

# Alternative Medicine and Common Errors of Reasoning

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## ABSTRACT

Why do so many otherwise intelligent patients and therapists pay considerable sums for products and therapies of alternative medicine, even though most of these either are known to be useless or dangerous or have not been subjected to rigorous scientific testing? The author proposes a number of reasons this occurs: (1) Social and cultural reasons (e.g., many citizens' inability to make an informed choice about a health care product; anti-scientific attitudes meshed with New Age mysticism; vigorous marketing and extravagant claims; dislike of the delivery of scientific biomedicine; belief in the superiority of "natural" products); (2) psychological reasons (e.g., the will to believe; logical errors of judgment; wishful thinking, and "demand characteristics"); (3) the illusion that an ineffective therapy works, when actually other factors

were at work (e.g., the natural course or cyclic nature of the disease; the placebo effect; spontaneous remission; misdiagnosis).

The author concludes by acknowledging that when people become sick, any promise of a cure is beguiling. But he cautions potential clients of alternative treatments to be suspicious if those treatments are not supported by reliable scientific research (criteria are listed), if the "evidence" for a treatment's worth consists of anecdotes, testimonials, or self-published literature, and if the practitioner has a pseudoscientific or conspiracy-laden approach, or promotes cures that sound "too good to be true."

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If only the ignorant and gullible were swayed by far-fetched claims, little else would be needed to explain the abundance of folly in modern society. But oddly enough, many people who are neither foolish nor ill-educated cling to beliefs repudiated by science. For example, college graduates, and even some physicians, accept certain aspects of complementary and alternative medicine (CAM), including therapeutic touch, iridology, ear candling, and homeopathy. Even highly trained experts can be misled when they rely on personal experience and informal reasoning to infer the causes of complex events.<sup>1-4</sup> This is especially true if they are evaluating situations to which they have an emo-

tional, doctrinal, or monetary attachment. Indeed, it was the realization that shortcomings of perception, reasoning, and memory incline us toward comforting, rather than true, conclusions that led the pioneers of modern science to substitute controlled observations and formal logic for the anecdotes and surmises that can so easily lead us astray. This lesson seems to have been largely lost on proponents of CAM. Some, such as Andrew Weil, reject it explicitly, advocating instead what Weil calls "stoned thinking," a melange of mystical intuition and emotional satisfaction, for determining the validity of a therapy.<sup>5</sup>

Those who advocate therapies of any kind have an obligation to prove that their products are both safe and effective. The latter is the more difficult task because there are many subtle ways that honest, intelligent patients and therapists can be led into thinking that a useless treatment has produced a cure. CAM remains "alternative" because its practitioners depend on subjective testimonials rather than randomized clinical trials (RCTs) for support, and because most of their hypothesized mechanisms are at variance with those accepted by basic science. It is my intent here to draw

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attention to several social, psychological, and cognitive factors that have helped convince many well-educated people that scientifically discredited or unproven treatments have merit.

In the last century, objective procedures have been developed that test the effectiveness of putative remedies and help distinguish therapeutically induced changes in an underlying pathologic condition from the subjective relief that might follow any intervention. These procedures form the basis of so-called "evidence-based medicine," and without such a demonstration that a treatment is safe and effective, it is ethically questionable to offer that treatment to the public. Since most "alternative," "complementary," or "integrative" therapies lack this kind of support, one must ask why so many otherwise savvy consumers trustingly pay out considerable sums for unproven, and possibly dangerous, health products. We must also wonder why claims of alternative practitioners remain so refractory to contrary data.

If an unorthodox therapy: (1) is implausible on a priori grounds (because its implied mechanisms or putative effects run afoul of well-established laws or empirical findings in physics, chemistry, or biology); (2) lacks a scientifically acceptable rationale of its own; (3) has insufficient supporting evidence derived from controlled clinical trials; (4) has failed in well-controlled clinical studies conducted by impartial evaluators and has been unable to rule out competing explanations for why it might *seem* to work in everyday settings; and (5) should seem improbable, even to the layperson, on "common sense" grounds, then why would so many well-educated people continue to purchase such a treatment?

Consumers of unscientific treatments can be classified broadly into two groups. Once a buyer from either group tries an unconventional treatment, the judgmental biases discussed below have a tendency to make even the most worthless interventions seem valid. Patrons of one type often gravitate to CAM because they suffer from chronic conditions that orthodox medicine does not handle to their satisfaction or because they live in morbid fear that they will lose their "wellness." They assume, erroneously, that competent authorities have validated CAM's wares. The other type of user chooses alternative treatments out of a philosophical commitment to the animistic, vitalistic cosmology of CAM, which rejects the mechanistic-empiricist underpinnings of scientific biomedicine.<sup>6</sup> CAM embraces subjective, emotive truth criteria, whereas its detractors demand objective evidence. Because one's concept of health is entwined with one's fundamental assumptions about reality, an attack on someone's belief in unorthodox healing becomes a threat to his or her entire metaphysical outlook. Understandably, this will be resisted fervently.

The ability to defend one's basic world-view is abetted by a number of cognitive biases that filter and distort contrary information. I shall return to these processes that incline

supporters to misconstrue their experiences to bolster their belief in CAM. But first let us examine the cultural milieu that has fostered a widespread desire to espouse such practices.

### SOCIAL AND CULTURAL REASONS FOR THE POPULARITY OF UNPROVEN THERAPIES

Several trends have contributed to today's popularity of CAM, in spite of (and to some degree, because of) its rejection by mainstream science. The resurgence of folk medicine can be traced, in large part, to nostalgic holdovers from the neo-romantic search for simplicity and spirituality that permeated the "counterculture" of the 1960s and 1970s.<sup>7</sup> The flower children of that generation now form the backbone of the "New Age" movement, which enthusiastically promotes unorthodox healing.<sup>8</sup> CAM suits the iconoclasm, mystical longings, desire for simpler times, and naive trust in the beneficence of "Nature" absorbed during those tumultuous earlier times. How, then, has this history benefited non-scientific medicine?

**Poor scientific literacy.** Surveys consistently find that, despite our overwhelming dependence on technology, the average citizen of the industrialized world is shockingly ignorant of even the rudiments of science.<sup>9</sup> Consequently, most people lack the knowledge to make an informed choice when they must decide whether a highly-touted health care product is sensible or not.

**Anti-intellectualism and anti-scientific attitudes piggy-backing on New Age mysticism.** As a major New Age industry, CAM shares the movement's magical world-view.<sup>6</sup> In advocating emotional criteria for truth over criteria based on empirical data and logic, New Age medical gurus such as Andrew Weil and Deepak Chopra have convinced many that "anything goes."<sup>5</sup> Even in elite academic institutions today, there are strong proponents (mostly in humanities departments) of the notion that objectivity is an illusion and one's feeling about something determines its truth value.<sup>10,11</sup> By denigrating science, these detractors have enlarged the potential following for magical and pseudoscientific health products.<sup>12,13</sup>

Mind-body dualism permeates New Age thought, including CAM, though ironically, it is CAM's disciples who accuse their scientific critics of being dualists.<sup>14,15</sup> That CAM devotees are the real mystics and dualists can be seen by their constant appeal to undetectable spiritual interveners to confer "wellness" on those who deserve it. This obfuscation is needed to sell the oft-heard canard that scientific medicine undervalues the effects of mental processes on health.<sup>6</sup> Admittedly, there are psychological effects on disease, but their importance has been grossly exaggerated by CAM promoters such as Herbert Benson.<sup>16</sup> Overstatements of this kind have

prompted a resurgence of ancient “mind cures” that assert that the real causes and cures for disease lie in the mind, conceived by New Agers to be equivalent to the soul.<sup>17</sup> Several good critiques have appeared recently, which expose the confusion and artifacts that dog the literature on spirituality and health.<sup>18–20</sup>

Another troubling supposition in New Age health propaganda is that one’s moral standing alters the impact of natural forces on one’s body. In accepting this anthropocentric, vitalistic worldview, alternative healers are reverting to the pre-scientific view of disease as supernatural retribution. Sad to say, it also amounts to blaming the victim, for implicitly, patients must have done something bad to “deserve” their afflictions.

**Vigorous marketing and extravagant claims.** According to a recent survey,<sup>21</sup> in the United States alone, “total 1997 out-of-pocket expenditures relating to alternative therapies were conservatively estimated at \$27.0 billion, which is comparable to the projected 1997 out-of-pocket expenditures for all U.S. physician services.” The annual number of visits to alternative healers now exceeds the total number of visits to all U.S. primary care physicians combined. With riches of this magnitude for the taking, it is not surprising that alternative healers have promoted themselves through aggressive marketing and intense legislative lobbying.<sup>22</sup> Routinely, promises are made that no ethical, scientifically trained practitioner could or would make. Unfortunately, the citizenry facing this slick promotional barrage is poorly equipped with the skills or information for evaluating such hyperbole.<sup>9</sup>

**Inadequate media scrutiny and attacks on critics.** With some notable exceptions, the mass media have tended to give CAM a free ride. Its enthusiastic claims make enchanting stories that are rarely disputed by the media, whose leaders know that challenging their audience’s fond hopes hurts ratings. Another disturbing factor that deters some would-be critics of unscientific treatments is the realization that many of CAM’s practices have been imported from non-European cultures and are championed by women. Thus self-promoters often sidestep valid criticisms by accusing detractors of racism and sexism. For example, scientifically rejected practices such as “therapeutic touch” are being embraced by many nursing schools. Because these are still institutions largely attended by women, doubters are often tarred with accusations of sexism. Likewise, when a colleague and I criticized aspects of traditional Chinese medicine (TCM),<sup>22</sup> we were accused of cultural insensitivity and racism.<sup>23</sup> We were chided for presuming to criticize TCM when we were not steeped in the philosophy that spawned it. To accept this absurd rebuke would be to concede that no one but gourmet cooks can tell when they’ve been served a bad meal. The truly racist and sexist attitude would be to hold empirically testable claims from other cultures or female proponents to

a lower standard of proof. This *would* be an assertion of intellectual inferiority. Fortunately, there are many scientific critics from within these communities who find archaic, unproven practices just as dubious as do their white male colleagues.<sup>24,25</sup>

**Social malaise and mistrust of traditional authority figures—the anti-doctor backlash.** Growing cultural disillusionment has nurtured the belief that society’s shortcomings must be due to active connivance by powerful, secret cabals, rather than merely the cumulative mistakes of well-intentioned planners. As these grand conspiracy theories flourish, so does sniping at those suspected of plotting against the common good.<sup>26</sup> Many have come to view government and the scientific and medical professions as parties to the plot. These conspiratorial musings have been reinforced by two other, not entirely unjustified, undercurrents to promote an anti-doctor backlash that CAM has exploited. One is disappointment arising from the failure of certain overly optimistic predictions of medical breakthroughs to materialize. The other is the realization that medicine, as a self-regulating profession, has not always held the public good at the top of its political agenda.<sup>27</sup> This has enhanced the social envy of many regarding the status, political clout, and wealth of the medical profession. The inability of many detractors to separate self-serving political actions by certain medical associations from the debate over whether scientific medicine’s treatments are genuinely better than those of CAM has enriched the “alternatives.” CAM also benefited by painting itself as the defender of the democratic ideal of “choice.” This would be commendable if consumers had the wherewithal to make an *informed* choice.

**Dislike of the delivery of scientific biomedicine.** CAM has played on a widespread but exaggerated fear that modern medicine has become excessively technocratic, bureaucratic, and impersonal. The narrowing of medical specialties, the need to maximize the cost-efficient utilization of expensive facilities, the advent of third-party payment and managed care, and the staggering workloads of physicians have led some patients to long nostalgically for the simpler days of the kindly country doctor with ample time and a soothing bedside manner. They tend to forget, however, that this was often all a doctor of that era could offer.

**Safety and side effects.** A quaint bit of romanticism that promotes “holistic” health care is the belief that “natural” remedies are necessarily safer, gentler, and more efficacious than scientific ones.<sup>6</sup> Web sites such as (www.quackwatch.com) readily dispel such myths, however. For example, it is often claimed that herbal concoctions have no side effects, whereas, in fact, some popular herbal products can be far from benign—reports of allergic, toxic, and even lethal reactions are accumulating.<sup>28–31</sup> Mislabeling and serious contaminations have been discovered,<sup>32</sup> while the potential for

adverse interactions with prescribed pharmaceuticals is also becoming more widely recognized.

Public awareness of these perils remains spotty, however, because centralized reporting of ill effects of alternative treatments is not required. Unfortunately, under current U.S. law, the government must show that herb or supplement is unsafe before vendors can be forced to desist.<sup>30</sup> And when harmful effects do occur, users are likely to attribute them to other causes because of their touching belief that benevolent "Nature" would never pull such dirty tricks. Boosters of "natural" products should be reminded that tobacco is also quite natural and that plants produce some of the most deadly poisons known. On the other hand, they should know that several common drugs in scientific biomedicine were originally derived from plants.<sup>25,30</sup> The difference, of course, is that the active ingredients in plants that led to drugs approved by the Food and Drug Administration were identified, synthesized, and rigorously tested for efficacy and safety. Thus, unlike herbal concoctions, their purity and dosages can be closely regulated.

#### PSYCHOLOGICAL REASONS FOR THE POPULARITY OF CAM

Psychologists have long been aware that people generally strive to make their attitudes, beliefs, and behaviors conform to a harmonious whole. When disquieting information cannot easily be ignored, individuals have a great ability to distort or sequester it to reduce the inevitable friction. It is to these mental gyrations that we now turn.

**The will to believe.** We all exhibit a willingness to endorse comforting beliefs and to accept, uncritically, information that reinforces our core attitudes and self-esteem.<sup>33</sup> Because it would be nice if the hopeful shibboleths of CAM were true, it is not surprising that they are often seized upon with little demand for evidence. Once adopted, such beliefs will be defended strongly, by misconstruing contrary input if need be.<sup>34,35</sup>

**Logical errors, shortcomings of judgment, and missing control groups.** One of the most prevalent pitfalls in everyday decision making is the mistaking of correlation for causation. We are all prone to assume that if two things occur together one must cause the other, although, obviously, this need not be the case. This logical error underlies most superstitions. Testimonials for the ministrations of alternative healers commit the same blunder in assuming that when improvement follows a treatment, the treatment must have been responsible. The value of CAM's personal endorsements is limited by what Gilovich<sup>36</sup> has called the "compared to what?" problem. It cannot be known that any vaunted treatment is effective without blinded comparisons with placebo-treated controls. Although this makes user tes-

timonials all but worthless, promoters of CAM such as Andrew Weil offer little else.<sup>5</sup>

Those who impugn fringe treatments are frequently dismissed by practitioners with the rejoinder, "I don't care what your research says. I have seen my treatments work hundreds of times." Unfortunately, this kind of intuitive judgment is also conducive to false conclusions.<sup>1-4,36</sup> These therapists ignore much research in the area of "cognitive heuristics"<sup>36,37</sup> that shows how mistaken causal attributions can arise when we rely on informal observations to determine what causes or alleviates symptoms. It is especially difficult to determine cause and effect when evaluating therapies because many relevant variables are interacting simultaneously—determinations that casual observation cannot reliably tease apart.

For example, Redelmeier and Tversky<sup>38</sup> showed how people are likely to perceive illusory correlations in random events. They then demonstrated how these "hunches" lead to false but widespread beliefs, including the concept that arthritis pain is influenced by the weather. Because CAM derives its diagnoses and treatments from just this kind of unreliable folklore, potential patrons should demand that all alternative treatments be held to the same standards of proof as those in scientific biomedicine. By introducing controlled clinical trials and epidemiologic methods, the pioneers of scientific medicine hoped to reduce the kind of false ascriptions of cause that these frailties of human reasoning can produce. A recent critique of studies purporting to show that various religious practices enhance health<sup>20</sup> offers good examples of how dubious causal attributions arise when the need for the simple control group is ignored.

**Wishful thinking and "demand characteristics."** Warping perceived reality in the service of dogma is commonplace.<sup>33,34</sup> According to cognitive dissonance theory,<sup>39</sup> mental distress is produced when new information contradicts existing attitudes, feelings, or beliefs. To alleviate the unease, we tend to distort the offending input, our memories, or both. For example, dissonance would be created if an individual received no benefit from an alternative treatment after committing time, money, and "face." Therefore, there would be strong pressure to find some redeeming value in the treatment rather than accept the psychologic implications of admitting that it had been a waste. Thus, CAM patients and therapists often remember things as they wish they had happened, rather than as they really occurred. And since CAM practitioners scorn careful record keeping and randomized clinical trials, they can be selective in what they recall, leading to an overestimation of their success rates while ignoring or explaining away their failures.

Likewise, there are many self-serving biases that help maintain self-esteem and promote harmonious social interchange. An illusory feeling that one's symptoms have abated could also be due to a number of so-called "demand char-

acteristics" found in any therapeutic setting. In all societies there exists a "norm of reciprocity," an implicit rule that obliges people to respond in kind when someone does them a good turn. Most therapists sincerely want to help their patients, and it is only natural that patients want to please them in return. Without clients necessarily realizing it, such obligations (in the form of implicit social demands) are sufficient to inflate their perceptions on how much benefit they have received. Thus, controls for these compliance effects must also be built into clinical trials.<sup>40</sup>

### WHY MIGHT THERAPISTS AND CLIENTS CONCLUDE THAT INEFFECTIVE THERAPIES WORK?

Although the terms "disease" and "illness" are often used interchangeably, it is worthwhile to distinguish between the two. I use "disease" to refer to a pathologic state of an organism. By the term "illness" I will mean subjective *feelings* of malaise, pain, disorientation, or dysfunctionality, which might accompany a disease state. Our subjective reaction to the raw sensations we call symptoms is, like all other perceptions, a complex cognitive construction. As such, it is molded by factors such as attitudes, suggestions, expectations, demand characteristics, self-serving biases, and self-deception. The experience of illness is also affected (often unconsciously) by a host of social, monetary, and psychological payoffs that accrue to those admitted to the "sick role" in society.<sup>41</sup> For certain individuals, these privileges and benefits are sufficient to perpetuate the experience of illness after a disease has abated, or even to create feelings of illness in the absence of disease. Unless we can tease apart these factors that contribute to one's perception of being ill, personal testimonials are a poor basis on which to judge whether a putative therapy has, in fact, cured anyone. Why, then, might someone mistakenly believe that he or she had been helped by an inert treatment?

**The disease may have run its natural course.** Many diseases are self-limiting. Thus, before the curative powers of a putative therapy can be acknowledged, it must be shown that the percentage of patients who improve following treatment exceeds the proportion expected to recover without any intervention at all (or that they consistently recover faster). Unless unconventional therapists release detailed records of successes *and failures* over a sufficiently large number of patients with the same complaint, they cannot claim to have exceeded the norms for unaided recovery.

**Many diseases are cyclic.** For example, arthritis, multiple sclerosis, asthma, allergies, migraines, and many dermatologic, gynecologic, and gastrointestinal complaints normally "have their ups and downs." Not surprisingly, sufferers tend to seek therapy during the downturn of any given cycle. Thus a bogus treatment will have repeated opportunities to

coincide with upturns that would have happened anyway. Without randomized controlled trials, consumers and vendors alike are prone to misinterpret improvement due to normal cyclic variation as a valid therapeutic effect.

**The placebo effect.** *The major reason for doubtful remedies' being credited with subjective, and occasionally objective, improvements is the ubiquitous placebo effect.*<sup>42,43</sup> The history of medicine is strewn with examples of what, with hindsight, seem like crackpot procedures that were once enthusiastically endorsed by physicians and patients alike.<sup>44,45</sup> These misconceptions arose from the false assumption that changes in symptoms following treatment must have been a specific consequence of that procedure. Through a combination of suggestion, expectancy, and cognitive reinterpretation, patients given biologically useless treatments often can experience subjective relief; thus, the need for placebo controls that CAM practitioners steadfastly refuse to institute in place of their customer satisfaction surveys.

Many of CAM's treatments, while unable to affect the disease itself, do make the illness more bearable, but for psychological reasons. Pain is one example. Modern pain clinics show that suffering can often be reduced by psychological means, even if the underlying pathology is untouched.<sup>46,47</sup> Anything that can allay anxiety, redirect attention, reduce arousal, foster a sense of control, or lead to cognitive reinterpretation of symptoms can alleviate the agony component of pain.<sup>48</sup> It is obviously beneficial if patients suffer less, but we must be careful that purely symptomatic relief does not divert people from proven remedies for the underlying condition until it is too late for them to be effective. Importantly, procedures aimed purely at relieving symptoms should never precede the appropriate diagnostic tests and at least a reasonable provisional differential diagnosis.

Because the power of expectancy and compliance effects is so strong, both therapists and recipients must be "blind" with respect to active treatment versus placebo status.<sup>49</sup> Such precautions are necessary because barely perceptible cues, unintentionally conveyed by unblinded treatment providers, can bias trial results. Likewise, those who assess the treatment's effects must also be blind, for there is a large literature on "experimenter bias" showing that scrupulous, well-trained professionals can unconsciously "read in" the outcomes they expect when they evaluate complex outcomes.<sup>49,50</sup>

Defenders of CAM often complain that conventional medicine itself continues to use many treatments that have not been adequately vetted by these standards. This may be so in some instances, but the percentage of such holdovers is grossly exaggerated by the "alternatives."<sup>51</sup> At any rate, this criticism does nothing to enhance the credibility of CAM, for merely arguing that "they're as bad as we are" offers no positive evidence in favor of one's own pet belief. The crucial difference between scientific biomedicine and

CAM is that, unlike the “alternatives,” scientific medicine is institutionally committed to weeding out treatments that fail to pass muster, and it does not cling to procedures and theories contradicted by the basic sciences.

**Spontaneous remission.** Any anecdotally reported cure can be due to a rare but possible “spontaneous remission.” Even with cancers that are nearly always lethal, tumors occasionally disappear without further treatment. One experienced oncologist reports that he has seen 12 such events in about 6,000 cases he has treated.<sup>52</sup> Alternative therapists can receive unearned acclaim for such remissions because many desperate patients turn to them out of a feeling that they have nothing left to lose. When the “alternatives” publicize such events, they rarely reveal what percentage of their apparently terminal clientele is represented by these happy exceptions. The exact mechanisms responsible for spontaneous remissions are not well understood, but much research is being devoted to revealing and possibly harnessing the mechanisms that are responsible for these unexpected turn-arounds.

**Somatization and fear of losing “wellness.”** Many people can be induced to think they suffer from diseases they do not have. When these healthy folk receive from orthodox physicians the oddly unwelcome news that they have no sign of disease, they often gravitate to alternative practitioners, who can always find something to treat. If “recovery” should follow, another convert is born. Alternative healers also cater to the “worried well” who dwell on minor symptoms and believe they must take elaborate precautions to avoid losing their good health.

There are many physical complaints that can both arise from psychosocial distress and be alleviated by support and reassurance. At first glance, these symptoms (at various times called “psychosomatic,” “hysterical,” or “neurasthenic”) resemble those of recognized medical syndromes.<sup>53,54</sup> They are, however, examples of somatization, the tendency to express psychologic concerns in a language of bodily symptoms.<sup>55,56</sup> Although there are many “secondary gains” (i.e., psychologic, social, and economic payoffs) that accrue to those who slip into “the sick role” in this way, we need not accuse them of conscious malingering to point out that their symptoms are nonetheless engendered and relieved by subtle psychosocial processes.<sup>41,56</sup> CAM offers comfort to these individuals who need to believe their symptoms have medical rather than psychologic causes (although, paradoxically, CAM teaches that all diseases stem from mental/spiritual lapses). With the aid of pseudoscientific diagnostic devices, fringe practitioners reinforce the somatizer’s conviction that the cold-hearted, narrow-minded medical establishment, which can find nothing physically amiss, is both incompetent and unfair in refusing to acknowledge a very real organic condition. It is obviously worthwhile when unscientific “heal-

ers” supply the reassurance, sense of belonging, and existential support that their clients are really seeking, but these provisions need not be foreign to scientific practitioners, who have much more to offer.

**CAM customers hedging their bets.** In an attempt to appeal to a wider clientele, many unorthodox healers have begun to refer to themselves as “complementary” or “integrative,” rather than “alternative” providers. Instead of ministering primarily to the ideologically committed or to those who have been told that conventional medicine has no further treatment, the “alternatives” have begun to advertise their ability to enhance scientific treatments. They accept that orthodox practitioners can alleviate specific symptoms but contend that alternative medicine treats the *real* causes of disease—dubious dietary imbalances and environmental sensitivities, disrupted energy fields, or even unresolved conflicts from previous incarnations.<sup>6</sup> If improvement follows the combined delivery of “complementary” and scientifically based treatments, the fringe practice demands, and often gets, a disproportionate share of the credit.

**Misdiagnosis.** Scientifically trained physicians do not claim infallibility, and a mistaken diagnosis, followed by a trip to a shrine, alternative healer, or herbalist, can lead to a glowing testimonial for the cure of a grave condition that never existed. At other times, the diagnosis may have been correct but the predicted time course might have proved inaccurate. If a patient with a terminal condition undergoes alternative treatments and succumbs at a later time than that predicted by the conventional doctor, the alternative procedure may receive credit for prolonging life when, in fact, the discrepancy was merely due to an unduly pessimistic prognosis.

**Derivative benefits.** Alternative healers often have enthusiastic, charismatic personalities.<sup>57–59</sup> Patients swept up by the messianic aspects of CAM can experience a psychologic uplift that can enhance placebo effects and engender other beneficial spinoffs. Elevating patients’ mood and expectations can motivate greater compliance with, and hence effectiveness of, concurrent orthodox treatments. These secondary effects also can lead patients to improve their eating and sleeping habits and to exercise and socialize more. These changes, by themselves, could help speed natural recovery, or at the very least, make the recuperative interval easier to tolerate. Psychologic spinoffs of this kind also can reduce the stress that has been shown to have deleterious effects on the immune system.<sup>60</sup> Removing this added burden may speed recovery, even if it is not a specific effect of the therapy.

## CONCLUSIONS

Potential clients should ask whether any alternative treatment they are considering is supported by research published

in biomedical journals whose peer-review processes strive to eliminate experimental artifacts that lead to false impressions of cures. Even then, because any single finding could always be due to an undetected confounding variable or a statistical fluke, independent replication is essential. If a supporting publication meets the foregoing criteria, clients should nevertheless always review the size of the reported treatment effect, for there are many “true but trivial effects” that are statistically significant but too small to be clinically useful.

One should be suspicious if, instead of randomized controlled trials, the “evidence” consists of anecdotes, testimonials, or self-published pamphlets or books. Supportive documentation should come from impartial scientific periodicals rather than from journals owned by promoters of the questionable practice or the “vanity press,” which accepts virtually all submissions and charges a fee to the authors for publication.

Clients should be dubious of any practitioner who (1) is ignorant of or hostile to mainstream science; (2) cannot supply a reasonable rationale for his or her methods; (3) uses promotional patter laced with allusions to spiritual forces and vital energies or to vague planes, vibrations, imbalances, and sensitivities; (4) claims to possess secret ingredients or processes; (5) appeals to ancient wisdom and “other ways of knowing”; (6) claims to “treat the whole person” rather than organ-specific diseases; or (7) claims to be persecuted by the establishment and encourages political action on his or her behalf, or is prone to attack or sue critics rather than responding with valid research. Practitioners with degrees from unaccredited institutions or who sell their own proprietary concoctions in their offices and stress the need for frequent return visits “in order to stay well” are also a cause for concern. The presence of pseudoscientific or conspiracy-laden literature in the waiting room ought to set a clear thinker looking for the exit. And, above all, if the promised results go well beyond those offered by conventional therapists and it is claimed that there are no side effects, the probability is that one is dealing with a quack. In short, if it sounds too good to be true, it probably is.

When people become sick, any promise of a cure is beguiling. As a result, common sense and the willingness to demand evidence are easily supplanted by false hope. In this vulnerable state, the need for critical appraisal of treatment options is more—rather than less—necessary. Those who still think they can afford to take a chance on the hawkers of untested remedies should bear in mind Goethe’s wise advice: “Nothing is more dangerous than active ignorance.”

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