are essential to clot formation and have a life span of about 10 days. Clinically, a disorder in platelets is usually suspected in a patient with excessive bleeding, typically from a mucocutaneous source or after trauma. Clinical evidence of bleeding does not occur until the platelet count drops below 50 to 70 $\times$ 10^3/μL. Platelet counts of less than 10 to 20 $\times$ 10^3/μL are associated with major spontaneous bleeding. *Thrombocytopenia* may be caused by disorders of production, distribution, or destruction (Table 14-11). In evaluating thrombocytopenia, one should first examine the peripheral smear for platelet clumping, or repeat the test using sodium citrate as the anticoagulant. *Thrombocytosis,* or an increased platelet count, may be caused by a reactive process or a myeloproliferative disorder. Reactive processes do not usually produce platelet counts greater than 1000 $\times$ 10^3/μL. Common causes of thrombocytosis include iron deficiency, acute blood loss, inflammatory disorders, malignancies, splenectomy, and myeloproliferative disorders.

Table 14-11 Causes of Thrombocytopenia

Decreased Production	Increased Destruction
Congenital disorders	Immune thrombocytopenia
Radiation or chemotherapy	Drugs
Vitamin B_{12} or folate deficiency	Quinine
	Quinidine
Drugs	Heparin
Systemic lupus erythematosus	Sulfa drugs
Aplastic anemia	Valproic acid
Acute leukemia	Disseminated intravascular coagulation (DIC)
Lymphomas	Hemolytic-uremic syndrome
Alcohol abuse	HELLP (hemolysis, liver dysfunction, and low platelets) syndrome
Viral infections, including human immunodeficiency virus (HIV)	Sepsis
	Cardiopulmonary bypass
Splenic sequestration	Toxemia of pregnancy, eclampsia

CARBON DIOXIDE OR BICARBONATE

Acid-base disturbances are often recognized by abnormalities in the carbon dioxide (CO_2) content of blood, which is composed primarily of bicarbonate (HCO_3^-), with small amounts of carbonic acid and dissolved carbon dioxide. The reference range for CO_2 is 22 to 29 mmol/L. A reduced serum bicarbonate concentration frequently suggests *metabolic acidosis,* particularly when combined with a low pH. An elevated serum bicarbonate level frequently occurs with *metabolic alkalosis.* Bicarbonate is often used as a buffer for excess acid production, and levels are reduced in metabolic acidosis. In the evaluation of acidosis, calculation of the serum *anion gap* is helpful in determining the cause of the acidosis, as follows:

The normal anion gap is 10 to 12 mmol/L. An increased anion gap generally indicates the presence of metabolic acidosis with elevation of unmeasured ions, such as lactic acid, phosphates, sulfates, and ketoacids. A normal anion gap acidosis is seen with bicarbonate losses and increased chloride reabsorption and most frequently occurs with chronic diarrhea, but also with certain types of renal tubular acidosis. Low anion gaps can occur with hypoalbuminuria, congestive heart failure, and occasionally, multiple myeloma.

An elevated serum bicarbonate level frequently occurs in the setting of metabolic alkalosis. Metabolic alkalosis can be generated by loss of acid, such as in vomiting, but normally the kidney corrects the abnormality promptly by excreting excess bicarbonate. To maintain a metabolic alkalosis, the kidney must not be able to excrete excess bicarbonate. This abnormality usually occurs in the setting of volume depletion, when sodium reabsorption is enhanced and the sodium must be accompanied by an anion to maintain electroneutrality. In the absence of available chloride in the urine, bicarbonate is reabsorbed with sodium, thereby maintaining the alkalosis. Urine chloride levels less than 10 mmol/L are present with chloride-responsive metabolic alkalosis, such as vomiting with volume depletion. Elevated urine chloride (>20 mmol/L) are associated with mineralocorticoid excess, such as hyperaldosteronism and hypercortisolism.

C-REACTIVE PROTEIN

An acute-phase reactant glycoprotein, C-reactive protein (CRP), is associated with inflammation. CRP is one of the first proteins to become elevated after an inflammatory process has begun and disappears rapidly when inflammation subsides. In healthy persons, CRP levels are usually less than 0.8 mg/L and are often below the detection limit for standard assays. Serum levels may increase dramatically to exceed 100 mg/L in the presence of bacterial and viral infections, inflammation, severe trauma, surgery, neoplastic proliferation, tissue injury, necrosis, and transplant rejection. Moderate elevations may be seen with myocardial infarction, autoimmune diseases, rheumatic fever, pregnancy, obesity, and postoperatively. CRP is not affected by age, race, or food intake and does not have significant circadian variation. Drugs that may reduce or suppress CRP levels by controlling inflammation include statins, fibrates, niacin, nonsteroidal antiinflammatory drugs (NSAIDs), steroids, salicylates, angiotensin-converting enzyme (ACE) inhibitors, and β-adrenergic blockers. Compared with the ESR, the CRP rises earlier, returns to baseline sooner, and is less influenced by altered physiologic states.

The levels of CRP used to assess atherosclerotic risk are much lower than those associated with inflammation, and highly sensitive immunoassays CRP tests (hsCRP; cardiac-CRP) can accurately measure to a lower limit of 0.3 mg/L. Many studies have found that hsCRP levels predict the long-term risk of myocardial infarction, ischemic stroke, peripheral vascular disease, and all-cause mortality in healthy subjects (Greenland, 2010). The hsCRP can be used to further evaluate patients judged to be at intermediate risk for the development of coronary heart disease (those with 10-year coronary heart disease [CHD] risk of 10% to 20%). CRP levels are divided into tertiles: low risk (<1.0 mg/L), average risk (1.0-3.0 mg/L), and high risk (>3.0 mg/L). A CRP in the highest tertile is associated with a twofold risk of major coronary events compared with a CRP in the lowest tertile. Unexplained levels of hsCRP levels higher than 10 mg/L should be repeated and evaluated for noncardiovascular causes, such as infection or inflammation (Smith et al., 2004).

ERYTHROCYTE SEDIMENTATION RATE

The erythrocyte sedimentation rate (ESR) is one of the oldest laboratory tests still in clinical use. The test measures the distance that erythrocytes (RBCs) fall in a column of anticoagulated blood in 1 hour. Plasma proteins known as *acute-phase reactants* facilitate erythrocyte aggregation, which in turn affects the rate at which the solid component of blood will settle in a capillary tube. The plasma proteins most responsible for this aggregation (rouleaux formation), in decreasing order, are fibrinogen, beta (β-) globulins, alpha (α-) globulins, gamma (γ-) globulins, and albumin. Inflammatory, infectious, neoplastic, and collagen vascular diseases increase the ESR. The ESR is helpful in the diagnosis of *polymyalgia rheumatica* and *temporal arteritis;* otherwise, it is both nonsensitive and nonspecific. In studies of patients with biopsy-proven temporal arteritis, 90% of patients had an ESR greater than 30 mm/h with mean ESR of 90 mm/h. About 4% of patients with biopsy-proven

Table 14-12 Factors Affecting the Erythrocyte Sedimentation Rate

Increase	Decrease	No Effect
Anemia	Polycythemia	Body temperature
Macrocytosis	Microcytosis	Recent meal
Female gender	Spherocytosis	Aspirin
Advanced age	Extreme leukocytosis	NSAIDs
Second- and third-trimester pregnancy	Sickle cell disease	First-trimester pregnancy
Hypoalbuminemia	Excessive anticoagulant	
Tilted ESR tube	Short ESR tube	
High room temperature	Low room temperature Clotted blood sample	

ESR, Erythrocyte sedimentation rate; *NSAID,* nonsteroidal antiinflammatory drug.

temporal arteritis have a normal ESR (Smetana and Shmerling, 2002). When there is strong clinical evidence for temporal arteritis and a normal ESR, however, a temporal artery biopsy or a trial of corticosteroids should be considered. Although used to follow the response to corticosteroid therapy in polymyalgia rheumatica and temporal arteritis, ESR should be used in conjunction with clinical findings. Typically, ESR drops within a few days of corticosteroid therapy, falling to a level that is higher than normal. In addition, relapse can occur without ESR elevation.

Table 14-12 lists physiologic, pathologic, and technical factors that alter ESR, which is higher in women than men and higher in older persons. To determine ESR for healthy adult men, age in years is divided by 2, and for women, age in years plus 10 is divided by 2. Clinical considerations for using ESR have been defined (Brigden, 1998; Sox and Liang, 1986). It should not be used as a screening test for disease in asymptomatic persons. As a single test after a normal history and physical examination in asymptomatic persons, ESR contributes to disease detection of a serious illness in less than 6 of 10,000 persons. The underlying cause of an elevated ESR is usually apparent by the history and physical examination, especially for extreme elevations of about 100 mm/h. Many cases of unexplained elevated ESR are transient and not associated with serious disease. If no obvious cause is seen for elevated ESR, repeating the test in several months is recommended, rather than searching for occult disease.

FECAL OCCULT BLOOD TEST

The fecal occult blood test (FOBT) is used to detect blood loss in the stool that is not clinically apparent. Patients who report rectal bleeding or those with frank blood by rectal examination should undergo further diagnostic evaluation and do not need an FOBT. The two main FOBTs commercially available are the *guaiac-based tests,* which detect pseudoperoxidase in the heme portion of hemoglobin, and *immunochemical tests,* which detect the globulin portion of human hemoglobin.

The basis of the guaiac test is that the pseudoperoxidase of hemoglobin oxidizes guaiac to form a blue-colored quinone compound, after the addition of a hydrogen peroxide developer. The likelihood of a positive guaiac test is related to the amount of blood present in the stool. Several factors have an impact on FOBT performance characteristics. Bleeding from proximal GI lesions, including the right colon, may allow for degradation of the heme, which will then not catalyze the guaiac reaction. The myoglobin or hemoglobin in red meat can give a false-positive reaction, although ingesting 8 oz of cooked red meat daily has only a 5% probability of giving a positive test result. Peroxidase-rich raw vegetables and fruits (turnips, parsnips, horseradish, artichokes, mushrooms, radishes, broccoli, cauliflower, beets, apples, oranges, bananas, melons, grapes, pears, plums, cantaloupe) may give a false-positive result if fecal specimens are tested immediately after collection. However, plant peroxidases are unstable with time; therefore, if a specimen is developed several days after collection, the likelihood of a false-positive test result because of plant peroxidases is reduced.

Gastric irritants such as aspirin, NSAIDs, and excessive alcohol consumption may also produce positive results. Oral iron supplements and acetaminophen do not affect the guaiac test. Ascorbic acid (vitamin C) in excess of 250 mg/day or multivitamins with vitamin C may cause a false-negative result because ascorbic acid is a reducing agent and interferes with the oxidation of guaiac. Other antioxidants should also be avoided.

The processes of collecting and processing FOBTs are important in the evaluation of the results. Delaying the processing of the slides allows for dehydration of the specimen, which allows degradation of peroxidase activity and will decrease the sensitivity of testing. The delay between preparation and laboratory testing should not exceed 6 days. The issue of rehydration of dried slides with water is controversial. Rehydration of slides increases sensitivity and decreases specificity (false-positive rate increases) (Bresalier, 2010). Patients should not collect specimens until 3 days after menses have stopped or if obvious rectal bleeding or hematuria is noted. For 3 days before testing, patients should avoid ingesting red meat, vegetables with high amounts of peroxidase (broccoli, turnip, cantaloupe, cauliflower, radishes), aspirin, NSAIDs, and vitamin C. The detection of the blue color of a positive test may be affected by other factors, including a thick stool smear, exposure to high ambient temperatures, and black stools from iron ingestion.

About 2% to 6% of asymptomatic adults have a positive FOBT test, 10% of whom have cancer and 20% to 30%, adenomas. The rest have upper GI sources of bleeding, nonneoplastic lower GI sources of bleeding (e.g., hemorrhoids), or no identified source of bleeding. With home-based testing, FOBT has best been studied using a regimen of three stools. Because only one specimen is obtained during a digital rectal examination (DRE), a single digital FOBT has poor sensitivity and therefore cannot be recommended as the sole test for screening for colon cancer.

Newer fecal immunochemical tests (FITs) are based on an antigen-antibody reaction that is specific for human hemoglobin. They do not react with animal hemoglobin or peroxide-containing foods. Moreover, the FIT is not affected by ingestion of vitamin C, iron, or rehydration, so no dietary restrictions are required. However, globulin levels are reduced in high temperatures and with a delay in testing,

which might reduce the sensitivity. Because globulin is broken down in the upper GI tract, the globulin tests do not detect bleeding from the upper GI tract as readily as guaiac-based tests. Current immunochemical tests use either one or two stool samples. The sensitive guaiac based tests (Hemoccult Sensa) and the FITs are more sensitive than Hemoccult II for colorectal cancer and advanced adenoma detection. Specificity for FIT testing is variable compared with sensitive guaiac-based tests, but probably similar. Several studies have shown participation rates are higher with the immunochemical tests than with guaiac-testing, likely because of the lower number of stool samples in the testing and the lack of dietary restrictions.

GLUCOSE

The reference range for a fasting plasma glucose level is between 70 and 99 mg/dL. *Hypoglycemia* is best documented by a plasma venous glucose level less than 50 mg/dL, although there is considerable variability in the level of hypoglycemia that causes symptoms. Asymptomatic hypoglycemia in a patient not taking insulin or oral hypoglycemic agents may be a laboratory artifact caused by ongoing metabolism of glucose in the specimen, especially if a delay has occurred in processing the specimen. The diagnosis of hypoglycemia is best made with typical symptoms associated with a laboratory confirmation of venous hypoglycemia, followed by relief of symptoms after ingesting glucose. The glucose tolerance test (GTT) can produce hypoglycemia in normal persons and should not be routinely ordered in the evaluation of hypoglycemia.

Hypoglycemia can be defined as iatrogenic, postprandial, or fasting. *Postprandial* hypoglycemia occurs after meals and is usually mild and self-limiting. *Alimentary* hypoglycemia occurs when patients have rapid gastric emptying. Insulin levels rise rapidly after a meal and fall more slowly than glucose levels, which results in hypoglycemia. *Fasting* hypoglycemia is seen much less often than reactive hypoglycemia and may be a harbinger of more severe disease, including insulin-producing pancreatic tumors and hepatic, adrenal, or renal insufficiency, or it may be the result of excess insulin or sulfonylurea administration. True fasting hypoglycemia needs to be confirmed by a prolonged fast, with simultaneous measurement of glucose and insulin. This technique can help determine whether the hypoglycemia is associated with excess insulin.

Diabetes mellitus is characterized by *hyperglycemia.* The American Diabetes Association has defined *normal* fasting plasma glucose as less than 100 mg/dL (5.6 mmol/L), *prediabetes* as 100 to 125 mg/dL (5.6-6.9 mmol/L), and diabetes mellitus as 126 mg/dL (7.0 mmol/L) or greater.

GLYCOSYLATED HEMOGLOBIN (HEMOGLOBIN A_{1C})

The glycosylated hemoglobin (hemoglobin A_{1c} [HbA_{1c}]) fraction measures nonenzymatic glycosylation of hemoglobin, which is related to level of glucose concentration over the life span of the erythrocyte. The HbA_{1c} fraction can be used to estimate glucose control in the previous 2 to 3 months. In persons with normal erythrocyte survival, the glucose levels in the last 30 days contribute to 50% of the HbA_{1c}, whereas the glucose levels in the preceding 90 to 120 days contribute only 10% to the HbA_{1c} measurement. HbA_{1c} can be reported in the familiar percentage combined with the HbA_{1c}-derived average glucose (ADAG) (Saudek et al., 2008). Using the National Health and Nutrition Examination Survey (NHANES) III data that the population average for HbA_{1c} was 5.17 with standard deviation (SD) of 0.45, the International Expert Committee (2009) selected an HbA_{1c} of 6.5% (approximately 3 SD above average) as the cutoff point to diagnose diabetes mellitus, with confirmation by a fasting glucose greater than 126 mg/dL or oral GTT greater than 200 mg/dL, or a repeat HbA_{1c} greater than 6.5%. Screening with HbA_{1c} identifies fewer individuals with diabetes than either plasma glucose or GTT. Goals for achieving optimal control of diabetes are controversial, but a reasonable goal in most persons is an HbA_{1c} less than 7%. Conditions that shorten erythrocyte survival, such as hemolysis or recent bleeding, give a lower HbA_{1c} level. Black patients tend to have a slightly higher HbA_{1c} levels (by 0.2-0.3) than white patients (Inzucchi, 2012).

HELICOBACTER PYLORI

A spiral, urease-producing bacterium, *Helicobacter pylori*, is associated with almost 90% of duodenal ulcers. Testing is indicated in patients with either active or previously documented peptic ulcer disease, in the evaluation of dyspepsia who have no "alarm features," and for patients with a history of gastric mucosa-associated lymphoid tissue (MALT) lymphoma (MALToma) (Chey and Wong, 2007). Several tests can be performed during endoscopy. Rapid urease testing of a biopsy specimen has sensitivity over 90% and specificity over 95%, with results available within 1 to 24 hours. The sensitivity of rapid urease tests is reduced by drugs that treat *H. pylori,* including bismuth, antibiotics, and proton pump inhibitors (PPIs). Histologic examination of gastric biopsies can also detect *H. pylori.* Culturing *H. pylori* has a lower yield, is more expensive, and is not widely done.

There are three nonendoscopic methods to detect *H. pylori* infection. Serologic tests for immunoglobulin G (IgG) antibody to *H. pylori* can identify previous infection and have sensitivity of approximately 88% but specificity of only 70% to 80%. Serologic tests are inexpensive and have a good negative predictive value. The positive predictive value depends on the prevalence of *H. pylori*. Even though titers may decline slowly after eradication of the organism with antibiotics, these tests have limited use in evaluation of the effectiveness of antibiotic therapy and cannot reliably distinguish current from past infection.

The value of *H. pylori* antibody testing in the evaluation of uninvestigated dyspepsia depends on the prevalence of *H. pylori* infection. In areas of high prevalence (>20%), serologic testing may be cost-effective for a test-and-treat strategy. In areas of lower prevalence, the low positive predictive value of serology limits its usefulness; either stool antigen testing or urea-breath is more accurate. Antibody testing is inexpensive and has a very good negative predictive value.

Urea breath tests using carbon 13 (^{13}C)–urea or ^{14}C-urea can detect ongoing replication of *H. pylori.* These tests are most helpful in determining whether *H. pylori* has been

successfully eradicated after a course of treatment, but they can also confirm active infection. After the ingestion of labeled urea, urease-producing *H. pylori* organisms break down the urea and produce labeled CO_2, which is absorbed into the circulation and exhaled, and can be measured by collecting an exhaled breath sample in a bag. False-negative breath tests may occur with the recent use of antibiotics, bismuth, or PPIs. Most studies find the sensitivity and specificity of the urease breath test to be greater than 95%.

Testing for *H. pylori* antigen in the stool by immunoassay has been found to have sensitivity over 90% and specificity approaching 100%, thereby making it an accurate noninvasive method to diagnose active *H. pylori* infection in untreated patients. As in urea breath testing, recent antibiotics, PPIs, and bismuth can cause false-negative results. Stool tests can also be used to confirm eradication, but no sooner than 4 weeks after completion of therapy. A rapid stool *H. pylori* antigen test is now available for on-site testing.

HEPATITIS SEROLOGY

Hepatitis A virus (HAV), hepatitis B virus (HBV), and less often hepatitis C virus (HCV) are the usual causes of acute viral hepatitis. A person with symptoms of acute hepatitis should have these four hepatitis serologies performed: immunoglobulin M (IgM) anti-HAV, hepatitis B surface antigen (HBsAg), IgM hepatitis core antigen (anti-HBc), and anti-HCV. At present, stool and blood assays for HAV antigen are not available. The diagnosis of hepatitis A is made by the detection of IgM anti-HAV during acute illness. A positive anti-HAV with only IgG anti-HAV indicates previous infection.

In hepatitis B, HBsAg is the earliest serologic marker of infection and is present before elevation of the aminotransferases. If HBsAg is present for more than 6 months, the patient should be considered chronically infected (carrier). Previous hepatitis B vaccination is indicated by the presence of anti-HBs only. After infection, antibodies to HBsAg (anti-HBs) typically indicate immunity to hepatitis B and appear several weeks to months after HBsAg disappears. The gap between the presence of HBsAg and anti-HBs is the "window period"; during this time anti-HBc can be detected in the blood. Anti-HBc can be differentiated into an IgM anti-HBc, which indicates recent infection, and an IgG anti-HBc, which indicates previous infection. HBeAg, a subparticle of core antigen, is present only when HBsAg is present and is a marker for infectiousness. Anti-HBe appears after HBeAg disappears, indicates decreasing infectivity and a good prognosis, and remains detectable for years. HBV DNA testing can be used to determine if the patient is a candidate for antiviral therapy. *Hepatitis delta virus* (HDV) infection coexists with hepatitis B in about 4% of hepatitis B infections and carries an increased mortality rate. HDV depends on the presence of HBV for expression and replication and can cause acute or chronic infection.

Hepatitis C occasionally presents as acute hepatitis, but more frequently is detected in the evaluation of patients with elevated aminotransferases or chronic liver disease. In 2012, the Centers for Disease Control and Prevention (CDC) recommended one-time screening for hepatitis C in persons in the United States born between 1945 and 1965, regardless of risk factors. The commonly available screening test is an enzyme immunoassay that detects antibodies to hepatitis C. The antibody test is usually detectable about 8 to 12 weeks after exposure. In a patient with a positive anti-HCV test, further testing for HCV RNA is recommended to confirm active HCV infection. A positive anti-HCV antibody and a negative HCV RNA suggest either a false-positive screening test or previous hepatitis C exposure with resolution of the infection. Quantitative HCV-RNA (viral load) and genotype testing should be performed prior to treatment.

HUMAN IMMUNODEFICIENCY VIRUS

The diagnosis of HIV infection usually depends on the detection of antibodies to the virus. The recommended screening test for HIV infection is an initial enzyme immunoassay, the ELISA test, which can detect the presence of antibody to HIV 2 to 8 weeks after infection. An initially positive ELISA should be repeated, and repeatedly positive ELISAs need to be confirmed by a more specific test, most often the Western blot. Sensitivity and specificity of this testing pattern are both greater than 99.5%. A positive ELISA combined with a negative Western blot should be considered a false-positive HIV test and indicates that HIV infection is not present. A positive ELISA and an indeterminate Western blot result can be a marker for early HIV infection or advanced acquired immunodeficiency syndrome (AIDS), or it can be a false-positive test result. The predictive value of a positive HIV test depends on the prevalence in the population being tested.

Rapid HIV tests are currently available that check saliva, whole blood, and plasma. The whole-blood tests measure capillary blood with a finger stick and do not require centrifugation. These tests are interpreted visually, do not require instrumentation, and provide test results in minutes. Rapid tests may be preferred for testing in patients who are not likely to return for results of standard testing, for pregnant women at delivery with no HIV testing during their pregnancy, and for testing during occupational exposure. Rapid tests for HIV have both similar sensitivity and specificity greater than 99.5%, and also require confirmation.

Tests to measure HIV directly include quantitative HIV RNA testing by polymerase chain reaction (PCR), which measures viral load or actual viral replication. Quantitative HIV RNA measurements are useful in evaluating indeterminate Western blot results and acute HIV infection, when the patient presents before seroconversion. Because neonates born to HIV-infected mothers often have maternal antibodies for months, early testing with HIV DNA PCR can identify infants with HIV infection. Newer combination fourth-generation p24 antigen-HIV antibody tests may shorten the window period between acute HIV infection and detection, and can be used in postexposure testing for health care professionals (Kuhar et al., 2013). In 2006, the CDC recommended routine, voluntary HIV screening for all patients age 13 to 64 in any health care setting.

IRON STUDIES

Iron deficiency is the most common type of anemia worldwide and therefore a significant cause of human morbidity. Other than menstrual blood losses, negligible iron is lost in

a healthy person. Normally, regulation of iron absorption in the proximal small intestine controls iron balance. Iron deficiency results from increased need (growth of infancy or childhood, pregnancy), excessive loss (menstruation, hemorrhage, GI loss), inadequate intake (iron-deficient diet), or defective absorption (gastrectomy or sprue). In adult men or postmenopausal women with adequate iron stores, it takes 3 to 4 years for these stores to be depleted once negative iron balance starts.

During early *iron deficiency anemia,* the erythrocytes may be normochromic normocytic, and later the peripheral blood smear may show microcytosis, anisocytosis, poikilocytosis, and hypochromia. The reticulocyte count is low, and RDW is high (>16). Bone marrow stores of iron are decreased or absent. Serum iron has marked diurnal variation (higher in morning, lower later in day) and is increased transiently after meals. Because morning levels determine the reference range, iron levels should be performed on a fasting morning specimen. Obtaining a serum iron level without determining the level of transferrin (*total iron-binding capacity* [TIBC]) is of limited value. Serum iron is decreased with inflammation, infection, and ascorbate deficiency and increased with iron ingestion, transfusions, liver disease, aplastic anemia, and ineffective erythropoiesis. The total iron-binding capacity or transferrin is not subject to diurnal fluctuation, but it is reduced in chronic inflammation and malnutrition. The serum ferritin is the best indirect marker for the assessment of iron stores. The conventional cut off of a ferritin under 10 to 15 ng/mL is virtually diagnostic of iron deficiency anemia. However, using cutoffs of 30 ng/mL still results in a 92% sensitivity and 98% specificity for the deficiency of iron deficiency (Mast et al., 1998). Serum ferritin is an acute-phase reactant and can be elevated in some patients with liver disease, malignancy, or inflammatory or infectious diseases. In a patient with chronic inflammation, a rule of thumb is to divide the ferritin level by 3, and if lower than 20 ng/mL, suspect coexisting iron deficiency. Less than 10% of people with ferritin levels higher than 100 ng/mL have iron deficiency. Hemolysis may cause falsely high levels of serum iron (eTable 14-5).

Iron overload, typically related to hemochromatosis or to repeated transfusions, is associated with elevated iron, transferrin saturation, and ferritin levels. While a transferrin saturation more than 60% in men and more than 50% in woman has a 90% sensitivity in detecting symptomatic homozygous hemochromatosis, several guidelines recommend a cutoff of more than 45% in both men and women to allow greater detection of individuals at earlier stages of the disease. Ferritin levels of more than 300 ng/mL in men and 200 ng/mL in women are suggestive of iron overload, in the absence of chronic inflammation or liver disease.

LIPID PROFILE

Lipid levels are often obtained to evaluate cardiovascular risk. There are four major classes of lipoproteins: chylomicrons, very-low-density lipoprotein (VLDL) cholesterol (VLDL-C), low-density lipoprotein (LDL) cholesterol (LDL-C), and high-density lipoprotein (HDL) cholesterol (HDL-C). Approximately 60% to 70% of plasma cholesterol is carried as LDL-C. A direct association is seen between increased LDL-C and the risk of CHD. HDL-C functions in the reverse transport of cholesterol to the liver and carries apolipoprotein A-1. HDL-C accounts for about 20% to 30% of total cholesterol. HDL-C and CHD have a strong independent inverse relationship; for every 1-mg/dL decrease in HDL, the risk of coronary artery disease (CAD) increases 2% to 3%. The Adult Treatment Panel (ATP) III of theNational Cholesterol Education Program (NCEP Expert Panel, 2001) recommended lipid screening as a tool to promote cardiovascular disease risk reduction. The standard lipid profile, as recommended by the ATP III, consists of direct measurement of total cholesterol, HDL-C, and triglycerides, with a calculated LDL-C, obtained after a 9-hour fast. The Friedewald formula for calculating LDL is LDL = total cholesterol – HDL – triglycerides/5.

The Friedewald formula for estimating LDL is not valid in the following three conditions: when there are chylomicrons present, when the triglycerides are higher than 400 mg/dL, and when there is dysbetalipoproteinemia (type III hyperlipidemia). Hypertriglyceridemia and dysbetalipoproteinemia lead to underestimations of the LDL. Using the Friedewald formula, some non-LDL lipoproteins—intermediate-density lipoprotein (IDL) and lipoprotein (a)—are included in the LDL calculation. Measurements of direct LDL, although more costly, give more accurate values than calculations using this formula in patients with hypertriglyceridemia. Nonfasting total cholesterol and HDL measurements give reliable assessment of CHD risk without the need to measure triglycerides (Di Angelantonio et al., 2009). The American Heart Association (AHA) 2010 guidelines recommend against the use of measurements of lipoprotein subfraction, particle size, and density in asymptomatic adults for cardiovascular risk assessment, because there is no evidence that these measures improved predictive capacity over standard lipid panel (Ip et al., 2009). While an analysis showed a higher CHD risk in individuals with higher LDL particle numbers, the risk was similar to that of non-HDL cholesterol as a risk (El Harchaoui et al., 2007). Lipoprotein(a) levels have shown modest correlations with stroke and CHD risk, but because of concerns with standardization of measurement and lack of strong evidence of benefit of additional risk prediction beyond transitional risk factor assessment, the AHA recommended against testing in asymptomatic individuals.

There are a number of sources of physiologic and analytic variation in lipid measurements. Failure to fast before the test elevates the triglycerides and leads to an underestimation of the LDL. The total cholesterol and HDL are not significantly different in the fasting or postprandial state. Dietary changes begin to become apparent in lipid measurements in approximately 1 to 2 weeks; therefore, patients should have a stable diet for 3 weeks before testing. Morning specimens are preferred because triglycerides have diurnal variation—lowest in the morning, highest in the afternoon. Recent illness or surgery, including myocardial infarction, stroke, or cardiac catheterization, can lower lipid measurements for several weeks. For major illness or injury, it may be necessary to wait 2 to 3 months before measurement. Cholesterol levels decrease 24 hours after myocardial infarction and remain depressed for up to 12 weeks. Table 14-13 lists some drugs that can affect the lipid components. Major causes of secondary dyslipidemia also include

eTable 14-5 Iron-Related Laboratory Measurements in Common Anemias

Type of Anemia	Serum Iron	Total Iron-Binding Capacity	Transferrin Saturation	Serum Ferritin	Serum Transferrin Receptor
Iron deficiency anemia	Low	High	Low	Low	High
Anemia of chronic disease	Low	Low	Low	High*	Low
Thalassemia	High	Low	High	High	High
Megaloblastic anemia	High	Low	High	High	High
Hemolytic anemia	High*	Low*	High*	High*	High

*May fall within normal range.
From Cook JD: The measurement of serum transferrin receptor. *Am J Med Sci*. 1999;318:269-276.

Table 14-13 Effects of Drugs on Lipid Values

Drug	Total Cholesterol	LDL Cholesterol	HDL Cholesterol	Triglycerides
Thiazide diuretics	↑	↑	–	↑
β-Blockers	–	–	↓	↑
α-Blockers	↓	↓	↑	↓
ACE-inhibitors	–	–	–	–
Calcium-channel blockers	–	–	–	–
Unopposed estrogens	↓	↓	↑	↑
Unopposed progestogens	–	↑	↓	↓
Tamoxifen	↓	↓	–	↑
Raloxifene	↓	↓	–	–
Isotretinoin	↑	↑	–/↓	↑
Protease inhibitors	↑	–	–	↑

ACE, Angiotensin-converting enzyme; *HDL,* high-density lipoprotein; *LDL,* low-density.
Adapted from Mantel-Teeuwisse AK, Kloosterman JM, Maitland-van der Zee AH, et al. Drug-induced lipid changes: a review of the unintended effects of some commonly used drugs on serum lipid levels. *Drug Saf*. 2001;24(6): 443-456.

Table 14-14 Causes of Magnesium Abnormalities

Hypermagnesemia	
Overingestion (usually in setting of renal insufficiency)	Renal insufficiency
Antacids	Addison disease
Cathartics	Hypothyroidism
Laxatives	Lithium intoxication
Hypomagnesemia	
Gastrointestinal causes	Drugs
Low-magnesium diet	Diuretics (thiazide and loop)
Malabsorption	Digitalis
Diarrhea	Cyclosporine
Renal tubular disorders	Cisplatin
Ketoacidosis	Aminoglycosides
Alcohol abuse	Proton pump inhibitors
	Amphotericin B

diabetes mellitus, hypothyroidism, nephrotic syndrome, and obstructive liver disease.

MAGNESIUM

Magnesium levels are not routinely included in standard chemistry panels, so abnormalities of magnesium frequently go unrecognized. The reference range of serum magnesium concentration is 1.7 to 2.2 mg/dL (1.5-1.7 mEq/L, or 0.75-0.95 mmol/L). The most common cause of *hypermagnesemia* is excess magnesium intake in a patient with chronic kidney disease (Table 14-14). Symptoms of hypermagnesemia are seen with levels greater than 4 to 6 mg/dL.

Hypomagnesemia is more common than hypermagnesemia. The three mechanisms causing hypomagnesemia are reduced intestinal absorption from malnutrition or malabsorption, increased urinary losses, and intracellular shifts. Hypomagnesemia is typically associated with alcohol abuse, hypokalemia, hypocalcemia, chronic diarrhea, and ventricular arrhythmias. Symptoms occur with serum concentrations less than 1 mEq/L. Clinically, hypomagnesemia is associated with neuromuscular hyperirritability, including tremors, tetany, and rarely, seizures. In distinguishing renal wasting from extrarenal losses as the cause of hypomagnesemia, a 24-hour urine excretion of greater than 24 mg or a spot urine fractional excretion of magnesium greater than 2% suggests that the cause of hypomagnesemia is excessive renal losses.

MONONUCLEOSIS (EPSTEIN-BARR VIRUS INFECTION)

Mononucleosis is a common viral infection, particularly in adolescents and young adults. Typical symptoms include fever, pharyngitis, cervical lymphadenopathy, and fatigue. Typically, mononucleosis is associated with an infection by the Epstein-Barr virus (EBV). Laboratory findings include leukocytosis, with greater than 50% lymphocytes and more than 10% atypical lymphocytes. Almost 90% of patients with mononucleosis have abnormal liver enzymes. Mononucleosis is typically diagnosed by detecting a *heterophile antibody,* which is a nonspecific response to EBV infection. The heterophile antibody response is an IgM antibody that will agglutinate with the surface antigen of sheep and horse RBCs, but not with guinea pig kidney cells. Monospot tests are done with rapid slide agglutination procedures and horse RBCs to detect the heterophile antibody. Heterophile antibodies are negative in about 25% of patients in the first week of infection, and in 5% to 10% of patients in the second week or later (Luzuriaga and Sullivan, 2010). The heterophile antibody usually persists for 3 to 6 months after an acute infection, less frequently up to 1 year. The heterophile antibody has an overall false-negative rate of 10% to 15%, except in children younger than the age of 12, where the false-negative rate is higher. False-positive heterophile antibodies can occur with rubella, hepatitis, other viral infections, and lymphoma.

When the heterophile antibody is negative or the features of infectious mononucleosis are atypical, the disease can be confirmed with specific Epstein-Barr antibodies. Acute or recent infection is thought to be present if four serologic criteria are found: positive IgM to viral capsid antigen (VCA); high titers (>1 : 320) of IgG to VCA; positive early antigen antibody (anti-EA); and initial absence of antibody to Epstein-Barr nuclear antigens (EBNAs). The most useful

EBV-specific antibody to diagnose acute mononucleosis is the IgM VCA, which appears soon after the onset of symptoms and has sensitivity of 91% to 98% and specificity of 99%. Convalescent testing should document the appearance of IgG EBNA and disappearance of IgM VCA and anti-EA.

Syndromes mimicking infectious mononucleosis, but with negative heterophile antibodies, are considered *heterophile-negative* infectious mononucleosis. The most common syndromes are related to cytomegalovirus infection and toxoplasmosis. Occasionally, viral hepatitis, rubella, lymphoma, leukemia, and the drugs isoniazid and phenytoin can cause a mononucleosis-like syndrome. As acute HIV infection can present with similar symptoms, consideration should be given to testing for HIV nucleic acid in patients with risk factors for HIV infection. Because heterophile antibodies are not uniformly positive early in the disease, serial tests may often be needed weekly to confirm mononucleosis. Specific serologic tests for EBV and now PCR are relatively expensive and take longer to obtain results, so they are generally reserved for unclear cases and are not necessary in most patients with infectious mononucleosis. In an adolescent or young adult with appropriate clinical symptoms, heterophile antibodies are 95% sensitive and specific.

NATRIURETIC PEPTIDES (B-TYPE NATRIURETIC PEPTIDE AND N-TERMINAL PRO–B-TYPE NATRIURETIC PEPTIDE)

Blood levels of natriuretic peptides are used in the evaluation of *heart failure.* Cardiac cells release natriuretic peptides in response to stretch and wall tension. Ventricular myocytes release a pro–B-type natriuretic peptide (pro-BNP), which is cleaved into the active B-type natriuretic peptide (BNP) and the inactive N-terminal pro-BNP (NT–pro-BNP). Levels of both BNP and NT–pro-BNP increase with age, in renal insufficiency, and are higher in women; obesity is associated with lower BNP levels. Some medications, including spironolactone, ACE inhibitors, and angiotensin receptor blockers, lower BNP/NT–pro-BNP levels. Other conditions that increase natriuretic peptides include myocardial ischemia, atrial fibrillation, pulmonary embolus, pulmonary hypertension, chronic kidney disease, and sepsis.

The major established use of BNP testing is evaluating *acute dyspnea,* when the cause is uncertain, to differentiate whether the etiology is from heart failure versus another cause. In the setting of acute dyspnea, natriuretic levels are more accurate than clinical judgment in excluding or diagnosing acute decompensated heart failure. A normal level in a patient with acute dyspnea has a high negative predictive value and suggests that heart failure is unlikely the etiology. The optimal cutoffs for BNP/NT–pro-BNP vary with age. BNP less than 100 pg/mL or NT–pro-BNP less than 400 pg/mL makes the diagnosis of heart failure unlikely. Levels of BNP greater than 400 pg/mL or NT–pro-BNP greater than 2000 suggest heart failure (Dickstein et al., 2008). Elevated levels of BNP and NT–pro-BNP also are predictive of death or increased cardiovascular events. There is some evidence that the use of natriuretic peptid testing to guide heart failure therapy may improve clinical outcomes, and clinical trials are ongoing to help determine optimal approaches (Januzzi, 2012).

PHOSPHORUS

Disorders of phosphorus metabolism are caused by variations in dietary intake, phosphorus excretion, and transcellular shifts. The reference range for serum phosphorus level is approximately 2.5 to 4.8 mg/dL in adults and 4.0 to 6.0 mg/dL in children. Because postprandial phosphorylation of glucose can decrease serum phosphorus levels, fasting specimens are more accurate. *Hyperphosphatemia* most often occurs in the setting of reduced renal excretion from renal insufficiency. Other causes of hyperphosphatemia include excess phosphate ingestion, either orally or with phosphate-containing enemas, hypoparathyroidism, and spurious causes such as thrombocytosis. Less common causes include acromegaly, hyperthyroidism, acidosis, and massive cell lysis from hemolysis, rhabdomyolysis, and tumor lysis after chemotherapy.

Hypophosphatemia is defined as a serum phosphorus level below 2.5 mg/dL. Clinically significant hypophosphatemia occurs at levels less than 1.5 mg/dL. The three major mechanisms associated with hypophosphatemia are decreased intestinal absorption, increased phosphate loss from the kidney, and increased phosphorus shift into the bones. Decreased absorption occurs most often with antacid use. Persistent hypophosphatemia most frequently results from disorders causing increased phosphate loss in the kidney, including hyperparathyroidism, vitamin D deficiency, renal tubular disease, chronic acidosis, and rickets. Intracellular shifts into cells and bones during acute respiratory alkalosis, refeeding after starvation, hyperalimentation, intravenous carbohydrate administration, rapid tumor growth, treatment of respiratory failure, or diabetic ketoacidosis can cause hypophosphatemia (Bacchetta and Salusky, 2012). If the cause of hypophosphatemia cannot be determined based on the history, a fractional excretion of phosphorus less than 5% suggests that the etiology is not from inappropriate renal loss; if the fractional excretion is more than 5%, it implies that the problem is renal; renal wasting of phosphorus. ($FE_{Pi(\%)} = [(P_{urine}/P_{plasma}) \times 100 \times (Cr_{plasma}/Cr_{urine})]$ where P_{urine} and P_{plasma} are urine and plasma concentrations of phosphorus and Cr_{plasma} and Cr_{urine} are plasma and urine concentrations of creatinine, respectively.)

POTASSIUM

Potassium is the most abundant *cation* in the body and has a much higher concentration in the intracellular space than in extracellular fluids. Normal potassium levels are maintained despite fluctuating potassium intake by adjustments in renal secretion of potassium. *Hyperkalemia* is defined as a serum potassium level greater than 5.1 mmol/L. Occasionally, hyperkalemia can be an artifact (pseudohyperkalemia) of phlebotomy, associated with thrombocytosis, leukocytosis, or hemolysis during phlebotomy. In a patient with hyperkalemia of no apparent cause, a plasma potassium level can eliminate these effects on the potassium measurement. Because the normal response to increased potassium intake is to increase excretion, hyperkalemia is not likely to be attributed to increased intake unless there is

Table 14-15 Causes of Abnormal Potassium Levels

Hyperkalemia	Hypokalemia
PSEUDOHYPERKALEMIA	**INADEQUATE DIET**
Thrombocytosis	Malnutrition
Leukocytosis	Alcoholism
Prolonged tourniquet use during venipuncture	
Hemolysis	
REDUCED EXCRETION	**RENAL LOSSES**
Oliguria	Diuresis
Renal failure	Renal tubular acidosis, proximal and distal types
Hyporeninemic hypoaldosteronism	Hypomagnesemia
Adrenal insufficiency	Hyperaldosteronism
Type IV renal tubular acidosis	Cushing syndrome
CELLULAR SHIFTS	**CELLULAR SHIFTS**
Acute acidosis	Alkalosis
Insulin deficiency	β-Adrenergic therapy
Rhabdomyolysis	Catecholamine excess
DRUGS	**DRUGS**
β-Blockers	Thiazide diuretics
Angiotensin-converting enzyme inhibitors	Loop diuretics
Angiotensin receptor blockers	Epinephrine
Spironolactone	Albuterol
Triamterene	Licorice
Amiloride	Glucocorticoids
NSAIDS	Mineralocorticoids
Heparin	
Cyclosporine	
Pentamidine	

NSAID, Nonsteroidal antiinflammatory drug.

a deficiency in potassium excretion. Shifts of potassium from intracellular to extracellular fluids, such as with acute metabolic acidosis, crush injury, burns, insulin deficiency, β-adrenergic blockade, and hemolysis, can be associated with a transient hyperkalemia. Persistent hyperkalemia is usually caused by decreased potassium excretion. Potassium excretion by the kidney is flow dependent; therefore, oliguria and anuria are important causes of hyperkalemia. Because aldosterone deficiency is an important cause of decreased potassium excretion, hyperkalemia is seen with hyperreninism, hypoaldosteronism, type 4 renal tubular acidosis, and drugs that inhibit aldosterone (Table 14-15).

Hypokalemia is associated with a serum potassium level of less than 3.5 mmol/L. Symptoms are nonspecific and include muscular weakness. Occasionally, hypokalemia is associated with sustained inadequate potassium intake, particularly in patients with alcohol abuse. Transient episodes of hypokalemia are associated with increased extracellular to intracellular potassium shifts and occur with catecholamine increase, hyperinsulinemia, and adrenergic drugs such as bronchodilators. More frequently, hypokalemia is a result of loop or thiazide diuretic therapy or GI losses of potassium, such as with protracted vomiting, diarrhea, and laxative abuse. Other causes of hypokalemia include hypomagnesemia, drugs, metabolic alkalosis, skin losses, and increased urinary losses. In cases when the cause of hypokalemia is not apparent, measuring urinary potassium is helpful. A random urine potassium-to-creatinine ratio greater than 15 mEq/gm creatinine suggests renal wasting (Groeneveld et al., 2005).

PREGNANCY TESTS

Current pregnancy tests use immunoassays to measure the beta subunit of human chorionic gonadotropin (hCG). Serum assays and sensitive urine assays can now detect pregnancy approximately 1 week after conception. Home pregnancy tests have variable sensitivity, ranging from about 50% to 97% sensitive when done on the first day of the missed period, and nearly 100% sensitive at 11 days after the missed period. The most common reason for a false-negative home pregnancy test is incorrect timing, such as performing the test too soon, so it is recommended to repeat a home test if the initial test is negative (Cole, 2012).

In the first 4 to 8 weeks of pregnancy, serum hCG levels double approximately every 2 days. Failure to double in 48 to 72 hours suggests an ectopic pregnancy or abnormal intrauterine pregnancy. For the first 2 weeks after conception, serum levels of hCG are higher than those in urine. However, beginning at approximately 3 weeks and for the remainder of the pregnancy, urine levels are higher than serum levels. Levels of hCG return to normal approximately 2 weeks after delivery. After an abortion, levels return to normal in approximately 3 to 8 weeks. Other conditions that can raise hCG levels include gestational trophoblastic neoplasms, such as hydatidiform mole and choriocarcinoma. False positive pregnancy tests are uncommon but may be seen in women who have heterophile antibodies and in perimenopausal women who produce pituitary hCG.

PROSTATE-SPECIFIC ANTIGEN

Prostate-specific antigen (PSA) is a glycoprotein produced by the epithelial cells of the prostate. This protein circulates in the serum and can become elevated because of benign and malignant conditions of the prostate. Fifty percent to ninety percent of PSA is protein bound and the remainder is free. PSA is used as a tumor marker for the screening, diagnosis, and management of prostate cancer. PSA lacks specificity for cancer, however, because it can be elevated in benign conditions such as benign prostatic hypertrophy (BPH) and prostatitis. Estimates suggest that a PSA higher than 4 ng/mL has sensitivity of 70% to 80% and specificity of 60% to 70% for prostate cancer. Factors other than prostate cancer can affect the PSA level (Table 14-16). Both prostate biopsy and transurethral resection of the prostate (TURP) can elevate the PSA, but DRE does not cause significant elevations in PSA.

Although elevations of the PSA are associated with increased risk of prostate cancer, the upper limit of normal of 4 ng/mL is arbitrary. PSA levels increase with age and recent sexual activity and are reduced with the use of 5-α-reductase inhibitors. During an initial screening examination, prostate cancer was found in 27% of men with PSA levels of 4.1 to 9.9 ng/mL and 59% with PSA higher than 10 ng/mL (Hernandez and Thompson, 2004) (eTable 14-6). However, prostate cancer is found in 23.9% of men with PSA of 2.1 to 3.0 ng/mL and 26.9% with PSA of 3.1 to 4.0 ng/mL (Thompson et al., 2004). The positive predictive value (PPV) of the PSA is doubled if the patient also has an abnormal DRE. A normal PSA does not exclude cancer; 20% to 40% of men with organ-confined prostate cancer

Table 14-16 Noncancer Factors That May Influence Prostate Specific Antigen

Factor	Change
Acute urinary retention	Increase
Androgens	Increase
Antiandrogens	Decrease
Bed rest	Decrease
Benign prostatic hypertrophy	Increase
Cirrhosis	Increase
Cystoscopy	Increase
Digital rectal examination	Not significant
Diurnal variation	No change
Ejaculation	Increase
Extensive exercise	Increase
Finasteride	Decrease
Physiologic variation	May fluctuate by 30%
Prostatic message	Increase
Prostate needle biopsy	Increase
Prostatitis	Increase
Radial prostatectomy	Decrease
Radiation therapy	Increase initially then decrease
Transurethral resection of the prostrate	Increase
Transurethral ultrasound of the prostrate	No change
Urethral instrumentation	Increase

will have PSA within the reference range. The use of PSA velocity, free PSA/total PSA, and urinary prostate cancer antigen 3 (PCA3) for screening is unproven.

The use of PSA for screening for prostate cancer remains controversial. Although it is clear that PSA testing can lead to earlier detection of prostate cancer, it is not clear that early diagnosis and treatment offer significant reduction in overall mortality. Estimates suggest that 1 prostate cancer death is prevented in 1000 men aged 55 to 69 screened every 1 to 4 years over a decade, although 110 cases will be diagnosed (Carter et al., 2013). A significant number of men diagnosed with prostate cancer by PSA screening have a tumor that would never have become symptomatic. In addition to screening, PSA is used to monitor the response to treatment for localized prostate cancer. After radical prostatectomy, PSA levels should become undetectable. Any detectable levels suggest residual or recurrent tumor and may occur months or years before becoming clinically apparent. PSA levels fall after radiation therapy, although they usually do not become undetectable. A PSA recurrence has been defined as three successive increases in the PSA level after radiation therapy.

TOTAL PROTEIN

Total protein includes albumin and globulin. The factors that affect the total protein level include changes in fluid status, the balance of protein synthesis and catabolism, and protein losses. While dehydration can cause a relative increase in serum protein concentration, volume expansion causes a relative decrease in protein concentration. Elevated protein levels in the absence of dehydration are usually related to increased globulin levels. As previously discussed, acute-phase reactants are proteins that are increased in inflammatory conditions and include CRP, haptoglobin, fibrinogen, ceruloplasmin, and α_1-antitrypsin.

Serum protein *electrophoresis* separates proteins based on their mobility in an electric field and can provide a visual estimate of albumin and globulin levels. The five bands on the electrophoresis column include albumin, α_1-globulin, α_2-globulin, β-globulin, and γ-globulin. The immunoglobulins are found primarily in the γ region. Diffuse elevations in the γ region can occur with chronic infections, liver disease, autoimmune disorders, and granulomatous diseases. A monoclonal spike in the γ region indicates proliferation of a single immunoglobulin, as seen in myeloma or a monoclonal gammopathy of uncertain significance. Immunoglobulin abnormalities noted on protein electrophoresis can be further characterized by *immunofixation,* which can confirm a monoclonal immunoglobulin and can determine the heavy or light chain type of the immunoglobulin.

RHEUMATOID FACTOR AND ANTI–CYCLIC CITRULLINATED PEPTIDE ANTIBODIES

The diagnosis of rheumatoid arthritis (RA) is usually made based on clinical findings, supported by laboratory testing. In 2010, the American College of Rheumatology/European League against Rheumatism classification criteria included the laboratory tests of rheumatoid factor (RF) and anti–cyclic citrullinated peptide antibodies (ACPAs) in the criteria for the diagnosis of RA. The mainstay of testing has been the RF, which is an autoantibody directed against the Fc portion of the IgG molecule. The sensitivity of RF is approximately 54% to 88% and the specificity 48% to 92%, depending on the method used (Lee and Schur, 2003). RF is not specific for RA and may be detected in the serum of persons with other rheumatoid conditions, chronic infections, or inflammatory conditions, as well as in healthy older adults.

Results are usually reported as a titer determined by using a tube dilution method. A significant titer is 1:80 or greater. In RA, titers are often 1:640 to 1:520 but can even be found up to 1:320,000. Very high titers more likely indicate severe disease or systemic involvement. Increasing serial titer elevations can be used to monitor RA disease progression but not response to therapy. RF titers may decrease during remission, but only rarely do they become undetectable. The ESR is a better index of disease activity.

The ACPA test complements RF in the diagnosis of RA. ACPAs have been found to be present in RA early in the disease course and have a high predictive value for developing RA. The sensitivity and specificity of the ACPA is 60% to 80% and 85% to 98%, respectively. The advantage of ACPA over RF is that it is much more specific for RA. In patients with a moderate pretest probability of RA, positive ACPA significantly increases the likelihood of RA (Shmerling, 2009).

SODIUM

Disorders of body fluid balance are categorized as hypoosmolar, when there is excess water to solute balance, or hyperosmolar, when there is reduced water to solute

eTable 14-6 Positive Predictive Value of Total Prostate-Specific Antigen for Prostate Cancer

Digital Rectal Examination	PSA Value		
	0.0-4.0 ng/mL	4.1-10 ng/mL	>10 ng/mL
Negative	9%	20%	31%
Positive	17%	45%	77%

PPV, Positive predictive value; *PSA*, prostate-specific antigen.
Data from Oesterling JE. Prostate-specific antigen: a valuable clinical tool. *Oncology*. 1991;5:107-122.

balance. Given that sodium is the primary solute in the body, these disorders are manifested as either hyponatremia or hypernatremia. The reference range for serum sodium concentration is 135 to 145 mmol/L. In the evaluation of abnormal sodium levels, it is helpful to measure or calculate the plasma osmolality, which typically has a range of 280 to 295 mOsm/kg H_2O. The osmolality can also be calculated using the following formula:

$$\text{Calculated osmolality} = (2 \times \text{Na}) + (\text{BUN}/2.8) + \text{glucose}/18$$

This formula gives comparable results to measured osmolality, except in the presence of significant unmeasured solutes, such as mannitol or radiologic contrast dyes.

In most cases, *hyponatremia* is associated with hypoosmolality (eTable 14-7). Pseudohyponatremia can be seen with very elevated glucose or protein levels, causing artifactually low serum sodium levels; in these cases measured plasma osmolality is normal. Hyponatremia can be associated with normal or increased measured osmolality in the presence of other osmotically active substances, such as glucose and mannitol. In the setting of hyperglycemia, every 100 mg/dL rise in glucose lowers serum sodium by 1.6 mmol/L.

The diagnostic evaluation of hypoosmolar hyponatremia should begin with an assessment of the patient's volume status and urine electrolytes (Verbalis et al., 2013). Hyponatremia can occur in states of volume deficiency, euvolemic states, or hypervolemic conditions (Table 14-17). *Hypovolemic hyponatremia* can occur with GI, renal or third space losses, and patients typically demonstrate clinical findings of hypovolemia. With nonrenal causes, the urine Na^+ should be less than 30 mmol/L and the urine osmolality higher than 100 mOsm/kg H_2O. Hypovolemic hyponatremia responds readily to isotonic fluid replacement.

Hypervolemic hyponatremia can occur with advanced congestive heart failure, cirrhosis, nephrotic syndrome, and renal failure in the presence of total-body sodium overload and edema. In these disorders, effective renal blood flow is reduced, thus stimulating the release of arginine vasopressin (AVP), also known as antidiuretic hormone (ADH), which reduces renal excretion of water. Both sodium and water are increased, but water is increased proportionally more than sodium. In the absence of diuretic therapy, urine sodium is generally less than 30 mmol/L, and urine osmolality is over mOsm/kg H_2O.

Euvolemic hyponatremia is caused by an excess in body water. The most common cause of *euvolemic hyponatremia* is the syndrome of inappropriate ADH secretion (SIADH), which occurs when the stimulus for ADH secretion is not related to osmolarity or reduced renal blood flow. No edema is present, although mild volume expansion and a modest increase in weight are seen. Continued release of ADH occurs despite low plasma osmolarity. Criteria for diagnosis of SIADH include (1) the presence of hypoosmolality (P_{osm} < 275 mOsm/kg H_2O); (2) urine sodium level greater than 30 mmol/L, assuming adequate sodium intake; (3) urine osmolality greater than 100 mOsm/kg H_2O; (4) clinical euvolemia; and (5) absence of diuretic therapy, hypothyroidism, and glucocorticoid deficiency. Other clinical findings that suggest SIADH includes a uric acid level less than 3 mEq/dL and BUN less than 10 mg/dL. Serum ADH (AVP) levels are not helpful because most causes of hyponatremia are associated with elevated AVP (ADH) levels. The major causes of SIADH are drugs and pulmonary and central nervous system diseases. SIADH can respond to fluid restriction or correction of the underlying disorder. Another cause of euvolemic hyponatremia is called *primary polydipsia,* which occurs in people who consume massive amounts of water and have very large volumes of urine. In general, plasma osmolarity is mildly decreased. These individuals have low urine sodium and dilute urine. The hyponatremia readily responds to a reduction in fluid intake.

Hypertonic disorders are associated with excess water losses compared with solute losses. Clinically manifested as hypernatremia, this serious electrolyte abnormality generally occurs in the setting of a significant underlying medical illness. The primary causes are deficient water intake or excessive water excretion. For example, when a patient has significant diarrhea, hypernatremia can develop when the patient cannot ingest enough water to compensate for the loss. When the clinical evaluation is not clear, measurement of urine osmolality is helpful. In the setting of hypernatremia and insufficient water intake, the urine should be maximally concentrated, higher than 800 mOsm/kg H_2O. In the setting of hypernatremia, if the urine osmolality is less than 800 mOsm/kg H_2O, a renal concentrating defect is present. This can be seen with hyperglycemia, an osmotic diuresis, or diabetes insipidus. A rise in urine osmolality after administering desmopressin (DDAVP) will distinguish central diabetes insipidus from nephrogenic diabetes insipidus.

Less frequently, hypernatremia can occur in a setting of increased total-body sodium from an excessive exogenous sodium load. Hypertonic intravenous fluids, saltwater near-drowning, and hypertonic dialysis can cause hypernatremia.

Table 14-17 Classification of Hyponatremia

Clinical Findings	Causes
VOLUME DEPLETION	Gastrointestinal losses: vomiting, diarrhea
Tachycardia	Renal losses: diuretics, chronic renal failure, salt-wasting nephropathies
Hypotension	Skin losses: burns
Urine sodium <30 mmol/L (if nonrenal losses)	Third-space losses: pancreatitis
Urine osmolality >100 mOsm/k H_2O	
Increased urine osmolarity	
VOLUME OVERLOAD	Congestive heart failure, nephrotic syndrome, cirrhosis
Edema	
Urine sodium <10 mEq/L	
Urine osmolarity high	
Euvolemic	**SIADH**
No edema or evidence of dehydration	CNS disorders: infection, mass lesion, head trauma
Urine sodium >30mmol/L (unless sodium-restricted diet)	Pulmonary: lung cancer, infection
Urine osmolality >100 mOsm/kg H_2O	Drugs: chlorpropamide, opiates, nicotine, phenothiazines, vincristine, SSRIs
Normal thyroid and adrenal function	
Psychogenic polydipsia	

CNS, Central nervous system; *SIADH,* syndrome of inappropriate diuretic hormone; *SSRI,* selective serotonin reuptake inhibitor.

STREPTOCOCCAL TESTING

Acute pharyngitis is a frequent office diagnosis, but the only common form of pharyngitis that requires antibiotic

eTable 14-7 Classification of Hypernatremia

Total Body Sodium (Na)	Causes	Urine Measurements
Reduced total body sodium (both Na and water losses, but relatively more loss of water)	Gastrointestinal losses: diarrhea, lactulose Skin losses: excess sweating Renal losses: loop diuretics, osmotic diuretics	Urine Na <10 mEq/L Hypertonic urine Urine Na ≥20 mEq/L Hypotonic or isotonic urine
Normal total body Na (loss of water)	Renal losses: central or nephrogenic diabetes insipidus, lithium, demeclocycline, hypercalcemia, hypokalemia Nonrenal losses: insensible losses from skin or respiratory tract	Variable urine Na Variable urine tonicity Urine Na variable Hypertonic urine
Increased total body Na (addition of sodium)	Hypertonic intravenous fluids Hypertonic dialysate Saltwater drownings	Urine Na >20 mEq/L Hypertonic or isotonic urine

Modified from Schrier RW. *Renal and Electrolyte Disorders*. 4th ed. Boston: Little, Brown; 1992, p. 43.

treatment is that caused by *group A β-hemolytic streptococci* (GABHS). Approximately 20% to 30% of children and adolescents and 5% to 15% of adults with sore throat have streptococcal pharyngitis. Suggestive clinical features include fever, no cough or rhinorrhea, tonsillar exudates or beefy-red pharynx, and tender anterior cervical lymphadenopathy. Because of the overlap in symptoms between viral and strep pharyngitis, the 2012 American Society of Infectious Disease guidelines recommend testing, unless the patients has symptoms clearly suggestive of a viral etiology. For an acutely ill patient, the *rapid antigen detection test* (RADT) and traditional bacterial throat culture are available to identify GABHS. In the setting of pharyngitis and a typical syndrome, a positive culture or RADT is sufficient to begin treatment. The sensitivity of both is affected by throat swab technique. Testing should be done of both tonsils or tonsillar pillars and the posterior pharynx. Antigen or bacterial recovery from the throat is increased by rigorous swabbing. The RADT has the advantage of giving immediate results, which allows for early antibiotic therapy and thus decreases the duration of illness, complications, and contagiousness. Recent antibiotic use may give a false-negative result. The major limitation of rapid streptococcal tests is low sensitivity (70% to 90% on average), but specificity is approximately 95%. Therefore, a positive test can be accepted as evidence of disease and therapy begun without further testing. However, a negative result does not exclude the possibility of GABHS as the source of the pharyngitis. Children and adolescents with a negative RADT should have a throat culture for confirmation. Because of the low incidence of streptococcal pharyngitis and the extremely low risk of rheumatic fever in adults, the American Society of Infectious Diseases supports the use of RADT alone in adults, without confirmation by cultures (Shulman et al., 2012).

The throat culture is performed on sheep blood agar plate under aerobic conditions. If proper collection and plating technique are used, throat culture sensitivity is 95% and specificity 99.5%. With poor technique, sensitivity can be as low as 30%. Previous antibiotic use may diminish the colony count. If clinical conditions suggest the presence of other pharyngeal pathogens, such as *Neisseria gonorrhoeae,* the laboratory test should be altered because different collection and plating techniques are required. Throat culture results are generally reported 24 to 28 hours after plating. Antibiotic sensitivities are not routinely reported because GABHS is uniformly sensitive to penicillin.

SYPHILIS TESTING

The sexually transmitted disease (STD) syphilis is usually diagnosed with serologic testing. Although darkfield microscopy can identify spirochetes in fluid obtained from lesions of primary syphilis, the test has many false-negative readings, and most physicians are not trained to perform these tests. PCR for *Treponema pallidum* DNA is now commercially available for diagnosing primary syphilis using a swab from an ulcer, with early reports showing good sensitivity and specificity.

The major serologic tests for syphilis are the nonspecific nontreponemal Venereal Disease Research Laboratories (VDRL) and rapid plasma reagin (RPR) tests, which measure antibody production to a cardiolipin-cholesterol-lecithin antigen, and the specific treponemal antibody tests, which measure antibodies against the spirochete *T. pallidum.* Because of false-positive results in each of these tests, the use of both types of tests are required for a diagnosis. The usual screening for syphilis is a two-step process, beginning with the RPR or VDRL test, followed by specific treponemal antibody testing for confirmation. However, some laboratories are now performing treponemal enzyme immunoassay (EIA) tests first, followed by nontreponemal tests for confirmation of current infection.

The RPR or VDRL is reported as a titer of the highest dilution giving a positive test. The VDRL usually becomes positive approximately 1 to 4 weeks after the development of a chancre. The highest titers of nontreponemal tests are seen in secondary syphilis. The sensitivity of the RPR or VDRL is 78% to 86% in primary syphilis, 100% in secondary syphilis, and 95% to 98% in latent syphilis. Titers of VDRL or RPR parallel disease activity. After appropriate treatment of primary or secondary syphilis, titers decline and usually become negative within 1 year. A fourfold decline in titers 6 months after treatment suggests an adequate response to treatment of primary or secondary syphilis. A fourfold rise in titers after treatment suggests reinfection. Low titers may persist after treatment of late and latent syphilis. Approximately 20% of nontreponemal screening tests are false positive; false-positive tests usually have titers less than 1:8. Causes of false-positive nontreponemal tests include autoimmune disorders, HIV infection, infectious mononucleosis, endocarditis, and lymphoma.

The treponemal tests, such as the fluorescent treponemal antibody absorption (FTA-ABS) test or *T. pallidum* enzyme immunoassay (EIA), are used to confirm infection in a patient with a positive nontreponemal test. The treponemal tests are reported as positive or negative. The FTA has a sensitivity of 84% in primary syphilis and almost 100% in other stages of syphilis. The specificity is 96%; approximately 1% of the population has a false-positive treponemal antibody. Treponemal tests remain positive in 95% of patients, even after treatment, and are not used to monitor treatment response and cannot distinguish active from treated syphilis. If using treponemal EIA for screening, the CDC recommends performing a standard nontreponemal test after a positive treponemal EIA to guide treatment decisions. If the nontreponemal test is negative, then a different treponemal test should be performed to confirm infection. If the second treponemal test is positive, those without a history of treatment should be treated and those with a prior history of treatment should be offered treatment if there is a likelihood of reexposure (Workowski and Berman, 2010). Rapid testing using point-of-care testing for immunoassays against treponemal antigens is now available. The sensitivities appear to be from 84% to 97%, and the specificity is 92% to 98%.

In neurosyphilis, cerebrospinal fluid (CSF) abnormalities include elevated protein, a lymphocytic pleocytosis, and a positive VDRL. The CSF VDRL is the preferred test because it is more specific than the CSF FTA. However, the sensitivity is low enough that a negative CSF VDRL does not rule out neurosyphilis. In congenital syphilis, the diagnosis can be difficult because both FTA and VDRL

antibodies can be transferred passively to newborns, and their identification at birth in the baby does not necessarily indicate infection. Passively transmitted antibodies generally decline in the first 2 months of life. If titers rise after birth, congenital syphilis is likely. Testing using specific *T. pallidum* EIA IgM may allow earlier diagnosis of congenital syphilis.

TESTOSTERONE

Evaluating men for low testosterone should be done only when there are clear signs and symptoms of androgen deficiency. Serum testosterone levels are highest in the morning, fluctuate by season, and are subject to episodic secretion and measurement variations. Therefore, the standard is to obtain more than one sample between 8:00 and 10:00 a.m. Other factors that affect testosterone levels include acute and chronic systemic illnesses, some medications including opioids and glucocorticoids, eating disorders, excessive exercise, and changes in the sex hormone–binding globulin (SHBG). The SHBG is affected by weight; diabetes mellitus; aging; thyroid, renal, and liver disease; acromegaly; HIV infection; and medications.

Most of the circulating testosterone is tightly bound to SHBG or loosely bound to albumin, while only about 0.5% to 3% is unbound, free testosterone. Bioavailable testosterone refers to the free plus albumin-bound fraction. Measuring the total serum testosterone is generally adequate. Checking the free or bioavailable testosterone concentration is usually necessary only when the total is low or conditions that affect the SHBG are present. The free and bioavailable testosterone tests cost significantly more than the total testosterone. The reference range for total, bioavailable, and free testosterone varies by laboratory and assay. In individuals with repeatedly low testosterone levels, measuring the luteinizing hormone (LH) and follicle-stimulating hormone (FSH) levels can help distinguish primary from secondary hypogonadism. These gonadotropins are high in primary (testicular) and low in secondary (pituitary) hypogonadism.

The serum testosterone level at which therapy should begin is unknown. Generally older men with low testosterone levels and men with borderline levels who are asymptomatic or have nonspecific symptoms should not be treated. The treatment goal is the minimal testosterone level that improves symptoms but no more than the mid normal reference range (Bhasin et al., 2010).

THYROID TESTING

Currently available tests for assessing thyroid function measure functional activity of the thyroid, the hypothalamic-pituitary-thyroid axis, or thyroid hormone levels. The third-generation thyroid-stimulating hormone (TSH) test is the best method to confirm or exclude primary thyroid disease in an ambulatory population. TSH is produced by the pituitary and is inhibited by circulating thyroxine (T_4) and triiodothyronine (T_3). In general, a normal TSH level is approximately 0.5 to 5 mIU/L and excludes hyperthyroidism or primary hypothyroidism. Supersensitive tests measure TSH at levels at least as low as 0.01 mIU/L. TSH levels less than 0.1vmIU/L suggest hyperthyroidism. Levels of 0.1 to 0.5 mIU/L may represent subclinical hyperthyroidism or excess thyroid hormone administration. Levels of 6 to 10 mIU/L are often considered subclinical hypothyroidism, are usually associated with normal free T_4 levels, and are not usually associated with symptoms. In patients with subclinical hypothyroidism, the presence of thyroid antibodies suggests a risk of conversion to frank hypothyroidism of about 5% per year. Symptomatic hypothyroidism occurs with TSH levels greater than 10 mIU/L. The TSH test is also the best way to monitor the results of replacement or suppressive therapy. Although the TSH level is an excellent screen for thyroid function in ambulatory patients, it must be interpreted with caution in acutely ill patients. TSH levels should be used to diagnose thyroid disorders in acutely ill hospitalized patients only when less than 0.1 mIU/L or greater than 20 mIU/L. TSH levels can be decreased by glucocorticoids, dopamine, and octreotide.

Measurements of circulating thyroid hormone should be obtained to confirm abnormal TSH levels. Measurement of free T_4 levels measure the total amount of hormone in blood, free and protein bound. Total T_4 or T_3 levels can be misleading in the setting of protein-binding abnormalities, such as estrogen therapy and liver disease. An approximate reference range in the adult for free T_4 is 0.7 to 2.5 ng/dL and for free T_3 0.2 to 0.5 ng/dL. Free T_3 testing is usually not necessary. One exception is in early hyperthyroidism, when the TSH is suppressed, free T_4 is normal, and free T_3 is elevated.

Primary hypothyroidism accounts for more than 95% of cases of hypothyroidism and is associated with an elevated TSH and reduced free T_4. *Central hypothyroidism* (secondary or tertiary) is associated with low free T_4 and normal to low TSH. Primary hyperthyroidism is associated with a suppressed TSH and elevated free T_4. Subclinical hyperthyroidism is associated with a reduced TSH but normal free T_4 and T_3 levels.

The radioactive iodine uptake scan measures 24-hour thyroid uptake of a labeled quantity of radioactive iodine. In normal persons, uptake is 8% to 30%. Lower limits of normal cannot be reliably differentiated from hypothyroidism in the radioactive iodine uptake scan. Its major value is to help identify causes of thyrotoxicosis associated with low levels of iodine uptake, such as thyroiditis and fictitious hyperthyroidism from overingestion of thyroid hormones. Other causes of reduced thyroid hormone uptake include recent iodine contrast administration and amiodarone.

URIC ACID

Uric acid is produced in the liver as a byproduct of purine metabolism. Measurement of uric acid is useful in the evaluation of *gout* and monitoring of certain types of chemotherapy. Uric acid levels are increased in situations with increased dietary purine intake, reduced excretion, or increased production. In addition, volume status affects uric acid secretion. With a decrease in extracellular volume, uric acid excretion declines, and serum uric acid levels increase. Conversely, volume expansion increases uric acid excretion and leads to *hypouricemia.* Several drugs inhibit the reabsorption of uric acid in the kidney and therefore lead to *uricosuria* (Table 14-18).

Table 14-18 Causes of Hyperuricemia

Overproduction	
Myeloproliferative disorders	Psoriasis
Polycythemia vera	Toxemia of pregnancy
Hemolytic anemia	Ethanol
Malignancies	
Decreased Excretion	
Renal failure	Hyperparathyroidism
Volume depletion	Diabetic ketoacidosis
Hypothyroidism	
Drugs	
Thiazides	Pyrazinamide
Furosemide	Cyclosporine
Aspirin (low dose)	Niacin
Ethambutol	Vitamin B_{12} therapy

Table 14-19 Expected Results on Urine Opiate Screen and Gas Chromatography/Mass Spectometry

Prescribed Opioid	Opiate Immunoassay	GC/MS
Morphine	Positive	Morphine Codeine
Codeine	Positive	Codeine Morphine Hydrocodone
Hydrocodone	Positive/negative*	Hydrocodone hydromorphone
Hydromorphone	Positive/negative*	Hydromorphone
Oxycodone	Positive/negative*	Oxycodone Oxymorphone
Oxymorphone	Negative	Oxymorphone
Methadone	Negative	Methadone
Fentanyl	Negative	Fentanyl

GC/MS, gas chromatography/mass spectometry.
*Depends on the cross-reactivity of the opiate assay with the prescribed drug; varies among assays.

Progressively higher levels *of hyperuricemia* predict the likelihood of gout; however, most authorities believe that asymptomatic hyperuricemia should not be treated. At 37° C, saturation in plasma occurs when uric acid levels are greater than 6.8 mg/dL. Most patients with gout have uric acid levels greater than 7 mg/dL at some time, but they can have normal serum uric acid levels at the time of an acute gouty attack. Although a biologically significant uric acid level is greater than 6.8 mg/dL, the upper limits of "normal" based on population studies are 7.7 mg/dL for men and 6.8 mg/dL for women. The incidence of gout is approximately 5% per year in men with uric acid levels greater than 9 mg/dL, but only 0.5% per year in men with uric acid levels of 7.0 to 8.9 mg/dL.

A distinction between production of uric acid and reduced uric acid excretion as a cause of hyperuricemia may be helpful in evaluating patients with gout. Underexcretion is identified when the *fractional excretion* (excretion of uric acid/excretion of creatinine) is less than 6%. When a person is consuming a standard diet, excretion of uric acid greater than 800 mg/day is considered *hyperuricosuria.* Follow-up testing for patients with hyperuricosuria can be repeated on a low-purine diet, with 24-hour excretion of uric acid greater than 600 mg indicating uric acid overproduction. Of patients with gout, an estimated 90% have reduced uric acid excretion, and less than 10% have overproduction of uric acid as the cause. Drugs that lower serum uric acid include losartan, amlodipine, fenofibrate, and atorvastatin.

URINE DRUG SCREENS

The standard urine drug screen in a clinical setting is a panel of immunoassays designed to detect common drugs of abuse. The panel can include the five drugs required by federal workplace testing: amphetamines, cocaine, opiates, marijuana, and PCP. Panels can also include other classes of drugs, such as benzodiazepines, and more specific assays for synthetic opioids, such as oxycodone, methadone, and fentanyl. Point-of-care testing kits can be ordered for office use that are individualized to the need of the practice. These point-of-care tests provide results in minutes and have generally good sensitivity.

Urine drug screens use cutoff points to define a positive and negative test. These cutoffs are somewhat arbitrary, are chosen mainly to maximize sensitivity and specificity, and do not correlate with the degree of impairment or toxicity. Urine that contains a drug concentration below the cutoff will be reported as negative, even though the drug is present. With standard drug screens, the immunoassays can produce false-positive results. In clinical settings, confirmatory testing using more specific tests, such as gas chromatography/mass spectometry (GC/MS) or liquid chromatography/mass spectrometry (LC/MS), may be ordered to confirm either the presence or absence of a drug.

Generally, drugs and their metabolites are detectable in urine tests for about 3 days after use. A notable exception is marijuana, which can be present in the urine for weeks after heavy use. Urine drug screens have significant limitations, which are not always recognized. For example, most immunoassays for "opiates" are designed to detect heroin and measure codeine, which is a byproduct of heroin and morphine metabolism. However, synthetic opioids such as fentanyl or methadone do not cross-react with "opiate" immunoassays and will produce a negative result. Oxycodone has variable cross-reactivity with standard opiate assays. See Table 14-19 for a chart listing "expected" results on urine opiate screens and GC/MS. Urine drug panels with specific assays for oxycodone, hydrocodone, methadone, and fentanyl are available for monitoring chronic opioid therapy.

VITAMIN D

Vitamin D is now recognized not only for its importance in preventing rickets, but also in preventing osteopenia, osteoporosis, muscle weakness, and falls. Testing levels of vitamin D can be considered in patients at increased risk of vitamin D deficiency, including elderly patients and those with osteoporosis, osteopenia, fat malabsorption, chronic kidney disease, and increased skin pigmentation. The term "vitamin D" includes vitamin D_2 and vitamin D_3. Vitamin

D_2 (calciferol) is manufactured from the plant sterols in yeast, and vitamin D_3 (cholecalciferol) is manufactured from lanolin. Vitamin D is hydroxylated by the liver into 25-hydroxyvitamin D [25(OH)D], the major circulating form of vitamin D in the body. The kidney converts 25(OH)D into 1,25-dihydroxyvitamin D [$1,25(OH)_2D$], which is the active form of vitamin D (Rosen, 2011).

The laboratory diagnosis of vitamin D deficiency relies on measuring the levels of 25(OH)D. Measuring $1,25(OH)_2D$ is not recommended in clinical practice because it is not a reliable indicator of vitamin D status. $1,25(OH)_2D$ has a half-life of only 4 hours, whereas 25(OH)D has a half-life of about 3 weeks. In addition, vitamin $1,25(OH)_2D$ levels can actually increase with vitamin D deficiency because increasing PTH levels stimulate the conversion of 25(OH)D to $1,25(OH)_2D$.

The serum 25(OH)D is a measurement of vitamin D intake and that made in the body after sun exposure. Although some laboratories may report $25(OH)D_2$ and $25(OH)D_3$ levels, it is the total level that is used clinically to monitor vitamin D status. PTH rises when the 25(OH)D levels are less than 30 ng/mL. Although laboratories may list 20 to 100 ng/mL as the reference range for 25(OH)D, most experts define a preferred level of 25(OH)D as 30 to 60 ng/mL, with deficiency defined as less than 20 ng/mL and insufficiency as 20 to 30 ng/mL.

Summary of Additional Online Content

The following content is available at www.expertconsult.com:

eTable 14-1 Pattern of Liver Function Elevation

eTable 14-2 Conditions Associated with Positive Antinuclear Antibody Test

eTable 14-3 Conditions Associated with Elevated Carcinoembryonic Antigen Level

eTable 14-4 Complete Blood Count Components

eTable 14-5 Iron-Related Laboratory Measurements in Common Anemias

eTable 14-6 Positive Predictive Value of Total Prostate-Specific Antigen for Prostate Cancer

eTable 14-7 Classification of Hypernatremia

References

The complete reference list is available at www.expertconsult.com.

Web Resources

http://labtestsonline.org/understanding/analytes/ Developed by the American Association for Clinical Chemistry, this site allows patients to search for explanation of specific tests.

www.nlm.nih.gov/medlineplus/laboratorytests.html An overview for patients that explains basic laboratory principles, and gives links to other resources.

http://www.uspreventiveservicestaskforce.org/ Homepage of the U.S. Preventive Services Task Force (USPSTF), which lists recommendations for screening tests.

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