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# Complementary and Alternative Medicine

*History, Definitions,  
and What Is It Today?*

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## INTRODUCTION

No topic in the health care arena has been the subject of more heated debate in the last few years, short of access to care and health care costs, than complementary and alternative medicine (CAM). CAM has been the focus of extensive media attention, numerous medical articles, books, periodical reviews, as well as the topic of talk shows and dinner conversations. Many patients are seeking increasingly more information from their physicians and other resources about alternatives to conventional, allopathic medicine.

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Health care practitioners are also demonstrating an increased level of interest in CAM, not only to better understand its interaction with conventional medicine, but as an additional resource for both their patients and themselves. Hospitals and health care systems are struggling to develop guidelines for credentialing CAM practitioners, as well as opening avenues to accommodate care practitioners and techniques unique to their current framework of health care. Insurance companies are reevaluating what services to provide their customers, while out of pocket expenditures for CAM continue to rise. Articles in popular publications outline how to add CAM practitioners into traditional medical practices, focusing on issues such as liability, reimbursement, and supervisory responsibilities in order to include services sought by many of their patients (1).

CAM has certainly become a permanent part of the health care culture and landscape as the borders between conventional medicine and CAM begin to blur. The results are numerous clinical, economic, ethical, legal, and social issues associated with not only the increased interest in the use of CAM, but a reevaluation of conventional medicine as well.

This chapter briefly reviews some basic definitions of what has now been labeled *CAM*, some statistics on its use, why and for what type of disease entities patients choose CAM, and why patients are drawn to these approaches; outlines the major types of CAM used in the United States; provides some brief data on the effectiveness (or lack of effectiveness) of CAM; as well as provides some thoughts/insights regarding health care in general and the role both conventional and CAM will surely play.

## DEFINITIONS

For the purposes of this chapter, the term *conventional medicine* is used when referring to what most readers would consider contemporary, allopathic medicine. Conventional medicine

would include those therapies provided by physicians (MDs or DOs) and allied health professionals such as physical therapists, psychologists, and registered nurses (2). The term *traditional* has sometimes been used, but that term has been avoided because it too often has been confused with traditional, Native American medicine.

Several definitions have been used to differentiate conventional medicine from what has now been most frequently referred to as complementary and alternative medicine. At its methodology conference in 1995, the National Institutes of Health (NIH) Office of Alternative Medicine adopted the definition of *complementary and alternative medicine* as follows:

a broad domain of healing resources that encompass all health systems, modalities and practices and their accompanying theories and beliefs, other than those intrinsic to the politically dominant health care system of a particular society or culture in a given historical period. CAM includes all such practices and ideas self-defined by their users as preventing or treating illness or promoting health and well-being. Boundaries within CAM and between the CAM domain and the domain of the dominant system are not always sharp or fixed. (3)

The National Center for Complementary and Alternative Medicine (NCCAM) defines CAM as a group of diverse medical and health care systems, practices, and products that are not presently considered to be part of conventional medicine (2). Eisenberg et al. simply define CAM as therapies not widely taught in medical schools, not generally used in hospitals, and not typically reimbursed by medical insurance companies (4).

Renner has taken a more systematic if not controversial approach to classifying alternative approaches to medical care. He defines the following five areas:

1. Quackery.
2. Folklore.

3. Unproven or untested.
4. Investigation or research.
5. Proven (5).

This classification system seems to be based more on the level of evidence supporting a particular treatment, rather than on its historical, cultural, or political origin. Although appearing somewhat dated, Renner's classification system is not without truth. Many physicians view aspects of CAM as quackery, without scientific foundation or substance. Some feel definitions such as one by the NCCAM provide an air of legitimacy that many, if not most of these practices have not, and never will, merit.

Although these definitions vary somewhat, the general themes are practices, techniques, and therapies not considered by most as part of mainstream health care. However, even the definitions cited previously are changing, as many medical schools are now teaching more about CAM and patients are utilizing these therapies for many disease entities as much, if not more, than conventional medicine.

Finally, three more terms require clarification: *complementary*, *alternative*, and *integrative* (2). Complementary refers to the practice of using a nonconventional approach or therapy along with a conventional treatment, for example chelation therapy for the prevention of heart disease, along with traditional risk-factor modification such as diet, exercise, and lipid-lowering therapy. Alternative refers to the use of a therapy in place of conventional medicine, such as a special diet or herbal therapy instead of standard chemotherapy, surgery, or radiation therapy for cancer treatment. Integrative medicine combines mainstream medical therapies and CAM therapies for which there is some degree of high-quality scientific evidence of safety and effectiveness (2).

## STATISTICS

The focus on CAM is anything but recent. Even as interest in the United States is increasing, Kaptchuk and Eisenberg refer-

ence reports dating back to the 1920s in which a leading Philadelphia physician published the results of a survey in which 34% of his patients had, prior to their first office visit, been under the care of what were considered cults. Kaptchuk and Eisenberg also referenced, from approximately the same time period, an Illinois Medical Society Survey of 6000 people in Chicago that found 87% had “dabbled” in cult medicine (6).

One of the more definitive papers on the use of CAM compared trends in the United States from 1990 to 1997 (7). Use of CAM increased from 33.8% in 1990 to 42.1% in 1997, with Americans spending somewhere between \$36 and \$47 billion on CAM therapies in 1997 alone. Approximately 58% of all of those costs were paid entirely out of pocket. The largest increases were in the use of herbal medicines, massage therapy, mega-vitamins, self-help groups, energy healing, and homeopathy. Patients used CAM most frequently for chronic conditions such as back pain, depression, anxiety, and headaches, with 4 out of 10 Americans having used CAM for treatment of these chronic conditions. By 1997, Americans made an estimated 629 million visits to CAM practitioners, up from 427 million in 1990, a 47.3% increase in total visits over that 7-year period. Approximately \$27 billion was spent out of pocket, an amount comparable to out-of-pocket expenses paid for all physician services over the same time. The 629 million visits to CAM practitioners far outweigh the 388 million made to primary care physicians during that same time period (7).

These trends cross all age groups. CAM had been used by 30% of the pre-baby boomer cohort, 50% of the baby boomer cohort, and 70% of the post-baby boomer cohort, reflective of trends that began more than 50 years ago, and suggest a continuing demand for CAM services (8). A more recent report, perhaps one of the most extensive reviews on CAM, came from the US Department of Health and Human Services, which surveyed 31,044 patients, finding that 75% of those surveyed had used CAM when prayer specifically for health issues was included in

the definition. Of these patients, 62% had used CAM within the previous 6 months. Approximately 19% used natural products such as herbs, glucosamine, and the like, and the most common medical conditions treated were back pain or problems, head or chest colds, neck pain or problems, joint pain or stiffness, and anxiety or depression. This was not unexpected, given that 25 to 33% of all adults suffer from these conditions at one time or another and because these conditions are typically resistant to conventional treatments. Most surveyed patients used CAM because they believed it could help when combined with conventional medicine. Half used CAM initially out of their own interest, and 26% used it because their physician suggested they try an alternative approach to their problem.

With prayer as part of the definition of CAM (often not included in other surveys), more than 62% of adults used some form of CAM in 2002. Excluding prayer, overall CAM estimates dropped to approx 36%—consistent with other studies. Interestingly, only approx 12% of these patients sought care from a licensed or certified practitioner, suggesting a large number of patients are self-medicating or self-treating with the corresponding risks of unmonitored adverse events, negative consequences, or potential substance interactions. An estimated 50 million adults took herbal preparations or high-dose vitamins along with their prescription medications, but only 38 to 39% of those patients disclosed to their physicians that they used CAM therapies. Also, consistent with other studies, 54.9% of patients used CAM along with conventional medicine (9).

Rao et al. looked specifically at rheumatological practices to better understand the use of CAM in chronic disease states, an area of high prevalence in other surveys. Nearly two-thirds of the patients sampled had used CAM, which was remarkable as their definition of CAM *excluded* biofeedback, exercise, meditation, or prayer. About 56% currently used CAM, 90% used CAM regularly, with 24% using three or more types of CAM. As suspected,

50% used CAM because they felt that their prescription medications were ineffective. The most commonly used approaches were chiropractic (73%) and spiritual healers (75%). Half of the patients in this survey also used mega-dose vitamins or herbal preparations (10).

Eisenberg et al. surveyed 831 patients who saw both a CAM practitioner and a conventional medicine practitioner, with 79% seeing the combination as superior (11). Nearly 75% typically saw their conventional medicine physician prior to the CAM practitioner. Respondents felt CAM was better for chronic conditions such as headaches, neck, and back problems, but conventional medicine was felt to be superior for diseases such as hypertension. The authors concluded that national data do not support the perception that patients use CAM because of a dissatisfaction with conventional medicine. Instead it appears that patients prefer a more integrative approach. They revealed to their physicians their use of CAM only about 28 to 47% of the time, mainly because they did not feel it was important for the doctors to know or because their physicians never asked them about it.

From the numerous surveys, interviews, and studies on the use of CAM, several themes emerge. Prayer, when defined as a CAM therapy, is used by a large number of patients. Most patients use CAM with, rather than instead of, conventional medicine. Most patients use CAM regularly, rather than as an isolated encounter, and do so for those chronic conditions conventional medicine has been less than successful at treating, such as musculoskeletal pain or dysfunction, headaches, chronic or recurring pain, anxiety and depression, or for potentially terminal conditions such as cancer or HIV. CAM is used by all age groups, and is typically used by the more educated, those willing to pay out of pocket, and those willing to tell their physicians when asked.

What is most interesting, as seen later in this chapter, is that despite the increased use of CAM over time and among a wide range of patients for numerous conditions, little data to date sup-

ports its overall efficacy. What these studies challenge is the concept that one size fits all when it comes to the type of health care Americans use, seek out, and are willing to pay for, even if directly out of pocket.

## WHY PEOPLE USE CAM

Patients use CAM for a myriad of reasons, including health promotion and disease prevention, curiosity, the preference to self-treat, cultural traditions, a perception that CAM is more patient-focused and less disease-specific than conventional medicine, because of a suggestion or testimonial from a friend, media claims, a distrust or lack of results from conventional medicine, or the belief that CAM systems have stood the test of time. With the advent of the Internet and more market-savvy consumers, many patients are looking beyond conventional medicine for their health care and health promotion. These inquiries span beyond a mere curiosity in CAM or a dissatisfaction with conventional medicine, but are founded in a quest for a more patient-centered, holistic, “natural” approach to health and well-being. Even with what may be perceived as a lack of clear outcomes data, “for many patients the lure of unproven, over-the-counter [OTC] remedies has been irresistible” (12). Despite its goals of rigor and foundation on solid, scientific principles, conventional medicine must recognize that it does not meet the needs of a large percentage of patients. With so many patients asking about or using CAM, either alone or in concert with conventional medicine, it is important to understand its appeal and what it appears to be providing that conventional medicine does not.

Eisenberg has delineated the following five main reasons patients seek and use CAM:

1. For health promotion and disease prevention.
2. Conventional therapies have been exhausted.

3. Conventional therapies are of indeterminate effectiveness or are commonly associated with side effects or significant risks.
4. No conventional therapy is known to relieve the patient's condition.
5. The conventional approach is perceived to be emotionally or spiritually without benefit (13).

The focus of most contemporary medicine has been more on disease detection, diagnosis, and treatment, and only very recently on health promotion and disease prevention. Many insurance companies still do not reimburse for routine health maintenance. On January 1, 2005, Medicare began paying for a routine physical, but only for new enrollees and then only within the first 6 months of enrollment. Patients perceive a lack of interest in health promotion from conventional medicine and look to alternative approaches. One-third of patients who use CAM do so specifically for health promotion and disease prevention (4), although the perception that CAM promotes prevention is interesting in that preventive diagnostic screening, *per se*, is not a typical approach used by CAM practitioners.

However, health promotion is an important component of CAM. Millions of dollars are spent on OTC vitamin and herbal preparations that are taken daily, specifically for health promotion and to prevent diseases such as cancer or heart disease. A key aspect of CAM is the perception that these health promotion therapies are natural and hence without side effects or toxic properties. Patients perceive conventional medicine, on the other hand, as having either serious side effects or risks not worth taking, viewing it as unnatural or invasive. CAM practitioners claim that as conventional medicine and pharmacology attempt to purify substances, they remove the essence of the compound that nature has provided. Herbs, for example, are seen as complete substances, with balanced healing powers: when kept intact, side effects are minimized.

Another fundamental of CAM that appeals to its users is the concept that the root cause of disease lies within the patient, as an imbalance within the system, rather than as an external, acquired disease entity. Inherent in this concept is the belief that a rebalance, a reconnection with the natural order, will cure or prevent disease, thus patients can cure themselves. CAM practitioners, therefore, are viewed as facilitators of healing, helping patients tap into their inner, self-healing abilities. Various techniques such as acupuncture, chiropractic therapy, massage, herbal preparations, and vitamins are used to either unlock this inherent healing power of nature or to unblock channels that obstruct the flow of vital, natural life forces. This belief appeals to many CAM users as they themselves become responsible for the success or failure of therapy, providing patients more of an ability to participate actively in the healing process; the idea that they can help themselves and avoid the often intrusive approaches of conventional medicine. The concept that “nature knows best how to heal,” is much more prevalent in CAM than in conventional medicine. “Alternative medicine is widely perceived as the kinder, gentler, safer system of care” (14).

A natural approach is also perceived as superior. CAM, viewed as a more natural approach than conventional medicine, is therefore perceived to be superior when juxtaposed with conventional medicine; pure vs toxic, organic vs synthetic, low-tech vs high-tech, coarse vs processed (12). However, we know that mercury and arsenic, for example, are “natural,” but highly toxic.

A spiritual perspective is much more prevalent in CAM and forms the basis of many therapies, a concept largely foreign to conventional medicine. Ayurveda, Traditional Chinese Medicine (TCM), and acupuncture all have their basis in Eastern philosophy and religion. However, these beliefs are not limited to Eastern religions. As evidenced by national data, many patients utilize prayer as a healing technique. The involvement of a higher, spiritual healing presence is a hallmark of many cultural belief systems. These beliefs are perhaps one of the reasons that a lack of a

mechanistic understanding of some complementary therapies (e.g., homeopathy) does not dissuade users. They believe there is an effect beyond what one can measure or perceive.

Patient autonomy is also a powerful component of CAM—a desire to enhance one’s own health, without the need for outside interventions. CAM focuses more on the patient and less on the therapy, giving patients the perception that they are more in control of their own health and that they can help themselves. There is something inherently appealing about the idea that the more effort one puts forth, the more successful one will be. It is not surprising then that CAM is used frequently for diseases such as cancer or AIDS, where loss of control is high and faith in conventional medicine is low, and where conventional medicine has been less than successful. This also explains the frequent use of CAM in chronic disease states or chronic pain syndromes.

CAM practitioners are viewed not only as the advocates and instruments of nature, but as being able to restore the patient to a state of natural harmony. In this model, the patient is the focus, not the disease. Conventional medicine is widely criticized for lacking patient focus—“the gallbladder in room 333” rings all too frequently through hospital corridors. Through CAM, patients seek more health communication, health information, therapeutic touch, and a more holistic, less time-constricted patient-focused approach.

Although a diverse collection of therapies and treatments, CAM attempts to maximize the body’s inherent healing abilities, to treat the whole person by addressing his or her physical, mental, and spiritual needs rather than focusing on a specific pathogenic process as emphasized in conventional medicine (15). Some of these holistic approaches hypothesize an influence, or an effect, on levels of the physiology or energy fields that conventional medicine either does not acknowledge or cannot access. Acupuncture, Reiki, meditation, and prayer unblock or unfold an inner healing potential, individualized, patient-centered, and resulting in health promotion and disease prevention. Patients also see

many of these types of CAM as having stood the test of time, such as TCM or Ayurveda.

Despite what might seem to be fundamental differences in the philosophy and basis for many CAM therapies, most patients still use CAM in conjunction with conventional medicine, rather than in place of it. This integrative approach would suggest patients perceive both methods somehow “complement” and add value to each other. Obviously, both systems seem to help patients move closer to their goals. Trying to better understand what CAM provides will help practitioners of both schools of medicine better serve the needs of all their patients.

## CLASSIFICATION OF CAM PRACTICES

Several taxonomies have been suggested to classify types of CAM. Whatever scheme one chooses, it must be flexible, as what is considered to be CAM continually changes, is culturally determined, and is dependent on the politically dominant health care system at that time. TCM and Ayurveda are considered alternative practices in the United States, but as mainstream medicine in China and India, respectively.

One suggested approach to classification would differentiate practitioner-based systems, such as chiropractic and acupuncture, from systems such as herbal therapies or mind–body techniques, which patients can engage in on their own. Another might organize by their historical roots, or perhaps by underlying philosophy. Although many systems of CAM have differing underlying principles and philosophies, they are by no means mutually exclusive. The NCCAM has proposed a system that broadly classifies CAM into five main categories or domains:

1. Alternative medical systems.
2. Mind–body interventions.
3. Biologically based therapies.

4. Manipulative and body-based methods.
5. Energy therapies (2).

### *Alternative Medical Systems*

Alternative/whole medical systems are those that have developed, and are built on, a complete system of therapies and practices. These systems can be further categorized as those developed in non-Western cultures (TCM and Ayurveda) and those developed in Western cultures (homeopathy and naprothy). These systems often developed either in isolation from, or earlier than conventional medicine (as some are thousands of years old), and evolved independently or in parallel to conventional medicine.

Several cultures have developed their own unique systems of medicine such as in Africa, Tibet, Central and South America, and Native American medicine. These are practiced less often in the United States than the systems discussed here.

### *Non-Western Systems*

The two non-Western systems used most frequently in the United States are TCM and Ayurveda.

#### TRADITIONAL CHINESE MEDICINE

TCM originated in mainland China more than 2000 years ago, although since then other countries such as Japan, Korea, and Vietnam have developed their own variations and adaptations. Written documentation of TCM has been discovered as far back as 200 BC.

The philosophical foundation of TCM is interesting and quite different from conventional medicine. In TCM, there is a fine balance between the two opposing but interrelated and inseparable forces of nature, Yin and Yang. Yin has been described as those aspects of cold, slow, passive, dark, and female, whereas Yang is hot, excited, active, light, and male. Health is maintained

by achieving and then maintaining the balance between these opposing forces. Disease is the result of imbalance, and imbalance results from a blockage of vital energy (qi) that flows throughout the body along well-defined channels called meridians.

There are 12 main meridians within the body. These anatomic channels and their tributaries are naked to the eye, but are well delineated on extensive anatomic charts and models used to guide therapies such as acupuncture and acupressure. Each meridian also corresponds to an internal organ and is under the influence of one of the five basic elements of the nature (water, fire, earth, metal, and wood). Diagnosis and treatment regimens in TCM are extremely individualized. Diagnostic methods or questions might seem unusual to a conventional physician as they are designed to determine where imbalances or blockages might exist, in order to develop a strategy to rebalance the system. Problems in the gastrointestinal/digestive system, for example, might be diagnosed as an imbalance of fire. The various techniques employed would then aim to unblock or facilitate the flow of qi in order to offset the imbalance of fire and water, or of hot and cold, to balance these opposing forces, the Yin and Yang, in order to restore or maintain health.

The various TCM techniques such as acupuncture, herbal preparations, and massage are employed to restore this balance through the unencumbered flow of qi. The main modalities of TCM are acupuncture and moxibustion, the use of natural products such as herbs, massage (Tuina), and manipulation (acupressure). These modalities are often used in combination with each other, along with diet and exercise programs.

### *Acupuncture*

Acupuncture was virtually unknown in the West until the 1970s when President Richard Nixon visited China and journalists witnessed major surgeries being performed with acupuncture as the only anesthesia. Acupuncture, one of the most frequently used and most recognized aspects of TCM, has now been used as

a therapeutic practice by well over 2.1 million adults in the United States (9). Acupuncture, however, is much more than just a pain blocker. It is one of the fundamental methods of health care in all of Asia. This technique, which originated in China more than 2000 years ago, is typically associated with TCM, although variations are practiced in both Korea and Japan. Extensive writings and diagrams exist describing the techniques of acupuncture. Detailed anatomical maps exist delineating the specific points/locations to be used to treat various disease states or affect various organs. Although popularized since the 1970s, Franklin Bache, MD—grandson of Benjamin Franklin—and Sir William Osler wrote about the benefits of acupuncture.

The theory behind acupuncture reflects back to the fundamental principles of Yin and Yang in TCM. The imbalance of these states results in disease; acupuncture is performed to rebalance the system, to cure disease, and to reestablish harmony. Fine, thin, solid, metallic needles, much smaller than the type of hollow needles used in conventional medicine, are typically first placed in a small tube then gently tapped into the skin by the acupuncturist along the defined meridian lines. The needles then stimulate the acupuncture points along these meridians (channels) to release any blockages that might exist, in order to allow the flow of qi (vital energy) and restore the body to its natural, balanced state. These needles are usually left in place for approx 30 minutes per session and anywhere from 5 to 30 needles may be used. The needles may be stimulated by lightly twisting them, by electrical stimulation, or further enhanced by a process called moxibustion during which a smoldering herb, *Artemisia*, is added to the acupuncture site. Often, several sessions are required to achieve the desired results.

This concept of unblocking the natural flow of qi (vital energy) is one of the fundamental principles of TCM. Conventional medicine might explain the benefits of acupuncture differently. Studies have shown acupuncture releases endogenous opioids,

endorphins, and enkephalins, stimulates the immune system, recruits white blood cells and other substances to the sight of injury. Research has shown the activation of endogenous opioids and through other mechanisms, acupuncture may stimulate gene expression of neuropeptides (16). Magnetic resonance imaging (MRI) studies have also demonstrated quantifiable effects on the brain.

In 1976, California became the first state to license acupuncturists and now more than 40 states have similar laws, with more than 11,000 acupuncturists in the United States alone. Despite the prevalence of the technique, high-quality, reproducible studies on the benefits of acupuncture are lacking. Controlled experiments are difficult to administer—blinding the patient to the use or non-use of acupuncture needles has its obvious limitations. Sham acupuncture procedures have been employed, but in a limited fashion. However, studies have shown acupuncture to be beneficial in reducing the emesis that develops after surgery or chemotherapy, for the nausea and vomiting associated with pregnancy, and for dental pain. Studies are equivocal for chronic pain, back pain, and headache (16).

A study recently published in the *Annals of Internal Medicine* has begun to change the landscape of acupuncture research. Funded by the NCCAM and the National Institute of Arthritis and Musculoskeletal Disease, researchers found acupuncture to be valuable in pain relief and functional improvement for patients with osteoarthritis of the knee (17). This was an extremely significant study given rigorous, scientific principles were applied to study acupuncture as compared to both a sham acupuncture procedure and a control group. The study showed significant benefits of acupuncture when used with conventional treatments such as cyclooxygenase-2 inhibitors, nonsteroidal anti-inflammatory drugs, and opioid pain relievers. This study, the largest randomized, controlled clinical trial of acupuncture ever conducted, will serve as a model for future research. As seen later in this chapter,

there are now numerous, ongoing well-designed trials to study various aspects of CAM.

### *Herbal Medicine*

Although a component of many different health care systems, the use of herbs plays a major role in TCM. In addition to their extensive use in TCM, herbs are one of the most commonly used forms of CAM in the United States. The Chinese Materia Medica, the standard reference on the medicinal substances used in TCM, contains information on thousands of herbs and their uses. Herbs are used in TCM to bring about changes in physiology, but also are used to influence the conscious and subconscious mind. Herbs are prescribed regularly to balance Yin and Yang, to produce harmony within the body.

Dispensed according to imbalances diagnosed in the system, an herb with Yin qualities might be given to balance a Yin deficiency. This concept is not unfamiliar to conventional medicine. It has parallels in the functioning of the endocrine system, a natural system designed to establish and maintain homeostasis. An herbalist will prescribe herbs based on environmental influences such as the change in seasons, or according to dietary needs. The indications for the use of herbs are quite specific, and herbs are often used in their whole form. Modern pharmacology often strives to isolate and administer the active ingredients of a substance such as herbs. In TCM the entire, unprocessed substance is most often used, with the belief that different parts of the herb interact with each other, actually enhancing the “active” ingredient in the herb while at the same time neutralizing potential side effects by keeping the substance intact.

Many specific factors can influence the beneficial effects and potency of herbs, such as the type of soil in which they were grown, geographic location, storage techniques, and post-harvest processing, thus making standardization difficult. Herbs are regulated by the Food and Drug Administration (FDA), but differently than prescription medications. With this lack of close

oversight, herbs can vary immensely in their components. With approximately half of the herbs taken by patients not reported to their physicians, there is significant potential for interactions with prescription medications and nonprescription substances (18).

#### AYURVEDA

Another non-Western whole medical system is Ayurveda. Developed by Brahmin sages some 5000 years ago in India, *Ayurveda* literally means knowledge of life. As this suggests, it is a health care approach beyond the mere treatment of disease, one whose fundamental principle is the integration of mind, body, and spirit. Various techniques are utilized to achieve this integration including diet, herbal therapy, aromatherapy, cleansing rituals, meditation, and yoga. Ayurveda is still practiced actively today as an integral part of the Indian health care system. As in TCM, the concept of balance is a fundamental principle of Ayurveda. Each individual, as part of the natural rhythm, is influenced by three fundamental universal energies: the three doshas—Vata, Pitta, and Kapha. These three elements are present in every human cell, tissue, and organ, and vary according to the individual's unique constitution. Imbalances of these doshas can lead to disease and suffering. Ayurveda strives to balance these doshas, which are influenced by diet, seasons, lifestyle, genetic tendencies, and the like. Diagnosis performed by a certified practitioner relies heavily on tongue and pulse analysis, which help determine the individual's constitution and identify imbalances. Herbal preparations, dietary instructions, and lifestyle advice are all provided to rebalance the individual's unique constitution.

Meditation, yoga, and breathing techniques are the foundation of ayurvedic therapies. Panchakarma, a series of cleansing rituals, is frequently employed to rid the body of impurities and therefore to rebalance the doshas. Increasingly more research studies on ayurvedic principles are beginning to emerge, but thus far most of the research on Ayurveda coming out of India generally falls short of contemporary methodological standards. A

recent article in *JAMA* studied several OTC ayurvedic preparations sold in the Boston area and discovered a disturbingly high percentage contained toxic chemicals such as lead, mercury, and arsenic (19). This most likely represents poor-quality manufacturing techniques, rather than flawed fundamental health care principles and practices.

### *Western Systems*

Two other whole medical systems have evolved in the West: homeopathy and naprothy.

#### HOMEOPATHY

Homeopathy, derived from the Greek *homoeo* (similar) and *patho* (disease) was developed by an 18th-century German physician, Samuel Hahnemann. However, its historical roots claim to date back to Hippocrates and Indian healers. The fundamental concept of homeopathy is the principle of similars: “like cures like,” that is, substances that produce the same symptoms of a disease can be used to cure that disease. For example, if the symptoms of a respiratory infection were similar to the symptoms of mercury poisoning, then mercury would be the homeopathic remedy for that infection. The homeopathic substance, in this example, mercury, is called the simillium. The mercury is not administered directly, but first treated through a series of dilutions, sometimes as dilute as one part to 1 billion. This concept, called potentiation, contends that the more dilute the remedy, the more potent the cure. The diluent, such as water, would then retain “trace memory” of the initial substance.

Homeopathy also proposes the concept of the single remedy; no matter how many symptoms one manifests only one remedy is taken and that remedy will affect all those symptoms. Because homeopathy is administered in extremely dilute, minute, or potentially nonexistent doses, there is significant skepticism on the part of conventional medicine. Homeopathic practitioners claim, however, that this approach is similar to allergy medicine

or the use of vaccines; in both techniques a small amount of substance is administered to bolster the immune system against that disease. Because homeopathic remedies are taken in such minute doses, they appear to be safe. Homeopaths claim this approach is much more specific than conventional medicine, based on highly individualized treatments, and hence difficult to study using conventional, clinical trial methods.

#### NAPROPATHY

Sometimes referred to as naprapathy and considered a universal healing system, naprapathy was developed in the late 1800s by Dr. Oakley Smith. A chiropractor himself, Dr. Smith was disappointed that chiropractic techniques only provided fleeting relief for his back pain, and through his research discovered the importance and healing potential of manipulating the soft tissue between the bones. Through experimentation and assimilation of various healing techniques, he developed the field of naprapathy. Naprapathy emphasizes health restoration and maintenance as well as disease prevention. Today, naprapaths see a broader range of conditions than say, for example, chiropractors or massage therapists. They treat such problems as anxiety, depression, fatigue, skin conditions, and menopausal symptoms (20). There are six fundamental principles of naprapathy, which will appear similar to other systems of health care:

1. The healing power of nature.
2. Identification and treatment of the cause of the disease.
3. "First do no harm."
4. The doctor as teacher.
5. Treatment of the whole person.
6. Prevention (2).

Perhaps more than other whole medical systems, naprapathy seems to integrate and utilize a wide variety of healing approaches such as nutritional supplements, herbal medicines, acupuncture

and Chinese medicine, homeopathy, hydrotherapy, massage and joint manipulation, and lifestyle counseling, while tapping into the healing power within the body that establishes, maintains, and restores health. There are no studies available on naproopathy as a complete system of medicine.

### *Summary of Alternative Medicine*

When viewed together, there is an underlying theme that permeates these whole medical system practices; a theme of the natural order of the body, supported by a vital energy, a life force, or a balance that when interrupted or distorted causes disease or dysfunction. Through various techniques, the goal of these systems is to restore the natural balance of the system by tapping into or unblocking the obstructed natural flow of a subtle, unmeasurable life force or energy. Balance is maintained through ongoing, often daily, practices.

As these concepts are either foreign to conventional medicine or unable to be better defined and/or measured in scientific terms, conventional medicine is skeptical not only of the practices themselves, but any purported benefits that may arise. Unfortunately, few well-designed, well-controlled scientific research studies have been completed on these systems to either support or disclaim proponents' experiences and testimonials. Fortunately, as was the case with the recent studies on acupuncture and osteoarthritis, more well-designed studies are ongoing that will stand up to scientific scrutiny and perhaps widen not only the medical armamentarium, but expand the understanding of physiology and the mechanisms of health and disease.

### *Mind–Body Interventions*

Mind–body interventions represented a major portion of the complementary and alternative techniques used in the United States in 2002. Relaxation techniques, imagery, biofeedback, and hypnosis were used by more than 30% of the US population (2).

Ancient health care systems such as TCM and Ayurveda recognize the relationship between mind and body and the importance of both approaches in the healing process—an approach prevalent today. These systems of medicine view illness as an opportunity for personal growth and transformation, beyond just the cure of the disease.

Hippocrates also recognized the spiritual aspects of healing, but as a more reductionist approach to modern medicine developed, the mind–body connection became less important. The focus changed to biology and physiology, cells, bacteria, viruses, and those entities that could be measured and observed. This dichotomy continues today, although recent investigations like those of Walter Cannon in the 1920s and the work of Hans Selye have begun to bridge the gap between emotion, thought, and the corresponding physiological responses. Cannon coined the concept “fight or flight” and defined the corresponding physiological, sympathetic, and adrenal activations in the face of perceived danger. Dr. Selye went on to describe in detail the concept of stress; the nonspecific physiological response of the body to any demand placed on it (21,22).

Understanding there is a physiological, measurable response to cognition has caused a resurgence of the mind–body connection in conventional medicine. With the placebo effect well recognized in modern medicine, better understanding this connection may prove worthwhile to patients. The myriads of mind–body techniques strive to incorporate just that. These techniques involve a wide range of therapies including relaxation, hypnosis, visual imagery, meditation, yoga, biofeedback, Tai Chi, Qi Qong, cognitive–behavior therapy, group support, autogenic training, spirituality, and prayer. Research is beginning to emerge in this field in areas such as pain control, headache, low back pain, effect on the immune system, wound healing, the placebo effect and surgical preparation of patients (2).

Meditation is one of the more popular and publicly available mind–body techniques. Typically thought of as a self-help or per-

sonal growth technique, meditation has been evaluated in numerous scientific studies. Probably the most widely researched technique is the transcendental meditation (TM) program. With more than 500 scientific studies on the technique in the areas of physiology, psychology, sociology, education, and rehabilitation, and with articles in prestigious journals such as *Science*, *Hypertension*, *American Journal of Physiology*, and *Scientific American*, TM is certainly one of the most intensively study techniques in the field of human development today. Canter recently reviewed the literature on numerous meditative techniques, including TM, and although he found benefits with the technique in areas such as hypertension, he found the current evidence for the therapeutic effects of any type of meditation to be weak, although he points out future trials with improved design may provide concrete, positive benefits (23,24). Other papers have also reviewed cognitive-behavioral techniques such as biofeedback, relaxation, and meditation specifically for the treatment of hypertension, and identified the limited quality literature available on the subject, mainly owing to methodology inadequacies (25).

### ***Biologically Based Therapies***

Biologically based therapies include a wide range of substances such as vitamins, minerals, botanicals, animal derived extracts, proteins, amino acids, prebiotics, probiotics, dietary supplements, whole diets, and functional foods. All one need do is visit a health food store to view the plethora of available biologically based therapies. In 2002, an estimated \$18.7 billion was spent on dietary supplements alone, with herbs/botanical supplements accounting for approx \$4.3 billion in sales (2). About 22% of the population use biologically based therapies, and about 19% use natural products, including Echinacea, ginseng, ginkgo biloba, garlic supplements, glucosamine, St. Johns Wort, peppermint, fish oil, ginger supplements, and soy supplements. As previously noted, given the fact that many patients do not tell their physicians about the use of these substances, and that many

patients use these in combination with prescription drugs and other substances, the potential for drug–drug interactions is high.

Dietary supplements are regulated differently than drug products (either prescription medications or OTC medications) by the FDA, without the level of pre- and postmarketing surveillance required for prescription medications. If a biologically based substance such as an herb, vitamin, or mineral is used to resolve a nutrition deficiency or to improve the function of the body, it is considered a dietary supplement. If it is used to prevent, treat, or cure a disease, it is considered a drug. Although required to be safe, there are no specific guidelines on what can be labeled and marketed as a specific product. In other words, if one looks for “fish oil,” there are numerous varieties of fish oil available, in various combinations, as no defined standards exist. As with other aspects of CAM, the research on these biologically based therapies is fraught with methodological problems, quality control, and definitional issues. Given the already established, extensive market penetration of these substances, it is not surprising that there is a lack of enthusiasm by producers to expose their products to rigorous, scientific scrutiny.

With numerous OTC preparations available and so many patients using them, one obvious concern is potential drug interactions. Several cases have been reported of increased bleeding associated with ginkgo biloba when used with anticoagulant or antiplatelet medications, whereas dietary supplements such as garlic, glucosamine, ginseng, sal palmetto, soy, and yohimbe have been shown to either interfere or potentiate prescription medications, or have their own isolated toxicities (26). A recent, systematic review found high-dose vitamin E may actually increase mortality, whereas several trials (e.g., the Heart Protection trial) have shown less than beneficial effects of vitamin therapy (27–29).

Chelation is a unique alternative treatment, somewhat different than other biologically based therapies. A technique that infuses ethylenediaminetetraacetic acid intravenously, chelation

has been used therapeutically in situations where cations such as lead, magnesium, zinc, iron, or calcium are in excess. Chelation is now being used to remove calcium from atheromatous plaques. The theory goes that as calcium is removed, atherosclerosis will reverse, resulting in improved coronary and peripheral blood flow. Therapy is usually provided over multiple sessions, both to treat vascular disease and to prevent its occurrence. Although figures vary, data from 1993 estimated more than 500,000 patients per year were treated in the United States with chelation therapy, with financial estimates on its cost at greater than \$400 million per year (30). By 1997, more than 800,000 patient visits were made for chelation therapy. A 2002 paper published the results of a randomized trial of chelation therapy in patients with ischemic heart disease and found no benefits in terms of the time to ischemia, exercise capacity, or quality of life (31). Currently, the NIH is conducting a randomized, controlled trial on the potential benefits of chelation in heart disease. This is another example of a therapy that perhaps has a theoretical foundation, but lacks efficacy data.

### *Manipulative and Body-Based Therapies*

Manipulative and body-based therapies are those practices that focus primarily on the bones, joints, soft tissues, the circulatory and lymphatic systems. Although these treatments are a fundamental component of ancient health care systems, many have been developed and popularized more recently. There are numerous practices that fall into this category including chiropractic, craniosacral treatments, reflexology, acupressure, and Rolfing, to name just a few. Visits to chiropractors and massage therapists alone account for approx 50% of all visits to CAM practitioners (7). Common principles among these therapies are the beliefs that the human body is self-regulating, all aspects are interrelated, and the body is capable of healing itself. Many of these types of techniques, although not widely accepted by conventional medicine, are more easily understood by physicians and patients, particu-

larly body manipulation and massage techniques especially when used for isolated “mechanical” problems such as musculoskeletal or back pain.

Chiropractic is certainly the most recognizable of all the manipulative therapies. It is the largest, most regulated and best recognized of the CAM treatments that have traditionally functioned outside mainstream medicine (32). Chiropractors are visited more frequently in the United States than any other alternative provider. Although spinal manipulation, the hallmark of chiropractic, is one of the oldest, most widely used and practiced method of manipulative therapies, modern chiropractic dates itself to 1895 when developed by Daniel Palmer. Palmer developed the concept of “innate intelligence,” the natural healing ability of the body, and integrated this idea with conventional knowledge of anatomy and physiology. He was a proponent of natural healing—he espoused the avoidance of drugs and surgery as unnatural and focused more on what he perceived as the normal functioning of the nervous system as the key to health.

Palmer believed neurological dysfunction developed as the result of impinged nerves at the level of the spine and that spinal manipulation (adjustments) removed these impingements and allowed normal functioning of the system. This adjustment is achieved by the application of a force to a specific body part, through various techniques, with therapeutic intent. Most chiropractors, however, have expanded their practices and also work with other modalities such as the application of heat, cold, electrical methods, massage, as well as nutritional and lifestyle counseling, vitamin therapy, relaxation techniques, and so on. Chiropractors are also one of the few groups of CAM practitioners that utilize modern diagnostic techniques such as X-rays.

Perhaps one of the appeals of chiropractic is the “hands-on,” high-touch, low-tech approach. Chiropractic is very patient-centered and less disease-focused than conventional medicine. Numerous randomized trials have studied the benefits of chiropractic for acute, subacute, and chronic low back pain. These

studies have shown at least moderate success in this area (33). However, systematic data are lacking on the overall benefits of chiropractic.

### *Energy Therapies*

Energy therapies are perhaps the most esoteric of all the CAM practices. These can be divided into two types: veritable (those that can be measured) and putative (those that cannot or have not been measured).

#### *Veritable Energy Therapies*

Veritable (measurable) energies include sound and electromagnetic forces including visible light, magnetism, and monochromatic radiation. There are many well-established uses of measurable energies in conventional medicine as well, from both a diagnostic and therapeutic perspective. MRI, cardiac pacemakers, electrocardiograms, radiation therapy, ultraviolet light for psoriasis, and laser keratoplasty are common examples. Magnet therapy, popular today for musculoskeletal and arthritic pain, has been used for centuries. Television and print ads are resurrecting many of these therapies supported by testimonials and claims of dramatic improvements. Research is now beginning to uncover the physiological responses of many of these therapies.

Pulse electromagnetic therapy has been used for years in orthopedic injuries and to accelerate healing fractures. Sound wave therapy, such as music therapy, has also been used for years for pain and anxiety, either alone or in combination with imagery. Even the most skeptical among us can vouch for, from personal experience, the beneficial effects of sound therapy (music). Light therapy has been well documented to impact seasonal affective disorders, with less effective data on depression and sleep disorders. When viewed in their proper context, energy therapies are a well-established component of conventional medicine as well as CAM, widely used, and with multiple applications.

### *Putative Energy Therapies*

What are more interesting in the context of this chapter are the putative (yet-to-be measured) energy therapies. An underlying theme in many CAM practices is the concept of a vital force, an inherent natural energy that permeates the individual and maintains health and wellness. This energy has various names; qi (TCM), the doshas in ayurvedic medicine, innate intelligence, creative intelligence/transcendental consciousness, and the like, but the fundamental principle is the same; tapping into or allowing this energy to flow unimpeded will cure disease, support the physiology, and perhaps result in personal and spiritual growth. Because this energy cannot be measured by current techniques, verifying the effects of these practices is difficult. All one can do is quantify and measure presumed outcomes or effects of these methods, which is not all that dissimilar to some aspects of conventional medicine. Various medications we use or therapies we employ have specific benefits, but the exact mechanisms of action are unknown.

Conventional medicine also relies on the “healing power of nature.” Immobilization is the most common treatment for fractures—letting nature heal the break. The pH of the stomach, the coagulation and thrombolytic systems, as well as the immune systems are all examples of what a CAM practitioner would consider the healing power of nature. Energy therapies aim to better tap into this natural order and direct this healing power of nature in a more specific manner. Acupuncture, herbal medicine, meditation, yoga, Qi Gong, and homeopathy are examples of treatments aimed to influence or unblock this healing biofield. Some methods use a practitioner to either directly touch the individual or merely pass their hands over the patient to strengthen or rejuvenate the patient’s energy. These include, for example, therapeutic touch, Reiki, vortex healing, and polarity healing. Distant healing proponents claim this energy can be redirected from a distance and does not even require personal contact with the patient.

Perhaps the most obvious example of “distant healing” would fall under the category of prayer. As noted in the NIH 2002 survey, prayer specifically for health reasons was the most commonly used CAM therapy employed; intercessory prayer (prayer for another) was also common.

Certainly the “mechanism” of prayer is immeasurable, but research studies are ongoing investigating its overall effectiveness. Attempts have also been made to measure these energy fields, in particular electromagnetic fields, but today no specific, quantifiable data are available.

## **A SYSTEMATIC APPROACH TO CAM**

This chapter has discussed many of the diverse practices that comprise CAM. With the multiple techniques, philosophies, and types of CAM available, a systematic structural framework was called for to better understand, investigate, legitimize, and disseminate information on CAM. This much needed, major initiative was undertaken in 1992, when Congress established within the NIH the Office of Alternative Medicine to investigate and evaluate promising, unconventional medical practices. With an initial budget of \$2 million, the Office of Alternative Medicine sponsored workshops on alternative medicinal practices and developed an infrastructure to provide grant money for research into CAM. Its first phase III clinical trial was funded in 1997, a study of St. John’s Wort for major depression.

By 1998, Congress established the NCCAM by elevating the status of the Office of Alternative Medicine to that of an NIH center. The NCCAM is dedicated to exploring complementary and alternative practices through rigorous scientific study, to provide training of CAM researchers, and to make authoritative information on CAM available to the public and health care professionals. The four primary focus areas of the NCCAM—research, research training and career development, outreach,

and integration—are supported by a yearly budget of now more than \$123 million. Recent publications in mainstream medical journals are a direct result of NCCAM funding (2). An interesting and very important role of the center is the integration of scientifically proven studies on CAM practices into conventional medicine by announcing public research results, investigating ways to better integrate evidence-based CAM practices into conventional medical practices, and supporting programs intended to incorporate CAM into the curriculum of medical, dental, and nursing schools. These principles were the foundation of the first 5-year plan of the NCCAM, “Expanding Horizons of Health Care” (2).

In addition to the work of the NCCAM, mainstream medical publications such as *The New England Journal of Medicine*, *JAMA*, and *The Archives of Internal Medicine* have developed an interest in CAM. The *Annals of Internal Medicine* sponsored and published an extensive, extremely well-structured series of articles on CAM, many referenced within this chapter (34). Numerous “alternative” periodicals now exist providing health care practitioners of all persuasions information on the historical foundation of CAM practices, methodologies, uses, and evidence-based outcomes. There are numerous ongoing clinical trials, many through the support of the NCCAM, in areas such as chelation therapy for heart disease, biofeedback for hypertension, CAM approaches to menopause, affective and anxiety disorders, multiple sclerosis, and the use of probiotics to treat infectious disease, just to name a few.

Why such an effort to develop evidence-based data on CAM? Many of these therapies have been used for thousands of years, why invest the time and money “verifying” what people have continued to use, presumably because they are working? If these therapies have stood the test of time, why open Pandora’s Box? It seems the most common criticism of CAM practices is the lack of evidence on their effectiveness. The foundation of

conventional medicine is the scientific method. Advances in conventional medicine are based on rigorous, scientific research, as well as the ongoing application of scientific and statistical methods in order to make available to patients those therapies that have proven most beneficial. Interestingly, one of the first evidence-based studies found in the literature involved what might be considered an alternative therapy today, “high-dose” vitamin therapy in the form of lemon juice to prevent scurvy on British naval vessels.

However, much of conventional medicine is often based on experience rather than hard data. With clinical variability and patient individuality, it is difficult, if not impossible, to study every drug or every procedure in every varied situation. Extrapolation is necessary. This does not, however, allow the provision of medical services, either as conventional medicine or CAM, without the responsibility of systematic review and oversight of treatments that are made available and marketed to the general public. Marketing styles today and the media messages with which the general public are constantly bombarded often contain explicit claims that have little, if any, validity.

Modern health care, both conventional medicine and CAM, must submit to scientific study and oversight, using the best available research and statistical methodologies, not only to gain credibility, but to help determine what practices truly benefit our patients, despite our biases or predilections. Not only do we need to better understand what works, but how better to disseminate that information to practitioners to assure our patients receive the benefit of that knowledge. Despite evidence-based outcomes for numerous clinical scenarios-data shows practitioners still do not always provide those proven therapies or medications to their patients on a consistent basis, despite well-researched, well-publicized national guidelines. Developing and defining best practices is one thing—getting practitioners to follow these guidelines is another.

Perhaps another reason physicians are hesitant to embrace CAM is the lack of understanding or believability of the proposed mechanisms of action. Even with conventional medicine, mechanisms of action are not fully delineated or explained, but they are more within the profession's realm of understanding. Although exact pathways or receptor effects of various medications are not well understood, we know they affect and influence known and accepted physiological mechanisms. Even the placebo effect, well researched and well documented in conventional medicine, is still not well understood. To begin to accept "universal life force" or "vital energy" as the medium of healing, while conventional medicine is unable to measure, define or quantify these entities, to many physicians is reminiscent of the days of snake oil and seen as taking a giant step backward.

What makes this more difficult are the problems associated with applying the scientific method to many CAM practices. Controlled trials are difficult to design for chiropractic, acupuncture, acupressure, or therapeutic touch. Homeopathy is a very individualized therapy; what works for one person probably will not work for another. Herbal products are not well regulated and therefore there is a lack of uniformity in definition and quality control. Modern science often searches for and isolates the active ingredient in a preparation and then studies the biological effects of that ingredient: in CAM the whole plant is often used as it is thought to offset potential side effects—the whole being more than the sum of its parts.

Still another question remains: what is legitimate healing? (35). Is healing an improvement over one's baseline condition, or is it an improvement over and above what one might attribute to the placebo effect? If, as this intimates, patients have used CAM for centuries with only subjective improvement, is this sufficient evidence of success? Must improvement fall within our measurable, defined, scientific methodological paradigms? It seems the cultural, politically dominant system of the time defines that para-

digm, such as the scientific model. For centuries, Ayurveda and TCM were well respected and flourished within their cultures, with explanations such as the balancing of doshas or unblocking qi, explanations well understood and accepted in those cultures. Were the benefits patients experienced any less legitimate?

Are there risks in embracing CAM? Certainly, malpractice and liability concerns are to be considered (and are discussed in a later chapter). With many physicians now providing CAM therapies within their offices, these issues must be addressed. Hospitals are now faced with new dilemmas, such as how to credential alternative practices where little data are available to assess the effectiveness of these practices, or to assess the competence of the practitioners. Hospitals can rely on already established state licensure policies, but are still faced with how to offer these services in the traditional, conventional medicine environment.

Not only have numerous articles been written on the lack of benefit of certain CAM therapeutic approaches, but also on the ethics and legalities of encouraging patients to use these therapies at the expense of proven modalities. Recommending alternative therapies over well-proven therapies, such as cancer chemotherapies, is certainly fraught with problems. However, conventional medicine must guard against unilaterally dismissing CAM, otherwise many potential benefits for patients may be missed.

There are many lessons physicians can learn from CAM. Prevention, health maintenance, doctor–patient interactions and communication, and chronic disease and pain management are all areas on which conventional medicine could improve. Mechanisms of action are less important to patients than to physicians. Patients want to get better or maintain health and well-being, however defined or measured. Consumer preference will dictate what types of care will be available. The market will then provide what patients want or need. The fact that more patients visit CAM practitioners than primary care physicians bears witness (7). This is a movement that is centuries old, and growing.

Contemporary medicine can seem to discount the body's own natural healing abilities. Perhaps CAM can be a vehicle to assist in a better understanding scientifically of what these healing powers are and how they can be tapped into. Contemporary medicine requires an understanding that fits its current paradigms, rather than recreating or redefining those models to fit the data. For example, several studies show positive results of homeopathy but by scientific principles, these effects should not be seen—so adherents of conventional medicine disbelieve the evidence (36).

CAM is often not accepted because it is culturally different, because mechanisms are not clearly understood or are explained in a way that is contrary to our belief system or currently accepted medical and scientific concepts. Modern medicine requires an understanding that fits its current constructs. CAM challenges these paradigms, and perhaps will facilitate a paradigm shift. This shift will only occur when data is unequivocal, hence the need for well-designed, repeatable trials to determine what does and does not work. CAM must be willing to undergo this study and to stand up to scientific scrutiny.

Conventional medicine is not without issues, either. Scientific research has its flaws—medications once thought safe are now found not to be so. Scientific knowledge must be adaptable when the results are unequivocal—conventional medicine must be willing to incorporate those techniques when proven beneficial for patients. Similarly, CAM must be willing to put aside practices proven unfounded in scientific, controlled trials. Galileo was ostracized when his views contradicted the current political, religious, and scientific standards. Let us not do the same when proven knowledge can benefit others. If outcomes are clear, perhaps clearly understanding mechanisms is less important.

As the understanding of CAM practices advances, an integration of conventional medicine and those proven CAM prac-

tices will certainly occur. Perhaps this was best stated by Fontanarosa and Lundberg:

There is no alternative medicine. There is only scientifically proven, evidence based medicine supported by solid data or unproven medicine, for which scientific evidence is lacking. Whether a therapeutic practice is “eastern” or “western,” is unconventional or mainstream, or involves mind–body techniques, or molecular genetics is largely irrelevant except for historical purposes and cultural interest.... We must focus on fundamental issues—mainly, the target disease or condition, the proposed treatment and the need for convincing data on safety and therapeutic efficacy. (37)

Only then can we blend the best that both conventional medicine and CAM have to offer.

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