

# The Role of Mindfulness in Healthcare Reform: A Policy Paper

| Kelley McCabe Ruff, MBA and Elizabeth R. Mackenzie, PhD |

## Contributing Authors:

Michael Baime, MD – University of Pennsylvania  
 Gina Biegel, MA, LMFT – Kaiser Permanente  
 Jeff Brantley, MD – Duke Integrative Medicine  
 Jeanne Chadwick, PhD – University of Connecticut  
 Connen O'Connell, MA – Won Institute  
 Jeffery Dusek, PhD – Penny George Institute for Health and Healing, Abbott Northwestern Hospital  
 Jakie Gardner-Nix, PhD, MRCP (UK) – St. Michael's Hospital Pain Clinic, Sunnybrook Health Sciences Centre Pain Management Programme  
 Arnold Kozak, PhD – University of Vermont  
 Ellen Langer, PhD – Harvard University  
 Sasha Loring, MA – Duke Integrative Medicine  
 Elizabeth R. Mackenzie, PhD – School of Arts and Sciences, University of Pennsylvania  
 Elise Mahovlich – Living Yoga Studios  
 Timothy McCall, MD – Medical Editor of Yoga Journal  
 Jane McCool, PhD – Northeastern University  
 Lisa Dalle Miller, MFT – private practice  
 David Nixa – eMindful Inc.  
 Beatriz Olson, MD – Yale University  
 Helen Rosen, PhD – Won Institute  
 Kelley McCabe Ruff, MBA – CEO eMindful Inc.  
 Kevin Thompson – eMindful Inc.  
 Glenn Wallis, PhD – Won Institute  
 Ruth Wolever, PhD – Duke Integrative Medicine  
 Elaine Yuen, PhD – Thomas Jefferson University  
 Lidia Zylowska, MD – UCLA

*"Awareness and meditation are, for me, fundamental to the deep change that is necessary for healing. Chronic illness is a way of life as well as, perhaps even more than, a disease entity. Before we can be free of the symptoms of illness and the role of the sick person, we need to know what has precipitated those symptoms, and how we are responding to our sickness. We need to recognize in our own lives the psychological, biological, and sociological factors that may affect our health.*

*Awareness allows us to see where we are; to stand for a moment outside ourselves; to appreciate in a powerful, personal way, how the world around us affects us; to observe the thoughts, feelings, and sensations that arise in us. Meditation is a state of moment-to-moment awareness that over time may help to dissolve physical symptoms and habitual ways of thinking and acting. Both awareness and meditation enable us to experience the way our mind may limit or free us. Together they prepare us to use our mind to make the deep changes in thought, feeling, and action that are necessary for our healing."*

—James S. Gordon, MD<sup>1</sup>

by 2012.<sup>2</sup> Clearly, our healthcare system is unsustainable both in terms of its financial and human costs. However, despite a nearly unanimous call for reform, there remains a lack of consensus about what form the changes should take, and different stakeholders have put forth a variety of approaches.

At this stage, one of the most important questions we can ask is, "What is driving healthcare costs?" It is reasonable to assume that if we can identify the underlying problem, we will increase our chances of arriving at an effective solution.

Like most commodities, healthcare is subject to the rule of supply and demand. Right now, we have a high demand for healthcare procedures characterized by sophisticated and expensive medical technology. The evidence suggests that advances in medical technology are the single biggest factor driving up healthcare costs over the last 50 years or so, eclipsing all the other factors such as aging population, costs of health insurance, rising incomes, defensive medicine, administrative costs, lower productivity, end-of-life care, and the like.<sup>2</sup> However, since advances in medical technology have also tended to produce better health outcomes for certain conditions,<sup>3</sup> we do not want to thwart technological progress. The problem is that the nation, regardless of who pays for healthcare, can no longer afford to keep supplying the ever-increasing demand. One solution is to put limits on the supply—to engage in healthcare rationing. There are many serious objections to this approach, chief among them the moral issue of denying potentially life-saving procedures to human beings. Fortunately, there is another more humane and sensible solution: *reducing the demand by leveraging preventive medicine.*

## THE URGENCY OF HEALTHCARE REFORM

By now it is clear to everyone—economists, lawmakers, health professionals, and the public—that healthcare reform is an urgent need, a national emergency that requires immediate and focused attention. Costs continue to spiral out of control, large

numbers of Americans are uninsured (medical bills are a leading cause of bankruptcy), and the aging of the so-called baby boomer generation threatens to burden Medicare beyond its capacity. The United States spends over \$2 trillion annually on healthcare, yet some key national health indicators lag significantly behind other developed nations (eg, infant mortality rates in the United States rank 23rd globally, on par with Poland and Slovakia). As a percentage of gross domestic product, healthcare spending exceeds 16% and is projected to reach 17.7%

The fundamental problem in our healthcare system—the factor most responsible for driving up healthcare costs—is the neglect of low-tech strategies to prevent disease and promote health in favor of high-tech interventions to treat disease after it has arisen. We must change the way we think about health and healthcare if we are to produce meaningful and lasting healthcare reform. As a society, we have become habituated to looking outside ourselves for answers to our problems, often turning to technological solutions that, although typically effective in the short-term, may not be the best long-term approach. Thus, we have a high incidence of cardiovascular disease and a plethora of sophisticated approaches to treating it, ranging from pharmaceutical interventions to heart transplants. The success of these interventions is wonderful to behold, and they are responsible for saving many lives. But what if we were able to reduce the demand for such interventions by lowering the incidence of heart disease in the United States? What if we had a healthcare system that successfully improved the health of our population so much that the demand for costly procedures declined, resulting in both cost savings *and* a healthier citizenry? In this scenario, healthcare rationing (limiting the supply) would be irrelevant due to the significantly reduced demand for costly procedures. Sophisticated medical technology would be there to serve patients whose lives depended on it. However, there would be fewer such cases, lowering costs overall and increasing the general well-being of the population. Such a scenario is feasible if we can tap into the potential of preventive medicine.

By leveraging preventive medicine, we can reduce the incidence of catastrophic illness and serious disease, thereby diminishing the need for expensive interventions. As the old adage has it, “an ounce of prevention is worth a pound of cure,” yet our current system focuses mostly on cure and largely overlooks the advantages of investing in prevention. Paying more attention to disease prevention and health promotion will result in a healthier population with less call for expensive medical interventions. Low-tech, cost-effective approaches to disease prevention and health promotion already exist; it is merely a matter of exploring how best to employ them

for greatest impact. Strategies for health promotion and disease prevention—those that focus on *self-responsibility* and that support *positive behavioral change*—will yield the greatest long-term cost savings and are the foundation for a sustainable healthcare system for the 21st century.

As Risa Lavizzo-Mourey, MD, MBA, the CEO of the Robert Wood Johnson Foundation, recently pointed out, although we spend over \$2 trillion annually in the United States on healthcare, only 5% of that money goes toward public health and disease prevention.<sup>4</sup> Perhaps these figures can explain why we have become so good at treating disease, but so deficient in preventing disease from occurring in the first place. Lavizzo-Mourey calls on lawmakers to “... reconfigure what we spend to build a ‘culture of wellness’ in this country.”<sup>4</sup>

In summary, the problem facing us is a disease-oriented healthcare system. It is a problem because the costs—both human and financial—are unsustainable. The humane and sensible solution is to employ a low-tech approach to health promotion that is successful, accessible, feasible, equitable, and cost effective. Luckily, this approach has already been discovered and is now being implemented and tested across the nation.

### COST-SAVINGS ASSOCIATED WITH MIND-BODY MEDICINE

Mind-body medicine focuses on the relationships among the mind, body, brain, and behavior, and produces interventions that use these connections to achieve and maintain health.<sup>5</sup> A small cadre of researchers has been quietly compiling data for many years on mind-body interventions and their potential cost savings. Among them is David S. Sobel, MD, MPH, of Kaiser Permanente, who summarized years of research in a short review article published in the *Journal of the American Medical Association* in 2000<sup>6</sup>:

- one study of 107 patients with heart disease found that psychosocial interventions (ie, stress management practices) reduced the risk of subsequent cardiac events by 75% (compared to usual care only)
- Kaiser Permanente and Stanford University implemented a seven-week patient education program for patients

with chronic disease; the randomized controlled trial (RCT) of 952 patients indicated a cost savings of approximately \$750 per participant, more than 10 times the cost of the program

- in an RCT of 335 patients scheduled for surgery, those who listened to guided imagery audiotapes beforehand experienced a 43% reduction in blood loss and were able to leave the hospital a day earlier
- two RCTs of premature infants found that those who were massaged three times a day for 10 days gained weight more rapidly and were discharged from the hospital five to six days earlier, yielding a savings of more than \$10,000 per infant

As Sobel has pointed out, the beauty of these low-tech mind-body interventions is that they result in both better health outcomes *and* significant cost-savings.<sup>6</sup> As the evidence mounts that mind-body medicine is both clinically effectual and cost effective, it is increasingly clear that the time has come to integrate these approaches into conventional healthcare. In fact, with support from the Bravewell Collaborative, an award-winning documentary titled *The New Medicine*, produced in 2006, presented many of the ways in which new scientific knowledge about the mind-body connection can be integrated within existing healthcare systems to both improve health outcomes and lower costs.<sup>7</sup>

### MIND-BODY APPROACHES TO DISEASE PREVENTION AND HEALTH PROMOTION

Mind-body medicine is not just a promising avenue for treating disease; there are many indications that it can actually prevent disease from occurring at all.

“Heart disease, diabetes, prostate cancer, breast cancer, and obesity account for 75% of health-care costs, and yet these are largely preventable and even reversible by changing diet and lifestyle.... The latest scientific studies show that our bodies have a remarkable capacity to begin healing, and much more quickly than we had once realized, if we address lifestyle factors that often cause these chronic diseases.”<sup>8</sup>

The authors of this *Wall Street Journal* op-ed cite the INTERHEART study,<sup>9</sup> which “followed 30,000 men and women on six continents and found that changing lifestyle could prevent at least 90% of all

heart disease.”<sup>8</sup> Clearly, it is more cost effective to spend money to help people eat healthfully, exercise, and manage their stress than to treat heart disease after it has developed. This is the proverbial “no-brainer,” and yet we have been slow to invest in relatively inexpensive health promotion programs known to prevent all manner of diseases, like cardiovascular disease, that are very expensive to treat after they have arisen.

## MEDITATION

There are a number of mind-body practices and interventions that researchers have found to be effective for a variety of conditions, including yoga, tai chi, Qi gong (or Chi Kung), biofeedback, and therapeutic bodywork techniques that address both mind and body. All of these modalities are worthy of discussion and have enormous potential to promote health and treat disease; however, they are beyond the scope of this paper, which focuses on meditation. There are many different styles of meditation—too many to enumerate here—and some are rooted in spiritual traditions (eg, Christianity, Buddhism, Taoism, and Hinduism), whereas others are not tied to any specific religious practice.

The fundamental concept at the core of meditation is similar across all traditions—to promote increased awareness through focused attention in the present moment. Meditation is primarily a reflective discipline that requires a quiet introspection, typically leading to a fundamental shift in one’s perspective on daily life. Interestingly, the practice of meditation is associated with increased resilience to stress and significant health improvements. Researchers have demonstrated that psychosocial stress plays a pivotal role in the development of disease.<sup>10,11</sup> This may explain why meditation can both prevent and treat a large range of conditions, everything from cardiovascular disease to fibromyalgia.

## MEDITATION: THE PHYSICAL EFFECTS

The practice of meditation is known to have effects on human physiology, including improved blood pressure and cardiac functioning (eg, Anderson et al,<sup>12</sup> Schnei-

der et al,<sup>13</sup> and Dusek et al<sup>14</sup>). Stressors activate the sympathetic nervous system (the fight-or-flight response), causing higher blood pressure and having a deleterious effect on the heart. Meditation, on the other hand, actually reduces sympathetic activation (measured by blood biomarkers and cardiac indices). For example, a study of 19 patients with congestive heart failure found that a 12-week meditation program reduced blood levels of the stress hormone norepinephrine, improved cardiovascular function, and enhanced quality of life.<sup>15</sup> Walton et al<sup>16</sup> evaluated studies of meditation and cardiovascular disease and found that meditation “may be responsible for reductions of 80% or greater in medical insurance claims and payments to physicians.” Another study of meditation among 23 African Americans recently hospitalized with congestive heart failure found that the meditation group had fewer rehospitalizations and better cardiac function than the control group.<sup>17</sup> Not surprisingly, they also exhibited improved mood and enhanced quality of life. The seminal study by Dean Ornish et al<sup>18</sup> published in the *Journal of the American Medical Association* found that lifestyle changes that included meditation-based stress management actually reversed coronary atherosclerosis over a five-year period in a group of 20 persons with moderate to severe coronary heart disease. Patients in the control group ( $n = 15$ ) had more than twice as many cardiac events than those in the experimental group. As many mind-body medicine advocates have pointed out, if there were a pill that could do this, the government would mandate its immediate and widespread use.

Psychoneuroimmunology is a growing field of research that seeks to map the biomechanical pathways associated with the mind-body connection. It is no secret that our thoughts and emotions can influence our immune systems, but the science of exactly how this happens is still not completely understood. What the psychoneuroimmunology studies have documented is that our perceptions, thoughts, and feelings can influence our immune and hormonal systems in both adaptive and nonadaptive ways. How we perceive daily life experiences (eg, being overwhelmed or feeling threatened) can lead to chronic psychological stress. Such chronic stress has been shown to have a deleterious

effect on immunity and the overall homeostatic regulation of the body.

Recent studies point to the role of meditation in bolstering immunity by modulating the stress response. In a landmark study, Davidson et al<sup>19</sup> were the first to demonstrate that meditation changes both brain and immune function. They found that an eight-week mindfulness meditation program produced beneficial changes in both brain and immune function in a group of 25 healthy participants. In addition to showing that the meditation group, compared to the controls, had increased brain activity in an area associated with positive emotions, they also demonstrated increased production of antibodies in response to a flu vaccine. Similarly, when Pace et al<sup>20</sup> randomized 61 healthy adults to a short meditation training (six weeks) or a control group, they found that the new meditators responded to stressors differently than the controls. Specifically, following a standardized stressor, those who meditated had lower levels of both distress and inflammation, suggesting that meditation reduces stress-induced immune responses. Another study looked at a form of mindfulness meditation on immune function, quality of life, and psychological coping in a group of women recently diagnosed with breast cancer.<sup>21</sup> They found that the women in the eight-week meditation group (when compared to controls over time) had better immune system biomarkers, reduced stress hormones, improved quality of life, and better coping skills. Carlson et al<sup>22</sup> explored an eight-week mindfulness meditation program as an intervention for early-stage breast and prostate cancer patients and found that the persons in the mindfulness group had enhanced quality of life, decreased stress symptoms, and may have experienced beneficial changes in the endocrine system, a component of the immune system. In sum, meditation appears to protect the body from the potentially damaging effects of psychological stress by physiologically interrupting stress pathways and strengthening the body’s immune responses, thus improving health directly.

## MEDITATION AND THE BRAIN

Neuroscience studies of meditation have demonstrated enduring and beneficial

changes in both the function and structure of the brain that persist beyond the period of meditation.<sup>19,23-26</sup> Neuroscientist Daniel Siegel<sup>27</sup> concludes that mindfulness produces a form of neural integration and coherence that leads to more adaptive functioning. The areas of the prefrontal cortex that show increases in gray matter are responsible for emotional regulation (including modulating fear) and an increased ability to be resilient in the face of stress. Other capacities affected include the regulation of body systems, attuning to others, responding flexibly, and exhibiting insight and empathy. For example, Lazar et al<sup>24</sup> found that mindfulness meditation led to a thickening in areas of the prefrontal cortex linked to these functions, and that these changes were correlated with the length of time practicing. Lutz et al<sup>25</sup> conclude that:

Many of our core mental processes such as awareness and attention and emotion regulation, including our very capacity for happiness and compassion, should best be conceptualized as trainable skills. The meditative traditions provide a compelling example of strategies and techniques that have evolved over time to enhance and optimize human potential and well-being. The neuroscientific study of these traditions is still in its infancy but the early findings promise to reveal the mechanisms by which such training may exert its effects as well as underscore the plasticity of the brain circuits that underlie complex mental functions.<sup>25</sup>

As this fledgling field progresses, it is very likely that neuroscientists will be able to demonstrate—in scientific terms—exactly how and why meditative practices produce the kinds of health benefits practitioners report anecdotally and researchers have found in their clinical studies.

### MEDITATION AND THE MIND

Meditation can protect the body from the negative effects of psychological stress, as discussed above; it can also help to prevent and treat mental health problems such as depression and anxiety. Depression is one of the most common chronic mental health problems, and it inflicts a heavy societal toll in terms of both human and financial costs. Meditation has been

found to have a beneficial effect for this and many other mental health problems.<sup>28</sup> In fact, a meditation-based intervention for depression was shown to be better at preventing relapse into depression than the standard treatment (antidepressant medication),<sup>29</sup> and a meditation-based stress reduction intervention was found to successfully treat anxiety disorders, not only in the short term but even at the three-year follow-up.<sup>30</sup> Meditation also holds promise as an intervention for the treatment of posttraumatic stress disorder (PTSD), a particularly debilitating condition that plagues many US veterans.<sup>31</sup> Although not yet systematically studied in a population of US veterans, an RCT of a mind-body intervention that included meditation was found to successfully treat adolescents suffering from PTSD in post-war Kosovo.<sup>32</sup> Researchers at the Veterans Affairs Health Care System in San Diego tested a mantra meditation practice in a group of veterans and found it to be an effective method of reducing symptoms of stress and anxiety.<sup>33</sup>

Meditation not only improves health directly (eg, normalizing blood pressure, enhancing immunity, lowering levels of stress hormones, and improving brain function), it improves health indirectly by helping individuals to avoid maladaptive responses to stress (eg, excessive drinking, substance abuse, smoking, binge eating), thus improving health indirectly. It has long been known that five behavioral factors significantly contribute to the rising costs associated with the chronic disease burden in the United States: excessive drinking, smoking, eating, inactivity, and stress. Meditation has been shown to help in all these areas. Meditation addresses stress directly by enhancing our ability to cope with psychological stressors that would otherwise adversely affect our physiology, as discussed above. It can also assist persons in making the lifestyle changes (eg, smoking cessation, reducing or eliminating alcohol consumption) necessary for good health.<sup>34</sup> For example, studies have shown that mindfulness meditation can help people quit smoking,<sup>35</sup> decrease binge eating,<sup>36</sup> and reduce alcohol and substance abuse.<sup>37</sup> Mindfulness-based interventions specifically targeted for substance abuse relapse prevention have proved successful. Mindfulness-based relapse prevention is an eight-week program

designed to prevent future relapse, and research shows that it is more effective than treatment as usual.<sup>37,38</sup>

There is also some evidence suggesting that mindfulness meditation discourages self-destructive behavior in response to stress through acceptance rather than avoidance of negative emotions such as sorrow, guilt, or loneliness.<sup>39,40</sup> Anecdotal evidence suggests that mind-body practices such as meditation help individuals make the journey from self-destructive to self-supportive behavior. Furthermore, mind-body interventions serve as catalysts for virtuous cycles, initiating a cascade of positive side effects. As with all truly holistic interventions, the effects of meditation are not confined to a single symptom or condition. For example, someone may begin a meditation program to stop smoking and find that not only does their craving for cigarettes decrease, their mood improves, their relationships are more harmonious, and their hypertension diminishes.

### AGING AND THE MIND

Finding cost-effective ways to support the healthy aging of the US population is one of the cornerstones of healthcare reform, and researchers continue to uncover intriguing indications that the mind has a profound influence on how the body ages. For example, following her studies on self-efficacy and longevity,<sup>41,42</sup> Ellen Langer's groundbreaking 1979 study on the psychology of aging raises a number of questions about the conventional perspective on the biological causes of aging.<sup>43</sup> In this study, a group of male nursing home residents in their late 70s and early 80s were taken on a weeklong retreat, where they were encouraged to live as if it were 1959. The researchers took steps to create a psychological environment that took the participants' imaginations back in time, allowing them to live in a fictional 1959. They then measured a range of indicators of chronological age, and they found significant changes in the experimental group, including improvements in joint flexibility, manual dexterity, and even finger length. Other studies have demonstrated that a simple change in mental attitude can result in weight loss and lower blood pressure,<sup>44</sup> as well as improved vision.<sup>45</sup> Findings of this nature fly in the face of the conventional view of human physiology

yet are the fruits of legitimate research. What might explain these research findings? One clue is found in studies suggesting that mind-body practices such as meditation can actually alter gene expression. Jeffery Dusek et al<sup>45</sup> conducted a study on long-term practitioners of a variety of mind-body practices and found that, compared with control subjects, the mind-body practitioners had more than 2,000 differently expressed genes. When they exposed the nonpractitioners to eight weeks of meditation training, the expression of more than 1,500 genes was altered. Replicating and confirming these studies would open up a new world of possibility for healthy aging, among other things, with important implications for both improved quality of life and reduced medical costs among the elderly.

## MINDFULNESS MEDITATION AND MEDICINE

The most common form of meditation found in clinical settings is mindfulness-based stress reduction (MBSR), a clinically tested, secular form of meditation popularized by Jon Kabat-Zinn, PhD, professor emeritus at the University of Massachusetts Medical School, and founding director of both the Stress Reduction Clinic and the Center for Mindfulness in Medicine, Healthcare and Society. Kabat-Zinn's work has provided a foundation for the use of mindfulness meditation as a medical intervention, and his books, scholarly articles, and scientific studies have greatly advanced our understanding of the mind-body connection.

The concept of mindfulness is simple. "The goal of all mindfulness is to maintain awareness moment by moment, disengaging oneself from strong attachment to beliefs, thoughts, or emotions, thereby developing a greater sense of emotional balance and well-being."<sup>46</sup> Detachment from thoughts and emotions allows individuals to observe their habitual patterns of behavior without judgment, creating space for wiser choices. Using his own experiences with mindfulness meditation, Kabat-Zinn developed and standardized an eight-week mindfulness meditation program for use in clinical settings that he called mindfulness-based stress reduction. His MBSR program has become a guide and a standard for virtually all other clinically oriented mindfulness programs.

Interest in the clinical application of mindfulness is gaining momentum, and there is convincing evidence that mindfulness can improve health and quality of life through the following:

- decreased perception of pain
- increased ability to tolerate pain
- reduced stress, anxiety, and depression
- diminished use of medication (lessening adverse effects of drugs)
- enhanced medical decision making
- better adherence to medical treatments
- increased motivation to make lifestyle changes
- more social connection and enriched interpersonal
- enhanced neuroendocrine and immune system function<sup>46</sup>

## MINDFULNESS-BASED INTERVENTIONS FOR CHRONIC CONDITIONS

Mindfulness-based stress reduction has been tested as a clinical intervention for a wide range of conditions. A brief overview of mindfulness-based interventions for chronic disease shows that it may be an effective treatment or adjunct intervention for a range of disorders, including depression,<sup>47,29</sup> anxiety,<sup>48</sup> substance abuse,<sup>37</sup> eating disorders,<sup>49</sup> binge eating,<sup>50</sup> insomnia,<sup>51</sup> chronic pain,<sup>52</sup> psoriasis,<sup>53</sup> type 2 diabetes,<sup>54</sup> fibromyalgia,<sup>55</sup> rheumatoid arthritis,<sup>56,57</sup> attention-deficit/hyperactivity disorder,<sup>58</sup> HIV,<sup>59</sup> cancer,<sup>21</sup> and heart disease.<sup>60</sup> A comprehensive literature review of four of the largest health sciences databases (EBSCO, CINAHL, PSYCHLINE, and MEDLINE) found that "MBSR is an effective treatment for reducing the stress and anxiety that accompanies daily life and chronic illness. . . . No negative side effects from MBSR have been documented."<sup>61</sup> Researchers hypothesize that its effectiveness for so many different types of conditions is due to its ability to modulate the stress response. In other words, MBSR allows us to use the wisdom of our minds and the innate healing capacity of our bodies to improve our physical health.

## STUDIES OF MINDFULNESS THAT INCLUDED COST IMPLICATIONS

Accumulating data indicates that mindfulness meditation is clinically efficacious

and cost effective, particularly in the treatment of chronic disease.

Roth and Stanley<sup>62</sup> report that an eight-week MBSR program at a community health center (N = 73) resulted in a significant decrease in chronic care office visits after the MBSR program was completed, based on a review of utilization records. The authors conclude that MBSR programs may help to contain healthcare costs in similar inner-city community health centers.

A small study of adult offenders with mild intellectual disabilities (N = 6) found that a simple mindfulness exercise reduced physical aggression so much that "no Stat medication or physical restraint was required, and there were no staff or peer injuries."<sup>63</sup> The authors estimate a 95.7% reduction in costs associated with lost workdays and rehabilitation.

A German study of 21 persons with chronic illnesses (physical and psychological) found that an eight-week mindfulness meditation program resulted in lasting reductions in symptoms as well as improved quality of life and general well-being as measured in a three-month poststudy follow-up.<sup>64</sup> The authors conclude that mindfulness training has important cost-control benefits.

A 2008 qualitative study of 27 older adults with chronic lower back pain (a condition associated with significant healthcare costs) found that an eight-week mindfulness meditation program produced numerous health improvements including diminished pain, improved attention, better sleep, enhanced well-being, and improved quality of life.<sup>52</sup>

Kreitzer et al<sup>51</sup> studied the effects of an eight-week mindfulness meditation program on 20 organ transplant recipients. Transplant recipients typically experience a host of symptoms after their surgery, such as anxiety, depression, and insomnia, all of which add to the expense of their recuperation. The recipients who completed the relatively low-cost mindfulness meditation program experienced better sleep quality even six months after completing the course, resulting in decreased anxiety/depression and better quality of life.

## MINDFULNESS FOR HEALTH PROFESSIONALS: THE IMPORTANCE OF SELF-CARE

The routine training of health professionals (eg, physicians, nurses, clinical social

workers, psychologists) in mindfulness programs such as MBSR may be one of the most effective ways to disseminate its benefits widely throughout the healthcare system, improving both the professional lives of clinicians and the health of patients.

A stressed healthcare workforce leads to increased costs associated with practitioner burnout, high staff turnover, clinical errors, and lower quality care for patients. Costs associated with medical errors are approximately \$17 billion annually, whereas those stemming from high rates of staff turnover are about \$21 billion per year.<sup>65</sup> Poor physician-patient communication is one of the factors responsible for the practice of defensive medicine,<sup>66</sup> which is associated with annual costs of about \$210 billion.<sup>65</sup> Mindfulness training can address these concerns (eg, Kabat-Zinn,<sup>67</sup> Baime,<sup>68</sup> and Brown and Ryan<sup>69</sup>). There are many immediate benefits to exposing clinicians to mindfulness training:

- evidence suggests that mindfulness training of physicians can reduce medical errors<sup>70</sup>
- a study of 53 medical residents suggests that training in self-awareness enhances the ability to conduct patient-centered interviews,<sup>71</sup> thereby improving physician-patient communication and ultimately resulting in higher quality of care<sup>68</sup>
- a number of studies and reviews have suggested that increased self-awareness can help prevent and manage stress and burnout, and increase empathy<sup>72-77</sup>
- studies suggest that teaching mindfulness to health professionals improves the quality of care they deliver through enhancing caregiver self-efficacy,<sup>78</sup> improving clinician well-being and coping skills,<sup>79</sup> and that training psychotherapists in mindfulness significantly improves the mental health of the patients under their care<sup>80</sup>

What the research underscores is the crucial importance of self-care for health professionals if they are to have the capacity to deliver truly high-quality care to patients, minimizing clinical errors, improving physician-patient communication, lessening the incidence of burnout, enhancing patient-centered care, and reducing the fear of litigation. Health professionals can receive training in mindfulness through a number of avenues. First, mindfulness training can

be integrated into existing curricula in schools of medicine, nursing, and social work. In fact, a number of programs seeking to address clinician burnout and stress already offer mindfulness training. Kabat-Zinn and his colleagues have taught mindfulness techniques to medical students at the University of Massachusetts for over 20 years,<sup>79</sup> and similar programs are being offered elsewhere, such as the Penn Program for Mindfulness at the University of Pennsylvania and the Mindfulness Institute at Thomas Jefferson University.<sup>76</sup> These programs could be expanded, encouraged, and replicated through National Institutes of Health training grants. Health professionals already in the workplace can be encouraged to seek mindfulness training through programs and workshops that offer continuing education credits (CEUs).

to continue using mindfulness in the classroom. A recent RCT demonstrated that adolescents with a whole host of medical and mental health problems experienced significant improvements after an eight-week program of MBSR, including reduced anxiety, depression, and improved self-esteem and sleep quality. These clinically significant changes were sustained over the three-month follow-up.<sup>83</sup>

Such research suggests that mindfulness training could be an important complement to existing public health initiatives to address childhood obesity, reduce school violence, and improve educational achievement. Teaching children the basics of mindfulness has the immeasurable added benefit of giving young people coping skills that may prevent the development of mental and physical disease later in life.<sup>84</sup> Researchers have found a correlation between childhood abuse (physical and/or sexual) and certain kinds of illnesses later in life (eg, irritable bowel syndrome, fibromyalgia).<sup>85,86</sup> One recently published study of over 15,000 individuals found that "childhood traumatic stress increased the likelihood of hospitalization with a diagnosed autoimmune disease decades into adulthood."<sup>87</sup> The authors discussed these findings in connection with recent biological studies on the impact of childhood stress on subsequent inflammatory responses.<sup>87</sup> The findings strongly suggest that giving children an effective method to cope with psychological stressors can help to prevent the development of serious, debilitating, and costly diseases later in life.

### MINDFULNESS IN THE SCHOOLS: PROMOTING HEALTH AND ACADEMIC ACHIEVEMENT

Children often experience just as much psychological stress as their parents, yet have few resources with which to cope. Children and adolescents living in low-income, high-crime areas, or whose parents are coping with high levels of psychosocial stress (for example, due to divorce, job loss, chronic disease, or substance abuse) are especially vulnerable. This can lead to a host of dysfunctions such as behavioral problems, eating disorders, substance abuse, depression/anxiety, interpersonal conflict, aggression, and poor academic performance.<sup>81</sup> A number of researchers across the nation are pioneering the study of MBSR in schools, and the results of their research are promising. For example, Park Day School in Oakland, California, has initiated a program in mindfulness for elementary students in the Oakland area.<sup>82</sup> Over 5,000 children in 20 schools have received mindfulness training. Analysis of the research findings is ongoing, but preliminary data show that 93% of students report that mindfulness has helped them in some way, 85% say they will use mindfulness techniques in the future, 61% say it helps them calm down; and 59% say it helps them focus better in the classroom. Among teachers, 96% say that the mindfulness training has benefited them personally, and 94% plan

### TELEMEDICINE AND THE DELIVERY OF MINDFULNESS TRAINING

Currently, the most common method of delivery of mindfulness instruction is face-to-face group trainings in classroomlike settings. It is a cost-effective way to promote physical and psychological well-being, yet there are limitations to how many persons can access mindfulness instruction due to a finite number of qualified mindfulness meditation teachers. New information technologies can improve access to mindfulness instruction. The age of telemedicine has arrived. Based on a growing awareness of the benefits of telemedicine, state governments are beginning to support its use. For example, in June 2009

the state of Maine passed a law requiring health insurance plans to cover telemedicine services.<sup>88</sup> Telemedicine (or telehealth or eHealth) refers to the use of communications and information technologies in the delivery of clinical care, and its proponents are enthusiastic about telemedicine's potential to address rising costs, inequities in healthcare delivery, and barriers to care.<sup>89</sup> Examples of telemedicine include distant health education initiatives, telephone-based case management and home monitoring programs, use of communication technologies to coordinate care, and the use of Internet-based clinical interventions.

Although this is a newly emergent field, several studies point to the effectiveness of therapies delivered over the Internet. A review of 14 studies comparing the effectiveness of Internet versus face-to-face psychological interventions showed no differences in outcomes.<sup>90</sup> Perini et al<sup>91</sup> found that a clinician-assisted delivery over the Internet of cognitive behavioral treatment for depression produced clinically significant results. Twenty persons diagnosed with depression completed an eight-week online program consisting of online sessions, weekly assignments, and email contact with a clinical psychologist. Individuals in the treatment group reported significantly reduced symptoms of depression. Another study examined the use of telemedicine to deliver mindfulness-based meditation to patients with chronic pain.<sup>92</sup> In this study, over 200 chronic pain patients were assigned to three groups: a present site, distant site, or a wait-list control group. Videoconferencing and CDs were used to deliver the intervention to the distant site participants ( $n = 57$ ). The researchers found that the distant site group's improvements were comparable to the present site group in two of the four key measures and conclude that telemedicine is a promising way to help chronic pain patients in rural areas manage their condition. Not only can such Web-based interventions improve access to care for persons living in remote areas or who find it difficult to leave their homes due to disabilities, caregiving duties, frailty, or lack of transportation, delivering clinically supervised care over the Internet is extremely cost effective. All indications are that telemedicine is a clinically

and cost-effective adjunct to conventional face-to-face care.

The use of Web-based, online mindfulness programs is a convenient, practical, and cost-effective way to allow large numbers of people (health professionals, patients, and the public) to access mindfulness meditation. At present, one of the main barriers to the widespread dissemination of mindfulness is the paucity of highly qualified and experienced meditation teachers. Although there is no formal licensure or credentialing for meditation instructors, it is generally agreed that only persons trained at a handful of professional training programs (such as the stress reduction program at the University of Massachusetts) should be considered qualified to teach others how to meditate.<sup>93</sup>

Internet-based mindfulness programs, featuring live instruction in virtual classrooms by experienced teachers, can greatly expand the reach of the existing network of mindfulness teachers, helping them to reach many more students than otherwise possible. Online mindfulness training programs can also increase the number of health professionals trained in mindfulness techniques by adding a distance education component to existing professional training programs. For example, health professionals could receive conventional, face-to-face mindfulness training in a single workshop and then continue their practice with support from the mindfulness teacher in online sessions over the course of several months. Patients who have completed the standard eight-week MBSR program could access ongoing instruction and support via Web-based instruction.

School-based mindfulness programs could maximize their resources by augmenting in-person training with Internet-based meditation instruction. As the emerging research findings suggest, some patients who would otherwise not be able to access mindfulness programs can successfully learn the practice of mindfulness from qualified teachers in the virtual classroom. Students of mindfulness are already using CDs produced by nationally recognized teachers such as Jon Kabat-Zinn to support them in their practice. Internet-based meditation instruction takes this idea a step further, using concepts from both telemedicine and distance education to disseminate the benefits of mindfulness practice to as many individuals as possible.

## PAYING FOR MINDFULNESS TRAINING

The costs associated with delivering mindfulness-based services and training healthcare professionals to deliver such services will pay for themselves if the prevailing paradigm within healthcare can be shifted from treating to preventing disease. Currently, many individuals receiving mindfulness meditation instruction pay for it out of pocket. Insurance companies, who would incur significant cost savings in the long run, may choose to cover the costs, perhaps with a modest copay, discounts in premiums, or with flexible spending accounts. Employers, wishing to support the health and productivity of their employees, could support mindfulness programs. Private foundations may be interested in supporting such programs, particularly if they have a rigorous evaluation component. The National Institutes of Health could fund training grants for health professionals, encouraging the widespread training of clinicians in schools of medicine, nursing, and social work, with the ultimate goal of standardizing mindfulness training into the curriculum. Healthcare organizations currently bearing the burden of increased costs associated with high rates of clinician turnover, clinician stress, and burnout may opt to pay for mindfulness training for their practitioners.<sup>94</sup> Health professionals could pay for such training as they do for other CEUs; in fact, some organizations already offer CEUs for mindfulness education programs such as those offered through the National Institute for the Clinical Application of Behavioral Medicine.<sup>95</sup> Finally, state and local governments could fund train-the-trainer programs through Area Agencies on Aging, YMCAs, Big Brother/Big Sister groups, and other community organizations.

## VISION FOR THE FUTURE

Our vision is that mindfulness is widely recognized as an indispensable tool in health promotion and disease prevention initiatives, as well as a cost-effective intervention for many chronic conditions and as an adjunct to conventional care. We envision the creation of mindfulness programs (using the MBSR program as a basic model) for a number of constituencies across a variety of settings. A number of

---

these programs already exist, such as mindfulness-based cognitive therapy, mindfulness-based chronic pain management, and mindful eating for bariatric patients, and these can serve as templates.

Mindfulness training for patients with conditions shown to be responsive to this intervention will become the standard of care, reducing costs and improving health outcomes across a spectrum of diseases and conditions. We envision a widespread inclusion of mindfulness training in the healthcare education system. Health professions training will integrate concepts and techniques of mindfulness into the existing professionalism and humanism curricula, diminishing burnout, reducing clinical errors, and enhancing patient care. Large-scale public health initiatives will leverage our understanding of the mind-body connection and the role of stress in determining health behavior by including components of mindfulness training in their health promotion efforts to combat obesity, substance abuse, cigarette smoking, domestic and school violence, and prevalent mental health disorders such as anxiety and depression.

Telemedicine will be employed to expand access to high-quality mindfulness training and maintenance programs. Internet-based instruction will connect individuals with mindfulness teachers in the virtual classrooms accessible through clinics, schools, workplaces, community centers, and households across the United States. Mindfulness meditation teachers, who formerly were limited by their geographic location in their ability to train students, will be able to reach a far greater audience. In this way, mindfulness meditation will become a key component of self-care for health promotion, as well as an important adjunct to conventional clinical care.

## **RESEARCH AND POLICY RECOMMENDATIONS**

Practical next steps include the expansion of research that explores the mechanisms of mindfulness in different diseases, compares its effects with other approaches in diverse populations, investigates different delivery models, demonstrates cost-savings, and establishes training requirements. We also need to explore the implementation of mindfulness training in different settings, such as workplaces, clinics, schools, and community centers.

1. Comparative effectiveness studies need to evaluate mindfulness practice against usual care for individuals with anxiety and depression, pain, cardiovascular disease, and other chronic conditions.<sup>96</sup>
2. The feasibility, effectiveness, and cost savings need to be studied of mindfulness practices and modalities in diverse populations (eg, ethnicity, age, gender, rural/urban) in the United States.
3. Cost-effectiveness studies need to demonstrate the cost savings associated with mindfulness interventions compared with usual care in populations for which there are already reliable records of cost (eg, Medicare).
4. Large-scale, longitudinal effectiveness studies are needed that document the cascade of positive side effects of mindfulness. Research into this area has been slow to emerge due to the tendency of scientific study to narrow its focus to one symptom or condition in the interests of clarity and precision). Although this reductionist approach has many benefits, it can miss the “big picture.” Developing a new kind of “person-centered” rather than “disease-centered” research model could assist us in better comprehending the cascade of positive effects characteristic of mindfulness interventions.
5. Rigorous research on telemedicine and the delivery of mindfulness training, comparing mindfulness instruction in the virtual classroom with face-to-face instruction, needs to continue.
6. Should additional research support the findings of the virtual classroom as an effective and inexpensive delivery medium, equitable insurance and flexible-spending reimbursements for Internet-based interventions should be considered.
7. Veterans Affairs Medical Centers would be an ideal setting for multi-site trials of mindfulness for PTSD, cardiovascular disease, substance abuse, depression, and other conditions that are prevalent in this population, evaluating both its efficacy and cost-savings.
8. Mindfulness-based training programs could be implemented and evaluated at federal workplaces and healthcare centers (eg, Veterans Affairs Medical Centers).
9. Employers who offer mindfulness programs and collect data on the cost savings related to reduced absenteeism, better employee retention, and enhanced productivity could receive tax incentives and/or discounts on health insurance products.
10. Institutions responsible for health professions education can begin the process of integrating mindfulness training into their curricula for the benefit of both practitioners and patients. This effort could be supported through National Institutes of Health training grants.
11. It is important to understand the extent to which clinicians understand the health benefits of mindfulness practices so they will recommend these modalities to their patients. Although the research evidence on the benefits of mindfulness practice are well established, these modalities have not been disseminated widely to the general public, and research on healthcare professionals’ attitudes and knowledge of mindfulness is critical in implementing these programs. Making mindfulness training a required component of annual CEUs would be one way to further education amongst healthcare professionals.
12. Because the practice of defensive medicine costs approximately \$210 billion each year, we need studies that explore how mindfulness training influences physician-patient communication. Previous research suggests that physicians with better communication skills are less likely to be the targets of malpractice suits. Can mindfulness training of health professionals decrease the incidence and fear of litigation, thereby reducing the practice of defensive medicine?
13. We need to conduct studies exploring the impact of mindfulness training on clinician errors (currently costing about \$17 billion annually) and health staffing turnover (\$21 billion).
14. Evaluating school-based mindfulness training will help us to understand how best to implement the mindful-schools model currently being developed, and whether this approach can be a corner-

stone of pediatric public health promotion in the future.

## CONCLUSION

Mindfulness practices can be an important tool in addressing our public health problems. Mindfulness training can enhance other nationwide health promotion efforts by helping people become more self-aware, more resilient to stress, and more responsible about their lifestyle choices. One of the great advantages of mindfulness training is that it assists people in making those lifestyle changes we all know we should make. It is one thing to *know* that smoking or obesity very often lead to disease, but another thing to have the capacity for behavioral change. Mindfulness-based practices can help us to cope with psychological stress and support us while we make the lifestyle changes we know will help us to become healthier. Creating a “culture of wellness” entails promoting a culture of self-responsibility, which requires a society composed of individuals cultivating self-awareness.

As researchers have repeatedly noted, by increasing awareness in the present moment, we can interrupt existing patterns of behavior and make wiser choices. In essence, practicing mindfulness skills throughout the day leads to the possibility of a different relationship to any situation. With mindfulness, one moves from being distracted and inattentive, or stuck on “autopilot,” to being present and aware in every moment. In this way, mindfulness training can help individuals make and sustain the lifestyle changes that lead to improved health. The regular practice of mindfulness meditation can also help our bodies to become more “stress hardy,” less likely to succumb to the wear and tear of chronic psychological stress. As the evidence mounts that the mind exerts a real and demonstrable influence on the central nervous system, the endocrine system, and the immune system, policy makers are called upon to explore the ways in which training the mind can prevent disease and promote the health of populations. What the scientific studies suggest is that we have, within us, the key to better health. Mindfulness practices unlock this potential and greatly increase the odds of avoiding debilitating and costly disease, while simultaneously improving quality of life, enhancing mood, and promoting general well-being.

At a hearing in June 2009, Tim Ryan, representative from the state of Ohio, asked Department of Health and Human Services Secretary Kathleen Sebelius to keep in mind the positive effects of mindfulness when reworking the nation's healthcare system.<sup>97</sup> “When we have these discussions about healthcare, there's always an issue we never really talk about, and it's the issue of stress,” Ryan said. “A lot of us are seeing it in our Congressional districts because of the economic situation we're dealing with. And the issue of stress leads to, I think, we know, increased illness.” Sebelius agreed that the technique was useful as a form of preventive medicine that could reduce the need for more costly treatments. “I think it's a prevention strategy that I know has the potential of paying huge dividends.” Sebelius said.

Regardless of who pays for healthcare in the United States, the costs must come down. Without a reduction in healthcare expenditures, no system will be sustainable for long. Applying what we know about the potential for mindfulness-based interventions to prevent disease, promote health, treat chronic conditions, and improve the quality of care may well turn out to be a cornerstone of a more humane, equitable, and effective approach to health and healthcare that can actually reduce costs in a meaningful way. Leveraging the body's innate capacity to heal itself may be the key to creating a sustainable healthcare system for the 21st century.

## REFERENCES

1. Gordon JS, *Manifesto for a New Medicine*. Reading Mass: Perseus Books; 1996:107-108.
2. Keenan PS. What's driving health care costs? November 2004. The Commonwealth Fund/Kennedy School of Government Bipartisan Congressional Health Policy Conference, January 15-17, 2004.
3. Cutler D, McClellan M. Is technological change in medicine worth it? *Health Aff*. 2001;20(5):11-29.
4. Hearings Before the Committee on Health, Education, Labor, and Pensions. Access to Prevention and Public Health for High-Risk Populations. (2009) (testimony of Risa Lavizzo-Mourey, MD, MBA, president and CEO, Robert Wood Johnson Foundation. Available at: <http://www.rwjf.org/about/product.jsp?id=37948>. Accessed June 18, 2009.
5. National Center for Complementary and Alternative Medicine. Mind-body medicine: an overview. *Backgrounder*. October 2004. Available at: [http://nccam.nih.gov/health/whatiscam/mind-body/D239\\_BKG.pdf](http://nccam.nih.gov/health/whatiscam/mind-body/D239_BKG.pdf). Accessed June 30, 2009.
6. Sobel DS. Mind matter, money matters: the cost effectiveness of mind-body medicine. *JAMA*. 2000;284:1705.
7. *The New Medicine* [documentary]. 2006. Minneapolis, MN: Bravewell Collaborative.
8. Chopra D, Ornish D, Roy R, Weil A. Alternative medicine is mainstream. *Wall Street Journal*. Jan 9, 2009, A13.
9. Yusef S, Hawken S, Ounpuu S, et al. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): case control study. *Lancet*. 2004;364:937-952.
10. Hemingway H, Marmot M. Evidence based cardiology: psychosocial factors in the aetiology and prognosis of coronary heart disease. Systematic review of prospective cohort studies. *BMJ*. 1999;318:1460-1467.
11. Innes KE, Vincent HK, Taylor AG. Chronic stress and insulin resistance-related indices of cardiovascular disease risk, part 2: a potential role for mind-bodies therapies. *Altern Ther Health Med*. 2007;13:44-51.
12. Anderson JW, Liu C, Kryscio RJ. Blood pressure response to transcendental meditation: a meta-analysis. *Am J Hypertens*. 2008;21:310-316.
13. Schneider RH, Walton KG, Salerno JW, Nidich SI. Cardiovascular disease prevention and health promotion with the TM program. *Ethn Dis*. 2006;16(3 suppl 4):15-26.
14. Dusek JA, Hibberd PL, Buczynski B, et al. Stress management versus lifestyle modification on systolic hypertension and medication elimination: a randomized trial. *J Altern Complement Med*. 2008;14:129-138.
15. Curiati JA, Bocchi E, Freire JO, et al. Meditation reduces sympathetic activation and improves the quality of life in elderly patients with optimally treated heart failure: a prospective randomized study. *J Altern Complement Med*. 2005;11:465-472.
16. Walton KG, Schneider RH, Salerno JW, Nidich SI. Psychosocial stress and cardiovascular disease. [Part 3: TM] *Behavioral Modification*. 2005;30(4):173-183.
17. Jayadevappa R, Johnson JC, Bloom BS, et al. Effectiveness of transcendental meditation on functional capacity and quality of life of African Americans with congestive heart failure: a randomized controlled study. *Ethn Dis*. 2007;17:72-77.

18. Ornish D, Scherwitz LW, Billings JH, et al. Intensive lifestyle changes for reversal of coronary heart disease. *JAMA*. 1998;280:2001-2007.
19. Davidson RJ, Kabat-Zinn J, Schumacher J, et al. Alterations in brain and immune function produced by mindfulness meditation. *Psychosom Med*. 2003;65:564-570.
20. Pace TW, Negi LT, Adame DD, et al. Effect of compassion meditation on neuroendocrine, innate immune and behavioral responses to psychosocial stress. *Psychoneuroendocrinology*. 2009;34:87-98.
21. Witek-Janusek L, Albuquerque K, Chroniac KR, et al. Effect of mindfulness-based stress reduction on immune function, quality of life, and coping in women newly diagnosed with early stage breast cancer. *Brain Behav Immun*. 2008;22:969-981.
22. Carlson LE, Speca M, Patel KD, Goodey E. Mindfulness-based stress reduction in relation to quality of life, mood, symptoms of stress and levels of cortisol, DHEAS and melatonin in breast and prostate cancer outpatients. *Psychoneuroendocrinology*. 2004; 29:448-474.
23. Farb NA, Segal ZV, Mayberg H, et al. Attending to the present: mindfulness meditation reveals distinct neural modes of self-reference. *Soc Cogn Affect Neurosci*. 2007;2: 313-322.
24. Lazar SW, Kerr CE, Wasserman RH, et al. Meditation experience is associated with increased cortical thickness. *Neuroreport*. 2005;16:1893-1897.
25. Lutz A, Brefczynski-Lewis J, Johnstone T, Davidson RJ. Regulation of the neural circuitry of emotion by compassion meditation: effects of meditative expertise. *PLoS One*. 2008;3:e1897.
26. Luders E, et al. The underlying anatomical correlates of long-term meditation: larger hippocampal and frontal volumes of gray matter. *Neuroimage*. 2009;45:672-678.
27. Siegel DJ. *The Mindful Brain*. New York, NY: Norton; 2007.
28. Shapiro SL. The integration of mindfulness and psychology. *J Clin Psychol*. 2009;65: 555-560.
29. Kuyken W, Byford S, Taylor RS, et al. Mindfulness-based cognitive therapy to prevent relapse in recurrent depression. *J Consult Clin Psychol*. 2008;76:966-978.
30. Miller J, Fletcher K, Kabat-Zinn J. Three-year follow-up and clinical implications of a mindfulness meditation-based stress reduction intervention in the treatment of anxiety disorders. *Gen Hosp Psychiatry*. 1995;17:192-200.
31. Cuellar NG. Mindfulness meditation for veterans—implications for occupational health providers. *AAOHNJ*. 2008;56:357-363.
32. Gorden JS, Staples JK, Blyta A, Bytygi M, Wilson AT. Treatment of post-traumatic stress disorder in postwar Kosovar adolescents using mind-body skills groups: a randomized controlled trial. *J Clin Psychiatry*. 2008;69:1469-1476.
33. Bormann JE, Smith TL, Becker S, et al. Efficacy of frequent mantram repetition on stress, quality of life, and spiritual well-being in veterans: a pilot study. *J Holist Nurs*. 2005;23:395-414.
34. Greeson JM. Mindfulness research update 2008. *Complementary Health Practice Review Online First*. January 13, 2009;0:1533210108329862V1.
35. Davis JM, Fleming MF, Bonus KA, and Baker TB. A pilot study on mindfulness based stress reduction for smokers. *BMC Complementary and Alternative Medicine*. 2007;7:2.
36. Kristeller JL, Baer RA, Quillian-Wolever R. Mindfulness-based approaches to eating disorders. In: Baer RA, ed. *Mindfulness-Based Treatment Approaches: A Clinician's Guide to Evidence Base and Applications*. San Diego, Calif: Academic Press; 2006:75-91.
37. Bowen S, Witkiewitz K, et al. Mindfulness meditation and substance use in an incarcerated population. *Psychol Addict Behav*. 2006;20:343-347.
38. Witkiewitz K, Marlatt A, Walker D. Mindfulness-based relapse prevention for alcohol and substance use disorders. *J Cogn Psychother*. 2005;19:211-228.
39. Bowen S, Witkiewitz K, Dillworth TM, Marlatt GA. The role of thought suppression in the relationship between mindfulness meditation and alcohol use. *Addict Behav*. 2007;32:2324-2328.
40. Greeson. 2009;0:1533210108329862V1.
41. Langer EJ and Rodin J. 1976. Long-term effects of a control-relevant intervention with the institutionalized aged. *J Personality and Social Psychology*. 1977;35:897-902.
42. Rodin J and Langer EJ. 1977. Long-term effects of a control-relevant intervention with the institutionalized aged. *J Personality and Social Psychology*. 1977;35:897-902.
43. Langer EJ. *Counterclockwise: Mindful Health and the Power of Possibility*. New York, NY: Ballantine Books; 2009.
44. Crum AJ, Langer EJ. Mind-set matters: exercise and the placebo effect. *Psychol Sci*. 2007;18:165-171.
45. Dusek JA, Otu HH, Wohlhueter AL, et al. Genomic counter-stress changes induced by the relaxation response. *PLoS One* 2008; 3:e2576.
46. Ludwig DS, Kabat-Zinn J. Mindfulness in medicine. *JAMA*. 2008;300:1350-1352.
47. Jain S, Shapiro SL, Swanick S, et al. A randomized controlled trial of mindfulness meditation versus relaxation training: effects on distress, positive states of mind, rumination, and distraction. *Ann Behav Med*. 2007;33:11-21.
48. Baer RA. Mindfulness training as clinical intervention: a conceptual and empirical review. *Clin Psychol (New York)*. 2003;10:125-143.
49. Baer RA, ed. *Mindfulness-Based Treatment Approaches. Clinician's Guide to Evidence Base and Applications*. San Diego, Calif: Academic Press; 2006.
50. Kristeller, Baer RA, Quillian-Wolever R, et al. 2006.
51. Kreitzer MJ, et al. Longitudinal impact of mindfulness meditation on illness burden in solid-organ transplant recipients. *Prog Transplant*. 2005;15:166-172.
52. Morone NE, et al. "I felt like a new person"—the effects of mindfulness meditation on older adults with chronic pain: qualitative narrative analysis of diary entries. *J Pain*. 2008;9: 841-848.
53. Kabat-Zinn, et al. Influence of mindfulness-meditation based stress reduction intervention on rate of skin clearing in patients with moderate to severe psoriasis undergoing phototherapy (UVB) and photochemotherapy (PUVA). *Psychosom Med*. 1998;60:625-632.
54. Rosenzweig S, et al. Mindfulness-based stress reduction is associated with improved glycemic control in Type 2 diabetes mellitus: a pilot study. *Altern Ther Health Med*. 2007;13:36-38.
55. Grossman P, Tiefenthaler-Gilmer U, Räysz A, Kesper U. Mindfulness training as an intervention for fibromyalgia: evidence of post-intervention and 3-year follow-up benefits in well-being. *Psychother Psychosom*. 2007;76:226-233.
56. Zautra AJ, Davis MC, Reich JW, et al. Comparison of cognitive behavioral mindfulness meditation interventions on adaptation to rheumatoid arthritis for patients with and without history of recurrent depression. *J Consult Clin Psychol*. 2008;76:408-421.
57. Pradhan EK, Baumgarten M, Langenberg P, et al. Effect of mindfulness-based stress reduction in rheumatoid arthritis patients. *Arthritis Rheum*. 2007;57:1134-1142.
58. Zylowska L, Ackerman DL, Yang MH, et al. Mindfulness meditation training in adults and adolescents with ADHD: a feasibility study. *J Atten Disord*. 2008;11:737-746.
59. Creswell JD, Myers HF, Cole SW, Irwin MR, et al. Mindfulness meditation training effects on CD4+ T lymphocytes in HIV-1 infected adults: a small, randomized controlled trial. *Brain Behav Immun*. 2009;23: 184-188.
60. Sullivan MJ, Wood L, Terry J, et al. The Support, Education, and Research in Chronic Heart Failure Study (SEARCH): a mindfulness-based psychoeducational intervention improves depression and clinical symptoms in patients with chronic heart failure. *Am Heart J*. 2009;157:84-90.

61. Praissman S. Mindfulness-based stress reduction: a literature review and clinician's guide. *J Am Acad Nurse Pract.* 2008;20:212-216.
62. Roth B and Stanley TW. Mindfulness-based stress reduction and healthcare utilization in the inner city: preliminary findings. *Altern Ther Health Med.* 8:60-62, 64-66.
63. Singh NN, Lancioni GE, Winston AS, et al. Clinical and benefit-cost outcomes of teaching a mindfulness-based procedure to adult offenders with intellectual disabilities. *Behav Modif.* 2008;32:622-637.
64. Majumdar M, Grossman P, Dietz-Waschkowski B, Kersig S, Walach H. Does mindfulness meditation contribute to health? Outcome evaluation of a German sample. *J Altern Complement Med.* 2002;8:719-730.
65. Kavilanz PB. Health care's big money wasters. *CNN.com.* August 2009. Available at: [http://money.cnn.com/2009/08/10/news/economy/healthcare\\_moneywasters/index.htm](http://money.cnn.com/2009/08/10/news/economy/healthcare_moneywasters/index.htm).
66. Levinson W, Roter DL, Mullooly JP, Dull VT, Frankel RM. Physician-patient communication. The relationship with malpractice claims among primary care physicians and surgeons. *JAMA.* 1997;277:553-559.
67. Kabat-Zinn J. Mindfulness meditation. What it is, what it isn't and its role in health care and medicine. In: Haruki Y, Ishii Y, Suzuki M, eds. *Comparative and Psychological Study on Meditation.* Delft, The Netherlands: Eburon; 1996:161-170.
68. Baime MJ. Meditation and spirituality for health care providers. In: Chez RA, Jonas WB, eds. *Spiritual Transformation and Health Throughout the Lifecycle.* Alexandria, Va: Samuel Institute for Information Biology; 2003:42-52.
69. Brown KW, Ryan RM. The benefit of being present: mindfulness and its role in psychological well-being. *J Person Soc Psychol.* 2003; 84:822-848.
70. Epstein RM. Mindful practice. *JAMA.* 1999;282:833-839.
71. Smith RC, Dorsey AM, Lyles JS, Frankel RM. Teaching self-awareness enhances learning about patient-centered interviewing. *Acad Med.* 1999;74:1242-1248.
72. Novack DH, Suchman AL, Clark W, et al. Calibrating the physician: personal awareness and effective patient care. *JAMA.* 1997;278:502-509.
73. Shapiro SL, Schwartz GE, Bonner G. Effects of mindfulness-based stress reduction on medical and premedical students. *J Behavioral Medicine.* 1998;21:581-599.
74. Meier DE, Back AL, Morrison RS. The inner life of physicians and care of the seriously ill. *JAMA.* 2001;286:3007-3014.
75. Milstein JM, Gerstenberger AE, Barton S. Healing the caregiver. *J Altern Complement Med.* 2002;8:917-920.
76. Rosenzweig S, Reibel DK, Greeson JM, Brainard GC, Hojat M. Mindfulness-based stress reduction lowers psychological distress in medical students. *Teach Learn Med.* 2003;15:88-92.
77. Beddoe AE, Murphy SO. Does mindfulness decrease stress and foster empathy among nursing students? *J Nurs Educ.* 2004; 43:305-312.
78. Oman D, Richards TA, Hedberg J, Thoresen CE. Passage meditation improves caregiving self-efficacy among health professionals: a randomized trial and qualitative assessment. *J Health Psychol.* 2008;13:1119-1135.
79. Irving JA, Dobkin PL, Park J. Cultivating mindfulness in health care professionals: a review of empirical studies of mindfulness-based stress reduction (MBSR). *Complement Ther Clin Pract.* 2009;15:61-66.
80. Grepmaier L, Mitterlehner F, Loew T, et al. Promoting mindfulness in psychotherapists in training influences the treatment results of their patients: a randomized, double-blind, controlled study. *Psychother Psychosom.* 2007;76:332-338.
81. Greene JW, Walker LS. Psychosomatic problems and stress in adolescence. *Pediatr Clin North Am.* 1997;11:1557-1572.
82. Mindful Schools: A Community Outreach Program of Park Day School. <http://www.mindfulschools.org>. Accessed July 5, 2009.
83. Biegel GM, Shapiro SL, Brown KW, et al. Mindfulness-based stress reduction for the treatment of adolescent psychiatric outpatients: a randomized clinical trial. *J Clin Consult Psychol.* 2009;77:855-866.
84. Frydenberg E, et al. Prevention is better than cure: coping skills training for adolescents in school. *Educ Psychol Pract.* 2004;20: 117-134.
85. Grossman DA, et al. Sexual and physical abuse and gastrointestinal illness: review and recommendations. *Ann Inter Med.* 1995;123:782-794.
86. Finnerstone HM, et al. Chronic pain and health care utilization in women with a history of childhood sexual abuse. *Child Abuse Negl.* 2000;24:547-556.
87. Dube SR, Fairweather D, Pearson WS, Felitti VJ, Anda RF. Cumulative childhood stress and autoimmune diseases in adults. *Psychosom Med.* 2009;71:243-250.
88. Main law requires health plans to cover telemedicine services. [www.iHealthBeat.org/Articles/2009/](http://www.iHealthBeat.org/Articles/2009/). Last accessed June 12, 2009. Available at: <http://www.ihealthbeat.org/Articles/2009/>. California Healthcare Foundation.
89. Bashur RL, Shannon GW. National telemedicine initiatives: essential to healthcare reform. *Telemed eHealth.* 2009;15:1-11.
90. Barak A, et al. A comprehensive review and a meta-analysis of the effectiveness of Internet-based psychotherapeutic interventions. *J Technol Hum Serv.* 2008;26:109-169.
91. Perini S, Titov N, Andrews G. Clinician-assisted Internet-based treatment is effective for depression: randomized controlled trial. *Austr NZ J Psychiatry.* 2009;43:571-578.
92. Gardner-Nix J, Backman S, Barbati J, Grummitt J. Evaluating distance education of a mindfulness-based meditation programme for chronic pain management. *J Telemed Telecare.* 2008;14:88-92.
93. Yuen E, Baime MJ. Meditation and healthy aging. In: Mackenzie ER, Rakel B, eds. *Complementary and Alternative Medicine for Older Adults.* New York, NY: Spring Publishing; 2006.
94. Williams ES, Konrad TR, Scheckler WE, et al. Understanding physicians' intentions to withdraw from practice: the role of job satisfaction, job stress, mental and physical health. *Health Care Manage Rev.* 2001;26: 7-19.
95. National Institute for Clinical and Behavioral Medicine. Available at: <http://www.nicabm.com>. Last accessed July 2009.
96. Institute of Medicine. *Initial National Priorities for Comparative Effectiveness Research: Report Brief.* National Academy of the Sciences June 30, 2009. <http://www.iom.edu/en/Reports/2009/ComparativeEffectivenessResearchPriorities/asp>.
97. Zimmerman E. Add meditation to healthcare bill. The Hill. June 10, 2009. Available at: <http://thehill.com/blogs/blog-briefing-room/news/legislation/34859-congressman-add-meditation-to-healthcare-bill>. Last accessed June 30, 2009.