

# **MIND/BODY MEDICINE**

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**HEARING**  
BEFORE A  
SUBCOMMITTEE OF THE  
COMMITTEE ON APPROPRIATIONS  
UNITED STATES SENATE  
ONE HUNDRED FIFTH CONGRESS  
SECOND SESSION

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**SPECIAL HEARING**

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## **MIND/BODY MEDICINE**

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**TUESDAY, SEPTEMBER 22, 1998**

U.S. SENATE,  
SUBCOMMITTEE ON LABOR, HEALTH AND HUMAN  
SERVICES, AND EDUCATION, AND RELATED AGENCIES,  
COMMITTEE ON APPROPRIATIONS,  
*Washington, DC.*

The subcommittee met at 11:01 a.m., in room SD-192, Dirksen Senate Office Building, Hon. Arlen Specter (chairman) presiding.  
Present: Senator Specter.

DEPARTMENT OF HEALTH AND HUMAN SERVICES

NATIONAL INSTITUTES OF HEALTH

**STATEMENT OF NORMAN B. ANDERSON, Ph.D., DIRECTOR, OFFICE OF  
BEHAVIORAL SCIENCES RESEARCH**

OPENING STATEMENT OF SENATOR ARLEN SPECTER

Senator SPECTER. Good morning, ladies and gentlemen. The Subcommittee on Labor, Health and Human Services, and Education will now proceed.

This morning we will focus on mind/body treatment which has come to be recognized as a very important part of medical treatment, emphasizing stress related illnesses and the elimination of stress contributing to a number of medical conditions that can be treated by so-called mind/body procedures contrasted with pharmaceutical or surgical approaches. The mind/body approach, such as relaxation response and those related to utilizing beliefs of the patients, have been utilized to successfully treat disorders and illnesses.

In the fiscal year 1999 Labor, HHS bill, we have included provisions to establish mind/body centers to explore the benefits of mind/body medicine and to address issues of application and research including the cost effectiveness of mind/body interventions.

We have a distinguished panel of experts today. We will begin with Dr. Norman Anderson who is Director of the Office of Behavioral and Social Sciences Research for the National Institutes of Health, a unit which was created in 1993. Dr. Anderson, we welcome you here.

We would like to have a 5-minute rule generally, so we will turn the green light on at 5 and the yellow at 1 and a red at 0. But we have some flexibility today on the timing, so we will not be rigidly bound by the lights.

We may be joined by other Senators. Today is a very busy day here. Yesterday was Rosh Hashanah and some are celebrating it today. I do not have to specify the activities that are underway in Washington, DC. So, it is a busy time. Whether we will be joined or not by our colleagues will remain to be seen.

PREPARED STATEMENT

At this point I would like to submit Senator Tom Harkins statement for the record.

[The statement follows:]

PREPARED STATEMENT OF SENATOR TOM HARKIN

Thank you, Mr. Chairman, for providing this forum to discuss the promising field of mind-body medicine. As many of you know, I have taken a great interest over the years in complementary and alternative medicine (CAM). I believe strongly in the need for improved and expanded research in this field. It is this belief that led me to create the Office of Alternative Medicine at NIH in 1991 and more recently, to propose giving the Office Center status and grant making authority. I want to thank the Chairman for working with me on this issue, and including my Center proposal in the LHHS bill this year.

Millions of Americans are turning to complementary and alternative medicine (CAM) and practices. Currently, patient visits to CAM practitioners outpace visits to conventional primary care physicians. According to a recent study by Harvard University researchers, 80 million Americans regularly use complementary and alternative medicine, usually in conjunction with more conventional care.

Harvard University reported that the public's out-of-pocket expenses for these CAM products and services is equal to that paid out-of-pocket for traditional physician services and is three times that paid out-of-pocket for hospital expenses. In 1990, those costs equaled more than \$14 billion, of which at least \$10 billion were not reimbursed to patients by health insurance.

These practices, which range from acupuncture to chiropractic care, to relaxation techniques, naturopathic, herbal and homeopathic remedies, are not simply complementary and alternative, but are integral to how millions of Americans are managing their health and treating their illnesses.

Today, I am pleased to have the opportunity to hear from the distinguished scientist, Dr. Herbert Benson, about his work in the field of Mind/Body Medicine. The relaxation techniques espoused by Dr. Benson have been shown to significantly improve patients' recovery from a wide range of illnesses.

The groundswell of public demand for CAM therapies, including the Mind/Body techniques described by Dr. Benson, has fueled the interest of conventional medical practitioners. Eighty percent of medical students in the U.S. have reported a desire for more structured training in complementary and alternative medicine and practices, including Mind/Body medicine. Indeed, the National Institutes of Health reports that more than 50 percent of conventional physicians in the U.S. now use or refer patients for alternative treatments.

Yet the federal government lags behind providers and the public. The Federal agencies responsible for protecting and promoting public health remain ill-equipped to deal with the public's demand for information and answers regarding alternative and complementary health care. Additionally, we are in an era when we must take a closer look at ways to provide cost-effective, preventive health care. The movement toward integrated medicine promises a more comprehensive, more effective, and more responsive health care system. And evidence suggests that this approach may be far more cost-effective as well.

As policymakers, we must act to promote quality research, provide useful information to patients about CAM therapies, and ensure adequate oversight of this burgeoning field. This hearing is an important step in that process. I look forward to the testimonies to be presented here today and urge the continued commitment of this Subcommittee in this important public health issue. Thank you.

SUMMARY STATEMENT OF NORMAN ANDERSON

Senator SPECTER. Dr. Anderson, all statements will be made a part of the record in full, and now the floor is yours.

Dr. ANDERSON. Thank you, Mr. Chairman. It is really a pleasure for me to participate in the hearing today on mind/body approaches to health. This area of research is particularly relevant to the mission of the Office of Behavioral and Social Sciences Research or OBSSR at the National Institutes of Health. Thank you for the opportunity to discuss the commitment of NIH to conducting and disseminating this vital research.

I am a clinical psychologist with training in behavioral medicine, and I have served as the first Associate Director of NIH for Behavioral and Social Sciences Research for the past 3 years. I am also an associate professor, currently on leave, at Duke University and president of the Society of Behavioral Medicine. In my role as Director of the OBSSR, I work with all of the institutes and centers of the NIH on issues related to basic behavioral and social sciences research and to research on behavioral treatment and prevention approaches. These areas of research have produced some of the strongest evidence for the role of the mind in healing and health.

I would like to direct your attention to the picture on the easel. The figure illustrates how the seemingly independent factors affecting health are, in fact, integrated and dependent. Please note the three large boxes on the poster. NIH has a long and revered research tradition in the physiological realm and more recently there has been tremendous excitement in the realm of genetics research, but equally important is the recognition of the role that behavioral psychological, sociocultural, and environmental factors play in health. Our beliefs, our emotions, our behavior, our thoughts, our family and cultural systems, as well as the environmental context in which we live, all are as relevant to our health as genetic inheritance and our physiology.

Some might say that there is nothing really new in this model, that we have long known that the mind, the body, and the context in which we live influence health. But this model brings a new oneness to our vision of the determinants of health. This oneness is captured not so much by the boxes in the poster, but by the arrows between the boxes which denote a unity of the factors that affect health. The arrows make salient the interaction and interdependence of the various influences on health. Health science has now reached a point where it is no longer accurate to talk about psychology versus biology, the mind versus the body, or nature versus nurture. These processes are inextricably linked. When I talk about mind/body medicine, I am referring to these linkages, that is, the connections between psychological, behavioral, and sociocultural processes with all levels of biological functioning and with health.

The figure not only illustrates the factors affecting health, but it also makes salient a number of scientific questions. For example, we know that social, psychological, and behavioral variables are important risk factors for illness, but the question now is, how do they affect health? That is, how do psychosocial and behavioral variables affect endocrine activity, the immune system, or even gene expression? How can we capitalize on discoveries in these areas to improve the treatment and prevention of disease? These are some of the key questions facing mind/body research today.

Research supported by the NIH continues to make progress in addressing these questions. Here are just a few recent discoveries.

Stress management training can reduce the fear and anxiety associated with the experience of asthma in children, resulting in more effective management of asthma attacks and fewer visits to the emergency room, and as a consequence, decreasing costs. Stress management training has also been shown to reduce the likelihood of cardiovascular morbidity.

Breast and skin cancer patients who participate in supportive groups show improved mood, adjustment, and decreased pain and may actually experience a decrease in mortality.

Finally, a variety of behavioral interventions such as relaxation training, which you will hear more about today, cognitive therapy, and biofeedback have now been demonstrated to reduce the chronic pain associated with a number of medical conditions.

#### PREPARED STATEMENT

These and other findings reinforce the commitment to and enthusiasm for research at the intersection of sociobehavioral and biological science at the NIH.

Thank you again for your interest in mind/body approaches to healing and health and for convening this hearing. I look forward to any questions you might have. Thank you.

[The statement follows:]

#### PREPARED STATEMENT OF NORMAN B. ANDERSON

Mr. Chairman, it is my pleasure to participate in the hearing today on mind/body approaches to health. This area of research is particularly relevant to the mission of the Office of Behavioral and Social Sciences Research (OBSSR) at the National Institutes of Health (NIH). Thank you for the opportunity to discuss the commitment of NIH to conducting and disseminating this vital research.

I am a clinical psychologist with training in behavioral medicine, and I have served as the first Associate Director of NIH for Behavioral and Social Sciences Research for the past three years. I am also an Associate Professor (on leave) at Duke University, and President of the Society of Behavioral Medicine. In my role as Director of the OBSSR, I work with all the Institutes and Centers of NIH on issues related to basic behavioral and social science research, and to research on behavioral treatment and prevention approaches. These areas of research have produced some of the strongest evidence for the role of the mind in healing and health.

I will focus my remarks on two questions: What are some recent developments in research on the role of the mind in healing and health? And what are the implications of this research for treatment and prevention?

To address the first question, I direct your attention to the picture on the easel (see Figure 1, attached). The figure illustrates how the seemingly independent factors affecting health outcomes are, in fact, integrated and dependent. Please note the three large boxes on the poster. NIH has a long and revered tradition of funding research in the physiological realm, and more recently, there is tremendous excitement in the realm of genetics research. But equally important is the recognition of the role that behavioral, psychological, sociocultural and environmental factors play in health. Our beliefs, our emotions, our behavior, our thoughts, our family and cultural systems, as well as the environmental context in which we live, all are as relevant to our health as our genetic inheritance and our physiology.

Some might say that there is nothing really new in this model—that we have long known that the mind, the body, and the context in which we live influence health. But this model brings a new oneness to our vision of the determinants of health. This oneness is captured not so much by the boxes in the poster, but by the arrows between the boxes, which denote unity of the factors that affect health. These arrows make salient the interaction and interdependence of the various influences on health. Health science has reached a point where it is no longer accurate to talk about psychology versus biology; the mind versus the body; or nature versus nurture. These processes are inextricably linked. When I talk about mind/body medicine, I am referring to these linkages. That is, the connections between psychological, be-

havioral, and sociocultural processes with all levels of biological functioning—from the organ systems, to the cellular, to the molecular—and with health.

The figure not only illustrates the factors affecting health, but it also makes salient a number of scientific questions. For example, we know that social, psychological, and behavioral variables are risk factors for illness, but the question now is: How do they affect health? That is, how do psychosocial and behavioral variables affect neuroendocrine activity, the immune system, or gene expression? How can we capitalize on discoveries in these areas to improve the treatment and prevention of disease? These are some of the key questions facing mind/body research today.

#### INTERDISCIPLINARY RESEARCH

Our next challenge is to seek a deeper understanding of mind/body interactions, and to do this we need research that cuts across disciplinary boundaries. That is, research that combines expertise from such social and behavioral science fields as psychology, sociology, demography, and anthropology, with expertise from the various fields of biomedicine. The OBSSR has made advancing this type of cross-disciplinary research one of its three primary goals. In cooperation with the NIH Institutes and Centers, we have recently issued a Request for Applications (RFA) to fund educational workshops designed to create a larger contingent of scientists who are broadly trained in the methods, procedures, and theoretical perspectives of disciplines outside their own. The goal is not to turn, say, geneticists into psychologists or vice versa, but to provide researchers with sufficient understanding of other fields in order to better foster collaboration across disciplines. We believe this collaborative research will transcend the contributions of single disciplines, and produce entirely new ways of thinking about health.

In recent years, we have made significant advances in the field of mind/body medicine. Let me provide some examples of studies that exemplify the influence of psychological, behavioral, and social processes on all levels of biological functioning and health.

*Asthma.*—For persons suffering from asthma, especially children, the experience of breathlessness is a very traumatic symptom that can lead to panic which may aggravate the symptoms or make the person unable to assess symptoms to determine appropriate treatment, such as whether to use an inhaler or go to the emergency room. Studies funded by the National Heart, Lung, and Blood Institute have shown that stress management training can reduce the fear and anxiety associated with the asthma experience. This has been shown to result in more effective management of asthma attacks and more appropriate use of health services, e.g., fewer visits to the emergency room.

*Breast Cancer.*—Many studies supported by the National Cancer Institute have demonstrated the positive effects of psychosocial group therapy for cancer patients, including improvements in mood, adjustment, and pain. It is also possible that psychotherapy can actually extend one's life, as well as improve its quality. In one study, patients with metastatic breast cancer who received weekly supportive group therapy actually lived an average of 18 months longer than did those who did not participate in the group treatment.

*Coronary Disease.*—Although smoking and hypertension have long been documented as very important risk factors for the development of coronary disease, they do not fully account for the timing and triggering of heart attacks and sudden death. Recent research has shown that the onset of acute coronary syndromes does not occur at random. For example, between 17 percent and 30 percent of heart attacks appear to be triggered by external and behavioral factors. These include emotional stress, strenuous physical exercise, cold weather, cocaine abuse, sexual activity, and anger. Reducing trigger activities can provide protection against heart attack and coronary deaths. Preliminary studies funded by the National Heart, Lung, and Blood Institute suggest that certain cardioprotective interventions, such as those utilizing stress management and aerobic exercise training, show promise in reducing cardiovascular morbidity.

*Touch and Preterm Infant Survival.*—Research funded by the National Institute of Mental Health and the National Institute of Child Health and Human Development has demonstrated the beneficial effects of touch in both animals and humans. When newborn rats are separated from their mothers, they are deprived of tactile stimulation. That deprivation of touch results in a decrease of hormones that are critical for growth and development. When the newborn is returned to its mother and touching resumes, these hormones return to normal levels. Animal research of this type has led to the development of behavioral interventions for human pre-term infants, resulting in improved growth and earlier hospital discharge.



*Personality and Health.*—A number of personality factors have been linked to mortality in several studies. One characteristic, cynical hostility or lack of trust, was found to predict increased rate of death from all causes in several prospective epidemiological studies including a 20-year study of corporate executives; a 25-year study of physicians; and a 25-year study of attorneys. Recently, using data from a 70-year longitudinal study of gifted and talented children, scientists funded by the National Institute of Aging have discovered that participants with childhood personality characteristics of high social dependability or conscientiousness were, as adults, 30 percent less likely to die in a given year than those low on these characteristics. These findings on personality and health could not be explained by differences in traditional disease risk factors among participants.

*Behavior, Experience, and the Brain.*—Several NIH Institutes, including The National Institute of Mental Health, the National Institute of Neurological Diseases and Stroke, the National Institute of Child Health and Human Development and others, have funded research on how behavior and experience may alter brain structure and intellectual functioning. Exposure to relatively enriched, complex, or stimulating environments can produce substantial changes in cellular functioning in the brain. Rats housed in environments with a variety of toys and objects with which to interact have increased brain weight and synapses (connections between brain cells). These findings have been extended to human populations, where intensive preschool interventions have led to demonstrable improvements in later intellectual functioning and lower rates of mental retardation.

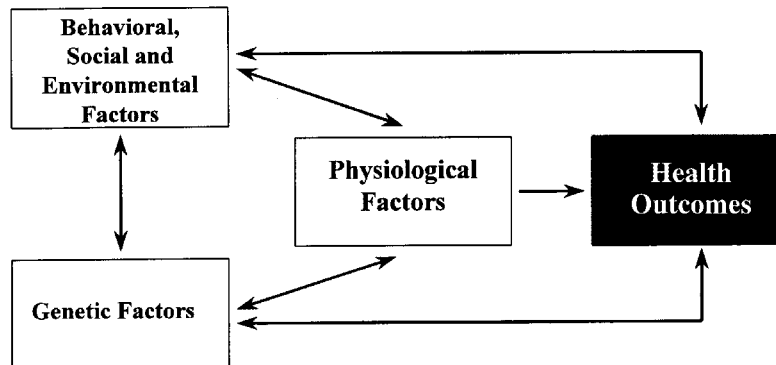
*Chronic Pain.*—Finally, because chronic pain afflicts so many in our society, NIH recently held a consensus conference to evaluate the use of behavioral medicine approaches in combating chronic pain and insomnia. The conference yielded the following conclusions. First, there is strong evidence for the efficacy of relaxation approaches in reducing chronic pain associated with a variety of medical conditions. Second, there is moderately strong evidence for the efficacy of cognitive behavior therapy for chronic pain syndromes. Importantly, the literature indicates that cognitive behavior therapy is superior to placebo and to routine care for alleviating low back pain and pain associated with rheumatoid arthritis and osteoarthritis. Finally, there is strong evidence for the efficacy of combined behavioral medicine treatments (e.g., cognitive therapy, relaxation, biofeedback, or hypnosis) for several categories of pain, including back and neck pain, dental or facial pain, joint pain, and migraine headache.

*Other Advances.*—Behavioral and social treatment and prevention approaches have also been used successfully for problems such as diabetes, arthritis, gastrointestinal problems, violence, depression, and alcohol and drug abuse. I would be happy to answer any questions you have about these areas.

My concluding remarks will briefly address the second question, "What are the implications of mind/body research for both treatment and prevention?" The NIH, and my office in particular, take very seriously the responsibility to ensure that our scientific findings actually reach the people they are intended to benefit. For example, I have organized a special task force to develop a plan for working with health care providers and managed care companies to incorporate scientifically validated behavioral treatment approaches into medical care. As you know, many proven behavioral treatments are not reimbursed by insurance companies. This must change—and I believe it will, as companies become more aware of the cost savings they will accrue by covering behavioral treatments and therapies for conditions ranging from arthritis, diabetes, depression, and recovery from surgery. Furthermore, approximately half of the nation's annual premature deaths can be directly attributed to modifiable risk factors such as tobacco use, unhealthy diet, lack of exercise, alcohol and drug abuse, and risky sexual behavior. These and other behavioral and psychosocial risk factors have been linked to higher ambulatory care and hospitalization costs, with preventable illness accounting for as much as 70 percent of all medical care spending.

Thank you again for your interest in mind/body approaches to health and healing, and for convening this hearing. I look forward to any additional questions you might have.

**Figure 1. Factors Affecting Health**



NATIONAL INSTITUTES OF HEALTH FOR BEHAVIORAL AND SOCIAL SCIENCES RESEARCH

Senator SPECTER. Thank you very much, Dr. Anderson.  
I note that you are the first Associate Director of the National Institutes of Health for Behavioral and Social Sciences Research?

Dr. ANDERSON. Yes.

Senator SPECTER. Did this unit come into existence in 1993?

Dr. ANDERSON. No; the legislation was passed in 1993. The office officially opened in 1995.

Senator SPECTER. I see. What took so long?

Dr. ANDERSON. I am not really sure. I was at Duke at the time and was recruited to this position by the NIH.

Senator SPECTER. And you are an associate professor in the Departments of Psychiatry, Psychology, Social and Health Sciences at Duke University?

Dr. ANDERSON. Yes.

Senator SPECTER. And you have done extensive work on the issue of high blood pressure in African-Americans.

Dr. ANDERSON. Yes.

Senator SPECTER. Well, thank you very much. I am going to reserve the questions until we have heard from our full panel of witnesses.

**STATEMENT OF HERBERT BENSON, M.D., PRESIDENT, MIND/BODY MEDICAL INSTITUTE**

Senator SPECTER. We turn now to Dr. Herbert Benson who is a foremost expert in this field, founding president of the Mind/Body Medical Institute, and associate professor of medicine at Harvard Medical School, and chief of the division of behavioral medicine at the Beth Israel Deaconess Medical Center. Dr. Benson is a pioneer in the field of behavioral medicine and mind/body studies, as well as spiritual healing, a graduate of Wesleyan, University of Harvard

Medical School, author or coauthor of over 150 scientific publications and 6 books. We welcome you here, Dr. Benson, and look forward to your testimony.

Dr. BENSON. Thank you, Senator. Mr. Chairman, I am delighted to have this opportunity to testify before this committee today.

A study, published this month, predicted that spending on health care is likely to double to \$2.1 trillion by the year 2007. Imaginative and responsible approaches to health care are needed. I propose that mind/body medicine with its self-care approaches holds great promise for the Nation's health and costs of health care.

My testimony will be evidence-based. The data I will present will be scientific findings that have been published in peer-reviewed journals. Some of these data were evaluated and supported at a 1995 NIH technology assessment conference.

Consider for a moment that I were here today discussing a new drug and the scientific evidence indicated that this new drug could successfully treat a very wide variety of prevalent medical disorders, conditions that lead to 60 to 90 percent of visits to doctors. Furthermore, consider that this new drug was safe and without dangerous side effects. It could also prevent these conditions from occurring and recurring. And, consider this new drug was demonstrated to decrease visits to doctors by as much as 50 percent and that this decrease could lead to annual cost savings of more than \$54 billion. The discovery of such a drug would be front-page news and immediately embraced. Such scientifically validated mind/body therapies have been shown to produce such clinical and economic benefits, but as yet have not been so received.

Why, given results such as these, have mind/body self-care therapies, such as the relaxation response, and those related to beliefs of patients not been more effectively integrated into mainstream medicine? Barriers to integration include: one, the lack of knowledge of the existing scientific data among health care providers, researchers in other fields, among patients, and among policymakers in Government and private industry; two, a bias against mind/body interventions in medical care as being soft science; three, inadequate insurance payments for these treatments; and four, a bias against shifting away from the overwhelming use of pharmaceuticals and surgeries and procedures.

One way to overcome these barriers is the establishment of mind/body medical centers. They will make the benefits of mind/body medicine, specifically those of the relaxation response, and those related to utilizing the beliefs of patients more visible. Mind/body medical centers would also markedly expand the hard science of mind/body interventions. It could be argued that NIH already has mechanisms in place to review mind/body proposals and some might ask, why the need for the new centers? NIH study sections do, indeed, skillfully assess and perform reviews of quite circumscribed research. Unfortunately, a striking paucity of study sections are equipped to adequately review proposals that investigate the simultaneously occurring, multiple mind/body linkages that involve human physicochemistry, biology, psychology, social behavior, and belief-related phenomena such as spirituality. Mind/body centers, under the aegis of the Office of Behavioral and Social Sciences Research at NIH, would be a meaningful step toward overcoming

narrowly focused, exclusively reductionistic research. Understanding the interrelatedness of different systems should be carried out in already existing organizations that are experienced in mind/body research and treatments. It might be advisable to encourage the centers to work collaboratively together. The centers would also teach and train health care professionals in mind/body approaches and treatments. Finally, these NIH supported centers could markedly expand the cost effectiveness of mind/body interventions and provide data for new reimbursement strategies for Medicare and Medicaid, as well as for private insurers.

PREPARED STATEMENT

The full integration of mind/body, self-care medicine is completely compatible with existing health care approaches. The integration is important not only for better health and well-being, but also for a more economically feasible health care system. Mind/body medicine responsibly fulfills the needs of our people who want therapies that enhance and complement traditional medicine and that do so in a scientifically established safe and cost savings fashion. Mind/body medicine holds such promise that it should be further researched, advocated, and utilized for the health and well-being of the people of our Nation.

Thank you.

Senator SPECTER. Thank you very much, Dr. Benson. As I say, we will defer the questions until we have heard from Dr. Koenig as well.

[The statement follows:]

PREPARED STATEMENT OF HERBERT BENSON

I'm delighted to be called to testify on mind/body medical interactions and their potential clinical applications.

Before I start my testimony, let me say a few words about the Mind/Body Medical Institute and the work I have been doing at the Harvard Medical School and its affiliated hospitals for the last thirty years. The Mind/Body Medical Institute is dedicated to performing research and to conducting teaching and training of health care professionals in mind/body and behavioral medicine approaches and transmitting this information to the general public. It is now just finishing its first ten years of existence. I myself occupy the Mind/Body Medical Institute Chair at the Harvard Medical School as an associate professor of medicine.

A study, published this month, projected that spending on healthcare is likely to double to \$2.1 trillion by the year 2007 (Smith et al., 1998). That's a trillion dollars more than we are spending now. According to this report, managed care savings have about run their course. What's driving this surge in costs? According to the report, it is expensive prescription drugs, enthusiasm for new medical technology and greater freedom to visit medical specialists whenever patients desire to do so. Imaginative and responsible approaches to healthcare are needed. I propose that mind/body medicine with its self-care approaches holds great promise for the nation's health and cost of healthcare (Friedman, et al., 1995).

My testimony will be evidence-based; the data I will present will be scientific findings that have been published in peer-reviewed journals. Some of these data were evaluated and supported at a 1995 NIH Technology Assessment Conference.

I will cover the following categories: stress and the fight-or-flight response; the relaxation response; the placebo effect and the importance of belief in healing; the three-legged stool and the importance of self-care; and the proper use of mind/body therapies and the creation of mind/body medical centers.

Stress contributes to many of the medical conditions confronted by healthcare practitioners. In fact, when the reasons for patients' visits to physicians are examined, between 60 to 90 percent of visits to physicians are related to stress and other psychosocial factors (Cummings, VandenBos, 1981; Kroenke, Mangelsdorff, 1989). Current pharmaceutical and surgical approaches cannot adequately treat stress-re-

lated illness. Mind/body approaches including the relaxation response, nutrition and exercise, and the beliefs of patients have been demonstrated to successfully treat stress-related disorders. To better understand mind/body treatments it is best to first understand the physiology of the stress and the fight-or-flight response.

#### STRESS AND THE FIGHT-OR-FLIGHT RESPONSE

Stress is defined as the perception of threat or danger that requires behavioral change. It results in increased metabolism, increased heart rate, increased blood pressure, increased rate of breathing and increased blood flow to the muscles. These internal physiologic changes prepare us to fight or run away and thus the stress reaction has been named the "fight-or-flight" response. The fight-or-flight response was first described by the Harvard physiologist, Dr. Walter B. Cannon (1941) earlier in this century. It is mediated by increased release of catecholamines—epinephrine and norepinephrine (adrenalin and noradrenalin)—into the blood stream.

#### THE RELAXATION RESPONSE

Building on the work of Swiss Nobel laureate Dr. Walter R. Hess, my colleagues and I more than 25 years ago described a physiological response that is the opposite of the fight-or-flight response. It results in decreased metabolism, decreased heart rate, decreased blood pressure, and decreased rate of breathing, as well as slower brain waves (Wallace, Benson, Wilson, 1971). We labeled this reaction the "relaxation response" (Benson, Beary, Carol, 1974).

The fight-or-flight response occurs automatically when one experiences stress, without requiring the use of a technique. In contrast, two steps are usually required to elicit the relaxation response. They are: (1) the repetition of a word, sound, prayer, phrase or muscular activity and (2) when other, everyday thoughts intrude, there is a passive return to the repetition (Benson, 1975; Hoffman, et al, 1982). Many different methods can be used to bring forth the relaxation response including: progressive muscle relaxation, meditation, autogenic training, yoga, and repetitive physical exercise. In addition, many forms of prayer can also be used. These include repetitive prayers such as the rosary as in the Catholic tradition, centering prayers in Protestant religions and pre-davening prayers in Judaism. The specific method used usually reflects the beliefs of the person eliciting the relaxation response (Benson, 1984). The method may be secular or religious, and performed either at rest or during exercise.

Our research conducted at the Harvard Medical School and that of others has documented that relaxation-response based approaches generally used in combination with nutrition, exercise, and stress management interventions result in alleviation of many stress-related medical disorders. In fact, to the extent that stress causes or exacerbates any condition, mind/body approaches that invariably include the relaxation response have proven to be effective. Because of this scientifically-documented efficacy, a physiological basis for many millennia-old mind/body approaches has been established and has overcome a great deal of initial professional skepticism.

It is essential to understand that regular elicitation of the relaxation response results in long-term physiologic changes that counteract the harmful effects of stress throughout the day, not only when the relaxation response is being brought forth (Hoffman, et al, 1982). These mind/body approaches have been reported to be effective in the treatment of hypertension (Stuart, et al, 1987), cardiac arrhythmias (Benson, Alexander, Feldman, 1975), chronic pain (Caudill, et al., 1991), insomnia (Jacobs, et al, 1993; Jacobs et al, 1996), anxiety and mild and moderate depression (Benson et al., 1978), premenstrual syndrome (Goodale, Domar, Benson, 1990), and infertility (Domar, Seibel, Benson, 1990).

As a result of the evidence-based data, the relaxation response is becoming a part of mainstream medicine. Approximately 60 percent of U.S. medical schools now teach the therapeutic use of relaxation-response techniques (Friedman, Zuttermeister, Benson, 1993). They are recommended therapy in standard medical textbooks and a majority of family practitioners now use them in their practices.

#### THE PLACEBO EFFECT AND THE IMPORTANCE OF BELIEF IN HEALING

The importance of mind/body interactions in healing is also profoundly evidenced by the placebo effect. Throughout history, medicine and healing has relied heavily on non-specific factors such as the placebo effect (Benson, Friedman, 1996). In other words, what patients believe, think and feel has profound effects on the body. Physicians and other healers have historically appreciated the effects of both positive and negative emotions. However, modern medicine has largely disregarded and ridiculed the importance of mind/body interactions such as the placebo effect by using such

statements as, "It's all in your head," "It's just the placebo effect," or "It's a dummy pill." These pejorative terms arose gradually over a period of decades as specific remedies for specific illnesses were developed and the reliance on what is now called non-specific healing factors—the placebo effect—diminished. Because the specific therapies were and are, so dramatically effective, they became the sole treatments utilized. Specific treatments such as insulin, antibiotics and cataract surgery are truly awe-inspiring. The result was that mind/body approaches were largely forgotten and pushed aside as the wondrous modern pharmaceuticals and surgeries and procedures advanced. Rather than using a combination of specific and belief-related therapies to promote healing, modern medicine has come to value and to rely exclusively on the specific effects of pharmacological and procedural interventions. It ignores the healing powers of beliefs.

The pioneering work of Beecher (1955), established that in patients with conditions of pain, cough, drug-induced mood changes, headaches, seasickness, and the common cold, the placebo effect was effective in 35 percent of the cases. Since these early findings, the placebo effect has been documented to be effective in 50 to 90 percent of diseases that include bronchial asthma, duodenal ulcer, angina pectoris, and herpes simplex (Benson, Friedman, 1996; Benson, 1996).

The placebo effect is dependent on three sets of beliefs: (1) the beliefs of the patient; (2) the beliefs of the healthcare provider (the healer); and (3) the beliefs that ensue from the relationship between the healthcare provider and the patient.

A study of Japanese students who were allergic to the wax of a lacquer tree, which produces a rash similar to that of poison ivy, provides one demonstration of the power of the belief of patient (Ikemi, Nakagawa, 1962). The students were first blindfolded and then told that one of their arms would be stroked with lacquer tree leaves, and that their other arm would be stroked with chestnut tree leaves, to which they were not allergic. However, the researchers switched the leaves. The skin that the subjects believed to have been brushed with the lacquer leaves, but that was actually stroked with chestnut tree leaves, developed a rash. The skin that had actual contact with the leaves of the lacquer tree, but that was believed to have been stroked with the chestnut tree leaves, did not react.

A study of treatments for angina pectoris provides an example of how beliefs of the healthcare practitioner can effect disease (Benson, McCallie, 1979). A number of therapies for angina pectoris have been used throughout the decades that are now known to have no therapeutic value. These include cobra venom, vitamin E and bizarre internal mammary artery surgeries. When they were used and believed in by physicians, they had a dramatic effect. They were found to be 70 to 90 percent effective in relieving the pain of angina pectoris. Not only would the pain disappear, but the patients' electrocardiograms and exercise tolerance would improve. However, when these therapies were later invalidated and no longer believed in by physicians, their effectiveness dropped to 30 percent or lower.

The beliefs that ensue from the relationship between physicians and patients are the third component of the placebo effect. A study by researchers at the Massachusetts General Hospital (Egbert, et al, 1964) compared two matched groups of patients who were to undergo similar operations. The doctors responsible for their anesthesia visited both groups of patients, but interacted with them quite differently. They made only cursory remarks to patients in one group, but treated the other group with warm and sympathetic attention, detailing the steps of the operation and describing the pain they would experience. The patients who received the friendlier more supportive visits were discharged from the hospital an average of 2.7 days sooner and asked for half the amount of pain-alleviating medication than patients in the other group.

Some insight into the possible brain mechanisms for the placebo effect is provided in a study conducted by Dr. Steven Kosslyn (Kosslyn, et al., 1993). He and his colleagues examined how the brain processes information, both real and imagined. Subjects were asked to look at a grid with a letter printed on it. As they did so, a PET Scan was used to determine what areas of the brain were active in seeing the grid and the letter. The subjects were then asked to look at the same grid without the letter on it, but asked to visualize the letter in their mind's eye. The PET scan was then repeated. The same area of the brain was stimulated in both situations. In other words, from the brain's perspective the visualization of a scene is similar to actually seeing the scene. This process helps to explain the placebo effect. All of our thoughts, actions, and memories, represent the activation of specific brain connections. Pain in an arm or leg is represented as activation of specific brain areas. There are memories in our brains of pain. There are also memories of being without pains. There are also brain connections for having a skin rash and of being without a skin rash. Thus, belief in a sugar pill or an inactive therapy can result in activating the brain connections to "remember" what it is to be without the pain

or the rash. The pain or rash can be thus alleviated. In other words, thoughts can activate brain connections that can result in physical healing.

The biased words “placebo effect” probably should be discarded and changed to “remembered wellness.” Remembered wellness is what explains this powerful mind/body reaction and the words, remembered wellness, have a positive connotation.

Placebos are not the only way to evoke remembered wellness. Consider the most profound belief Americans share. Ninety five percent of the U.S. population believe in God (Gallup, 1990). Research by different investigators working in different locations throughout the United States have repeatedly demonstrated a connection amongst religious beliefs and greater well-being, better quality of life, and lower rates of depression, anxiety and substance abuse (Koenig, 1998). Religious beliefs and practices have been associated with enhanced physical health (Koenig et al, 1997; 1998). They are also associated with a lower use of expensive health services (Koenig, Larson, in press). Recently, such research has appeared in respected medical journals and has begun to influence both the education of physicians and the practice of medicine (Marwick, 1995; Levin et al., 1997).

The effects of the relaxation response should not be confused with remembered wellness (the placebo effect). The relaxation response is a proven, specific mind/body intervention. The measurable, predictable, and reproducible changes of the relaxation response will occur when you follow the two specific steps—belief is not essential. It is like penicillin—it will work whether or not you believe in it.

#### THE THREE-LEGGED STOOL AND THE IMPORTANCE OF SELF-CARE

Health and well being and the incorporation of mind/body therapies in medical care are best conceptualized in terms of an analogy of a three-legged stool (Benson, Friedman, 1996; Benson, 1996). One leg is pharmaceuticals, the second is surgery and procedures, and the third leg is self-care. Self-care consists of health habits and behaviors for which patients themselves can be responsible. Specifically, self-care includes the relaxation response, beliefs that promote health, stress management, nutrition and exercise. Health and well-being are balanced and optimal when all three legs of the stool are in place. Of course, attention to nutrition and exercise have been recognized for centuries. In contrast, the scientific documentation of mind/body interactions has only recently been presented.

For more than a hundred years medicine has relied almost exclusively on the first two legs of the stool: pharmaceuticals and surgery. Without the support of the third leg through mind/body and behavioral approaches, the treatment of many medical conditions is imbalanced and inadequate. Patients receive less than optimal clinical care and the care they receive is more costly.

As I noted earlier, if medical care continues to be based only on two legs, it is estimated that the costs for this care will double in the next decade (Smith et al, 1998). Mind/body therapies are scientifically-proven strategies that can be thoroughly integrated with pharmaceuticals and surgery and procedures and they offer cost savings. I've also noted that 60 to 90 percent of physician office visits are related to stress-related conditions. To estimate the monies that could be saved per year by the application of mind/body therapies, I used 75 percent as an average. I estimated that half of these doctor office visits—or 37.5 percent—could be eliminated with a greater emphasis on mind/body health. Using 1994 statistics, there were approximately 670,000 practicing physicians in the United States who reported an average of 74.2 patient visits per doctor per week, for a total of 3,858.4 office visits per doctor that year. Each visit for an established patient cost an average of \$56.2. Thus, the average cost per year was  $670,000 \times 3,858.4 \times \$56.2 = \$145.3$  billion. By reducing these visits by 37.5 percent, the cost savings would be \$54.5 billion dollars, for one year alone (Benson, 1996).

One example of how mind/body, behavioral interventions can reduce costs was shown through a study conducted at the Harvard Community Health Plan (Hellman, et al, 1990). Two group mind/body interventions were compared among high-utilizing primary care patients who experienced physical symptoms which had psychosocial components. The symptoms included: palpitations, shortness of breath, gastrointestinal complaints, headaches, and sleeplessness. Both interventions offered patients educational materials, relaxation-response training, and awareness training, and both included cognitive restructuring. These groups were compared with a randomized control group that received only information about stress management. Six months after treatment only the patients in the mind/body groups reported less physical and psychological discomfort and averaged about 50 percent fewer visits to the health plan than the patients in the control group. The estimated net savings to the HMO above the cost of the intervention for the behavioral medicine patients was \$85 per participant in the first 6 months.

Chronic pain and insomnia are two other examples of the successful integration into mainstream medicine of mind/body interventions (NIH Technology Assessment Panel on Integration of Behavioral and Relaxation Approaches Into the Treatment of Chronic Pain and Insomnia, 1996).

Millions of Americans are in chronic pain, which by definition, is pain that cannot be eliminated, but must be managed. Chronic pain sufferers, motivated both by medical and emotional factors, often become frequent users of the medical system. The treatment of chronic pain becomes extremely costly and frustrating for patients and healthcare providers. In one study, clinic usage was assessed among chronic pain patients at an HMO who participated in an outpatient behavioral medicine program, of which the relaxation response is an integral part (Caudill, et al., 1991). In addition to decreases in the severity of pain as well as in anxiety, depression and anger, there was a 36 percent reduction in clinic visits for over two years in the patients who participated in the behavioral medicine program as compared to their clinic usage prior to the intervention. In the 109 patients studied, the decreased visits projected to an estimated net savings of \$12,000 for the first year following treatment and \$24,000 for the second year.

Another example of how these same mind/body interventions can result in better medical care and reduce medical costs is in the treatment of another extremely common disorder, insomnia (NIH Technology Assessment Panel on Integration of Behavioral and Relaxation Approaches Into the Treatment of chronic Pain and Insomnia, 1996). Approximately 35 percent of the adult population experiences insomnia. Half of these insomniacs consider it a serious problem. Billions of dollars are spent each year on sleeping medications, making insomnia an extremely expensive condition. In fact, the direct costs to the nation are approximately \$15.4 billion yearly and the actual costs in terms of reduced quality of life, lowered productivity and increased morbidity are astronomical. Although frequently employed, sleeping pills are not effective in the long term.

The shortcomings of such drug therapy, along with recognition of the role of behavioral features of insomnia, prompted the development of mind/body behavioral interventions for this condition. Researchers at our laboratories at the Mind/Body Medical Institute studied the efficacy of a multifactor behavioral intervention for insomnia that included relaxation-response training. Compared to controls, those subjects who received behavioral and relaxation-response treatment showed significantly more improvement in sleep patterns. On average, before treatment it took patients 78 minutes to fall asleep. After treatment, it took 19 minutes. Patients who received behavioral and relaxation response treatment became indistinguishable from normal sleepers. In fact, the 75 percent reduction in sleep-onset latency observed in the treated group is the highest ever reported in the literature (Jacobs, G.D. et al, 1993; Jacobs, Benson, Friedman, 1996).

It is also important to remember that the research on mind/body, behavioral therapies in the treatment of both chronic pain and insomnia were reviewed in 1995 at a NIH Technology and Assessment Conference. The planning committee chairman was my late friend and colleague Dr. Richard Friedman. Dr. Julius Richmond, former Surgeon General of the United States Public Health Service and Assistant Secretary for Health of the Department of Health and Human Services under President Carter, was the chair of the independent panel (before he became a trustee of the Mind/Body Medical Institute) that reviewed the evidence. Dr. Richmond stated in a press conference that it was "imperative" that these interventions be integrated into routine medical care.

#### THE PROPER USE OF MIND/BODY THERAPIES AND THE CREATION OF MIND/BODY MEDICAL CENTERS

Consider for a moment that I were here today discussing a new drug and the scientific evidence indicated that this new drug could successfully treat a very wide variety of prevalent medical conditions—conditions that lead to 60 to 90 percent of visits to physicians. Furthermore, consider that this new drug was safe and without dangerous side effects. It could also prevent these conditions from occurring and recurring. And, consider that the new drug was demonstrated to decrease visits to doctors by as much as 50 percent and that this decrease could lead to annual cost savings of more than \$54 billion (Benson, 1996). The discovery of such a drug would be front page news and immediately embraced. Such scientifically-validated mind/body therapies have been shown to produce such clinical and economic benefits, but as yet have not been so received.

Why, given results such as these, have mind/body therapies such as the relaxation response and those related to the beliefs of patients not been more effectively integrated into mainstream medicine? Barriers to integration include: (1) the lack of



knowledge of the existing scientific data among healthcare providers, researchers in other fields, among patients and among policy makers in government and private industry; (2) a bias against mind/body interventions in medical care as being "soft" science; (3) inadequate insurance payments for these treatments; and (4) a bias against shifting away from the overwhelming use of pharmaceuticals as well as surgeries and procedures.

One way to overcome these barriers is the establishment of mind/body medical centers. They will make the benefits of mind/body medicine, specifically those of the relaxation response and those related to utilizing the beliefs of patients more visible. Mind/body medical centers would also markedly expand the "hard" science base of mind/body interventions. It could be argued that NIH already has mechanisms in place to review mind/body proposals and some might ask, Why then the need for new centers? NIH study sections do skillfully assess and perform reviews of quite circumscribed research. Unfortunately, a striking paucity of study sections are equipped to adequately review proposals that investigate the simultaneously occurring multiple, mind/body linkages that involve human physicochemistry, biology, psychology, social behavior, and belief-related phenomena such as spirituality. Mind/body medical centers under the aegis of the Office of Behavioral and Social Sciences Research of NIH would be a meaningful step toward overcoming narrowly-focused, exclusively reductionistic research. Understanding the inter-relatedness of different systems should be carried out in already existing organizations that are experienced in mind/body research and treatments. It might be advisable to encourage the new centers to work collaboratively on joint projects. The centers would also teach and train healthcare professionals in mind/body approaches and promote responsible education to the public about mind/body mechanisms and treatments. Finally, these NIH supported centers could markedly expand studies of the cost effectiveness of mind/body interventions and provide data for new reimbursement strategies for Medicare and Medicaid as well as for private insurers.

The full integration of mind/body, self-care medicine is completely compatible with existing healthcare approaches. The integration is important not only for better health and well-being, but also for a more economically-feasible healthcare system. Mind/body medicine responsibly fulfills the needs of our people who want therapies that enhance and complement traditional medicine and that do so in a scientifically-established, safe, and cost-savings fashion. Mind/body medicine holds such promise that it should be further researched, advocated and utilized for the health and well-being of the people of our nation.

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**STATEMENT OF HAROLD G. KOENIG, M.D., DIRECTOR, CENTER FOR  
THE STUDY OF RELIGION/SPIRITUALITY AND HEALTH, DUKE  
UNIVERSITY MEDICAL CENTER**

Senator SPECTER. Dr. Harold Koenig is the director and founder of the Center for the Study of Religion, Spirituality and Health at Duke Medical Center. His areas of research include depression in the medically ill elderly, religion, aging and health, ethical issues, and geriatric psychiatry. Dr. Koenig received his undergraduate degree from Stanford, continued his education at the University of California at San Francisco, and furthered his medical education in geriatric medicine, psychiatry, and biostatistics at Duke University Medical Center. Welcome, Dr. Koenig, and the floor is yours.

**PSYCHOLOGICAL AND SOCIAL STRESS**

Dr. KOENIG. Thank you, Senator.

As Dr. Anderson and Dr. Benson have already spoken to, there is an increasing amount of scientific evidence that is establishing the link between psychological and social stress and a host of disabling and serious medical illnesses, particularly heart disease and cancer which are the major killers of Americans today. Traditional medical and surgical treatments typically do not include mind/body medicine approaches that could empower and motivate patients toward self-care, prevent illness, speed recovery, and reduce the costs of health care that are quickly spiraling out of control.

Patients have become accustomed to relying on medical and surgical approaches to their illnesses rather than focusing on things that they can do to improve their health or prevent health conditions from occurring, and physicians have become accustomed to treating sick people like broken down cars, simply fix them and then send them out. Patients and physicians need to be educated about and encouraged to participate in self-care activities that help to maintain their wellness, speed recovery, and prevent disease.

Now, the relaxation response and ways of eliciting it, like repetitive prayer, is easily taught and widely acceptable to Americans throughout the country. These techniques have been shown to enhance well-being by alleviating and reducing anxiety, pain, stress, and preventing substance abuse and alcoholism and drug use. Consequently, given the relationship between psychological stress and physical illness, we would expect that these techniques would reduce blood pressure, enhance coronary functioning, reduce coronary artery ischemia, lower the risk of cancer, and perhaps even increase immune system functioning.

Likewise, certain beliefs have been associated with greater well-being and better physical health. Let us just take for an example religious or spiritual beliefs. Now, they could be beliefs really in anything, beliefs in your doctor or beliefs in a pill, but as an example we will take religious and spiritual beliefs because they are so prevalent in society.

These have been associated with reduction of acute stress, prevention of depression, faster recovery from depression, faster adaptation to chronic stress, and prevention and treatment of drug and alcohol addiction. This has been shown by multiple different research groups located in many different areas of the country.

Likewise, because of this mind/body connection, we would expect that perhaps religious beliefs and practices might be associated with better health, and indeed they have been found to be connected with a lower risk of coronary heart disease, lower blood pressure, enhanced recovery from open heart surgery, prevention of cancer, promotion of positive health behaviors, and enhancement of immune system functioning, and actually extension of overall survival.

Finally, religious beliefs and practices are associated with quicker recovery from disabling illnesses like hip fracture and stroke, and they can also help to prevent costly disability in people that is causing a great increase naturally in the costs of health care.

Now, again these religious beliefs and practices appear to also directly reduce the amount of acute hospital use which is the most costly form of health care. Indeed, we have found that again these beliefs seem to actually shorten the hospital stay of significantly ill older patients.

#### PREPARED STATEMENT

Now, mind/body centers will be equipped with sufficient expertise to develop this new area in a way that NIH's typical programs simply cannot do. Only centers with a critical mass of investigators and core infrastructure can launch the ambitious and multi-disciplinary projects that are necessary to advance this field. Centers are also the best way of disseminating the research findings to the public and to clinicians and to rapidly moving these research findings into practical applications.

Thank you.

[The statement follows:]

#### PREPARED STATEMENT OF HAROLD G. KOENIG

##### THE EFFECTS OF STRESS, RELAXATION, AND BELIEF ON HEALTH AND HEALTHCARE COSTS

Thank you for inviting me to speak on this fascinating topic of mind-body medicine and the usefulness of establishing mind-body medicine centers to focus research and training in this area. I am a physician boarded in geriatric medicine and geriatric psychiatry, serve on the Duke University Medical Center faculty as an associate professor of psychiatry, and direct Duke's Center for the Study of Religion/Spirituality and Health. For the past 15 years, our center scientists (now 8 in number) have investigated the effects of religious belief and practice on health, conducting over 50 research projects and publishing several hundred scientific papers. In my talk, I hope to accomplish four goals: (1) Provide further evidence for a link between Stress and physical health; (2) Examine the effects of the Relaxation Response on specific health problems; (3) Explore the effects of Belief on health and well-being; and (4) Demonstrate how mind-body practices may, through Relaxation Response related therapies and Belief, reduce health care Costs.

##### A LINK BETWEEN STRESS AND PHYSICAL HEALTH

Mounting research is demonstrating that psychological stress negatively impacts physical health, and that mind-body medicine approaches are effective in relieving stress and counteracting its negative health effects. Below, Bruce McEwen reviews this research and Janice Kiecolt-Glaser provides a fascinating example that illustrates the effects of stress on wound healing.

McEwen, B.S., and Stellar, E. (1993). Stress and the individual mechanisms leading to disease. *Archives of Internal Medicine*, 153, 2093-2101. Examines diseases associated with stress, including asthma, diabetes, gastrointestinal disorders, myocardial infarction, hypertension, cancer, viral infections, and autoimmunity; dis-

cusses mechanisms, including neurochemistry (serotonin) and immunology (natural killer cell activity and cancer). See recent update in: McEwen, B.S. (1998). Protective and damaging effects of stress mediators. *New England Journal of Medicine*, 338, 171–179.

Kiecolt-Glaser, J.K., Marucha, P.T., Malarkey, W.B., Mercado, A.M., and Glaser, R. (1996). Slowing of wound healing by psychological stress. *Lancet*, 346(8984): 1194–1196. Thirteen women (mean age 62) caring for demented relatives (high stress) were compared with 13 controls matched for age (60 yo) and family income. All subjects underwent a 3.5 mm punch biopsy. Healing was assessed by photography of wound and response to hydrogen peroxide (healing defined as no foaming). Wounds in stressed caregivers took significantly longer to heal (48.7 vs 39.3 days,  $p < .05$ ). Furthermore, peripheral blood leukocytes (white blood cells) of caregivers produced significantly less interleukin-1 beta mRNA in response to lipopolysaccharide stimulation (suggesting impaired functioning).

If psychological stress adversely affects the cardiovascular and immune systems, then perhaps cognitive (beliefs and attitudes) and behavioral interventions may help decrease this effect.

#### THE RELAXATION RESPONSE

Below I review studies of the relaxation response (and methods of eliciting it) on well-being and physical health.

##### *Well-being*

Studies have shown that the Relaxation Response, and the many methods of eliciting it (such as repetitive prayer), help to relieve stress, chronic pain, and negative mental health states like anxiety disorder and drug and alcohol abuse. What are the nature of these studies?

##### *Reducing Anxiety*

Kabat-Zinn, J., Massion, A.O., Kristeller, J., Peterson, L.G., Fletcher, K.E., Pbert, L., Lenderking, W.R., and Santorelli, S.F. (1992). Effectiveness of a meditation-based stress reduction program in the treatment of anxiety disorders. *American Journal of Psychiatry*, 149, 936–943. Study of 22 patients referred for meditation and relaxation program who had generalized anxiety disorder or panic disorder (ages 26–65, 17 women). The intervention consisted of a 8-week long course involving weekly 2-hour classes and a 7.5 hour intensive meditation retreat session in week six. Subjects were assessed at the start and end of intervention and at monthly intervals for 3 months after treatment. A significant reduction in symptoms of anxiety and depression was identified during treatment and maintained for at least 3 months after treatment ended. The authors indicated that a 3-year follow-up showed that 18/22 subjects maintained these beneficial effects.

Azhar, M.Z., Varma, S.L., and Dharap, A.S. (1994). Religious psychotherapy in anxiety disorder patients. *Acta Psychiatrica Scandinavica*, 90, 1–3. Investigators randomized 62 Muslim patients with generalized anxiety disorder to either traditional treatment (supportive psychotherapy and anxiolytic drugs) or traditional treatment plus religious psychotherapy. Religious psychotherapy involved use of prayer and reading verses of the Holy Koran specific to the person's situation. Patients receiving religious psychotherapy experienced more rapid improvement in anxiety symptoms than those receiving traditional therapy.

##### *Reducing Chronic Pain*

Kabat-Zinn, J., Lipworth, L., and Burney, R. (1985). The clinical use of mindfulness meditation for the self-regulation of chronic pain. *Journal of Behavioral Medicine*, 8, 163–190. Investigators compared patients in two hospital clinics involving. One hospital clinic treated patients using "mindfulness meditation"; 90 chronic pain patients received 10 weeks of a Stress-Reduction and Relaxation Program (SSRP). In these patients, investigators found statistically significant reductions in pain symptoms, mood disturbance, and psychological symptoms. Pain-related drug utilization also decreased and self-esteem increased. Improvement was independent of sex, source of referral or type of pain. A comparison group of patients in the other hospital pain clinic ( $n=21$ ) and referrals to the SSRP from the pain clinic ( $n=21$ ) did not show similar improvement after traditional treatment protocols. At follow-up, improvements were maintained for 15 months for all measures except one measure of pain; the majority of subjects reported high compliance with daily meditation.

##### *Preventing and Treating Substance Abuse*

Gelderloos, P., Walton, K.G., Orme-Johnson, D.W., and Alexander, C.N. (1991). Effectiveness of the transcendental meditation program in preventing and treating

substance misuse: A Review. *International Journal of the Addictions*, 26, 293–325. These investigators reviewed 24 studies on the benefits of Transcendental Meditation in treating and preventing substance abuse. They concluded from this review that “all studies showed positive effects of the TM program.” Only two studies, however, used longitudinal experimental designs with random assignment of subjects. Myers and Eisner (1974) randomly assigned young male students from a community college (selected from a large pool of volunteers). Sixty were assigned to TM, 60 to karate, and 60 to a no-treatment control group. After 4 months, investigators compared groups on use of marijuana, psychedelics, uppers, downers, and hard drugs. There was a significant drop in one or more categories of substance abuse in TM participants relative to controls. The second study (Bounouar 1989), examined 925 TM participants and 6,145 controls who attended an introductory lecture on TM. Subjects were followed for 20 months, examining tobacco consumption levels. Over 80 percent of those who meditated twice a day quit or decreased smoking after 20 months vs. 55 percent of irregular meditators and 33 percent of controls ( $p < .0001$ ). Also see Alexander, C.N., et al (1994). Treating and preventing alcohol, nicotine, and drug abuse through transcendental meditation: A review and meta-analysis. *Alcoholism Treatment Quarterly*, 11(1/2), 13–87.

#### *Physical Health*

Because mind body-medicine techniques help to reduce stress and anxiety, they also have a direct impact on stress-related physical illnesses like cardiovascular disease and cancer, the No. 1 and No. 2 killers of Americans.

#### *Reducing Blood Pressure*

Benson, H. (1977). Systemic hypertension and the relaxation response. *New England Journal of Medicine*, 296, 1152–1156. This article reviews research on the relaxation response and blood pressure (BP). In one of the studies reviewed, subjects were taught to elicit the relaxation response by meditating for 20 minutes twice/day. After two weeks, BPs were measured every two weeks for 6 months (BP's never measured after meditation). Among meditating subjects, there was an average drop in systolic BP (SBP) during 6 months of 7 mmHG lower than at baseline and diastolic BP (DBP) was 4 mmHG lower than at baseline. Subjects served as their own controls, with a 6-week run-in period when no BP changes were observed before start of study. For subjects who “chose to stop meditation,” both SBP and DBP returned to initial high levels within 4 weeks of the end of the study. This review also discusses one study (published in 1973 in *Lancet*) that showed Yoga combined with biofeedback reduced SBP by 20 mmHG and DBP by 14 mmHG in hypertensive patients treated with antihypertensive medication, compared with no statistically significant change in a matched control group. A third study using a control group and Buddhist meditation reported reductions of 15 mm SBP and 10 mm DBP in patients with hypertension (*NEJM*, 1976). Other studies have also shown significant decreases in both SBP and DBP with the relaxation response in normotensive working populations.

Chesney, M.A., Agras, S., Benson, H., Blumenthal, J.A., Engel, B.T., Foreyt, J.P., Kaufmann, P.G., Levenson, R.M., Pickering, T.G., Randall, W.C., Schwartz, P.J. (1987). Task Force 5: Nonpharmacologic approaches to the treatment of hypertension. *Circulation*, 76 (Suppl I), 104–109. This is a more recent review of the literature. Authors conclude that since 20 million people in the U.S. alone have mild hypertension (HTN) and drug treatments for HTN have many potential negative side-effects, non-pharmacological treatments “must be explored vigorously” (p 104). Suggests that for the standard care of hypertensive individuals that “Relaxation-based treatments should also be given early consideration in light of the evidence of their efficacy” (p 105).

Linden, W., and Chambers, L. (1994). Clinical effectiveness of non-drug treatment for hypertension: A meta-analysis. *Annals of Behavioral Medicine*, 16, 35–45. Perhaps one of the best reviews ever performed of mind-body medicine strategies for reducing blood pressure. This review is unique in that the authors control for initial blood pressure levels. In previous reviews, persons with normal blood pressure were included (in such populations it is difficult to demonstrate an effect for mind-body strategies on blood pressure because the blood pressure cannot be reduced much further). The authors concluded that these approaches were equivalent to single drug therapy for hypertension.

Schneider, R.H., Staggers, F., Alexander, C., Sheppard, W., Rainforth, M., Kondwani, K., Smith, S., and King, C.G. (1995). A randomized controlled trial of stress reduction for hypertension in older African Americans. *Hypertension*, 26, 820–829. Study involved 111 African Americans in Oakland, CA, ages 55–85 with baseline blood pressures  $\leq 179/104$  mmHg (mild hypertension). Subjects were en-

rolled in a randomized, controlled single-blind trial of Transcendental Meditation (TM) compared with progressive muscle relaxation (PMR) and a life-style modification education control program. TM and PMR sessions lasted 1.5 hours initially and 1.5 hours/month for 3 months; data collected every month. Investigators found that TM had significantly greater effects on systolic blood pressure ( $p=.02$ ) and diastolic blood pressure ( $p=.03$ ) than PMR; SBP was reduced by 10.7 mmHG ( $p<.003$ ) and DBP reduced by 6.4 mm ( $P<.,0001$ ) for TM. The investigators concluded that TM was twice as effective as PMR in reducing systolic and diastolic blood pressures.

Koenig HG, George LK, Cohen HJ, Hays, JC, Blazer DG, Larson DB, Larson, DB (1998). The relationship between religious activities and blood pressure in older adults. *International Journal of Psychiatry in Medicine* 28, 189–213. Epidemiological study of 4,000 randomly selected older adults in North Carolina (NIA-supported Establishment of Populations for Epidemiologic Studies of the Elderly (EPESSE)). Persons who both attended religious services regularly and who prayed/meditated regularly were 40 percent less likely to have diastolic hypertension than those who did not ( $p<.0001$ , after controlling for age, sex, race, education, smoking, physical functioning, and body mass index). Among Black persons in the sample (54 percent of subjects), the effects on blood pressure were even greater. Religious activities (especially regular prayer and scripture reading) at one wave predicted lower blood pressure levels three years later, after controlling for baseline blood pressure and other compounding variables.

#### *Heart Disease and Other Cardiovascular Risk Factors*

Zamarra, J.W., Schneider, R.H., Besseghini, I., Robinson, D.K., and Salerno, J.W. (1996). Usefulness of the transcendental meditation program in the treatment of patients with coronary artery disease. *American Journal of Cardiology*, 77, 867–870. A clinical trial that tested the hypothesis that stress reduction intervention with TM could reduce exercise-induced myocardial ischemia in patients with known CAD (coronary artery disease). 21 pts with known CAD were recruited from the Buffalo, NY VA Hospital and prospectively studied. Subjects were randomly assigned to TM ( $n=12$ ) or waitlist control group ( $n=9$ ). TM group received 10 hrs of basic instruction and follow-up, including personal instruction for 60 minutes initially and 30 min twice/week for 1st month and monthly thereafter. Subject were instructed to practice TM 20 min twice/day for 6–8 months. After 8 months, the TM group had a 14.7 percent increase in exercise duration ( $p=.01$ ), an 11.7 percent increase in maximal workload ( $p=.004$ ), and an 18.1 percent delay of onset of ST depression ( $p=0.029$ ), whereas control subjects showed no substantial changes in these outcomes. Furthermore, the TM group showed significantly greater reduction in rate-pressure products after 3 and 6 minutes of exercise ( $p=.02$ ), compared to controls.

Leserman, J., Stuart, E.M., Mamish, M.E., and Benson, H. (1989). The efficacy of the relaxation response in preparing for cardiac surgery. *Behavioral Medicine*, Fall, 111–117. In this study, 27 cardiac surgery patients (mean age 68) were randomly assigned to either educational information + Relaxation Response vs. educational information only. On the Profile of Mood States scale, the relaxation response group experienced significantly greater reductions in tension and anger than the education only group. More importantly, the experimental group had lower incidence of supraventricular tachycardia (SVT) ( $p=.04$ ), a dangerous heart rhythm often complicating cardiac surgery.

Sudsuang, R., Chentanez, V., and Veluvan, K. (1991). Effect of Buddhist meditation on serum cortisol and total protein levels, blood pressure, pulse rate, lung volume and reaction time. *Physiology and Behavior*, 50, 543–548. This was a clinical trial involving 52 males ages 20–25 years practicing Dhammakaya Buddhist meditation (similar to Zen or transcendental meditation). Control group was 30 males of the same age group not meditating. Serum cortisol levels were significantly reduced in treatment group (combined A and B), and was different from controls ( $p<.01$ , all comparisons). Serum protein levels increased after 6 weeks for combined group ( $p<.01$ ) and different from controls ( $p<.05$ ). Systolic and diastolic blood pressures both significantly different in combined treatment group ( $p<.01$ ) and significantly different from controls ( $p<.01$ ). Heart rate significantly different at 3 and 6 weeks ( $p<.01$ ) and from controls ( $p<.01$  at 3 wks,  $p<.05$  at 6 wks). Pulmonary function (vital capacity, tidal volume, and maximum voluntary ventilation) significantly different at 3 and 6 weeks ( $p<.05$ ) before and after in treatment group.

Alexander, C.N., Robinson, P., Orme-Johnson, D.W., Schneider, R.H., and Walton, K.G. (1994). Effects of transcendental meditation compared to other methods of relaxation and meditation in reducing risk factors, morbidity and mortality. *Homeostasis*, 35, 243–264. Review of research showing that TM is associated with reduced cardiovascular risk factors such as hypertension, smoking, cholesterol.

*Preventing Cancer and Limiting Cancer Spread*

Koenig HG, George LK, Cohen HJ, Hays JC, Blazer DG, Larson DB (1998). The relationship between religious activities and cigarette smoking in older adults. *Journal of Gerontology (medical sciences)*, in press (November). Cigarette smoking and religious activities were assessed in a probability sample of 3,968 persons age 65 years or older participating in the Duke EPESE survey. Data were available for Waves I-III of the survey (1986, 1989, and 1992). Analyses were controlled for age, race, sex, education, alcohol use, physical health, and in the longitudinal analyses, smoking status at prior waves. Participants who frequently attended religious services were significantly less likely to smoke cigarettes at all three waves. Likewise, elders frequently involved in private prayer and meditation were less likely to smoke (Waves II and III). Total number of pack-years smoked was also inversely related to both attendance at religious services and private prayer/meditation. Among those who smoked, number of cigarettes smoked was inversely related to frequency of attendance at religious services and private prayer/meditation. Retrospective and prospective analyses revealed that religiously active persons were less likely to ever start smoking, not more likely to quit smoking. Those who both attended religious services at least once/week and prayed/meditated at least daily were almost 90 percent more likely not to smoke than persons less involved in these religious activities. The likely impact of religious beliefs and activities like prayer on smoking-related diseases—like lung cancer and chronic lung disease—is considerable.

Spiegel, D., Bloom, J.R., Kraemer, H.C., and Gottheil, E. (1989). Effect of psychosocial treatment on survival of patients with metastatic breast cancer. *The Lancet*, 2(8668), 888-891. This clinical trial examined the effects of a psychosocial intervention on survival among 86 women with metastatic breast cancer. The 1-year intervention consisted of weekly supportive group therapy with self-hypnosis and relaxation for pain. At 10-year followup, only 3 patients were alive and death records obtained for the other 83 deceased patients. Among those receiving the intervention, average survival was 36.6 months compared to 18.9 months in the control group ( $p < .0001$ , Cox model). Interestingly, differences in survival began 8 months after the intervention ended.

*Enhancing Immune Function (indirectly affecting cancer risk)*

Carson, V.B. (1993). Prayer, meditation, exercise, and special diets: Behaviors of the hardy person with HIV/AIDS. *Journal of the Association of Nurses in AIDS Care*, 4(3), 18-28. Investigators studied 100 subjects who were either HIV positive or had AIDS. A Personal Views Survey developed by Kobasa was used to determine "hardiness" (related to longer survival in this population). Level of spirituality was measured by responses to questions concerning participation in prayer, meditation, use of imagery or visualization, reading religious literature, spiritual retreats, and church services. A single item examined the frequency of prayer. Spirituality (total score) was significantly related to greater hardiness ( $r = 0.18$ ,  $p = .04$ ), although only prayer ( $r = 0.233$ ,  $p = .01$ ) and meditation ( $r = 0.262$ ) were related to hardiness when individual items were examined. Hardiness is seen as an indirect measure of immune system functioning.

Woods, T.E., Antoni, M.H., Ironson, G.H., and Kling, D.W. (1998). Religiosity is associated with affective and immune status in symptomatic HIV-infected gay men. *Journal of Psychosomatic Research*, in press. These investigators examined in the association between religious beliefs and behaviors and immune functioning in 106 HIV seropositive gay men. Religious activities—prayer or meditation, religious attendance, spiritual discussions, reading religious/spiritual literature—were associated with significantly higher CD4+ counts and CD4+ percentages (T-helper-inducer cells) (controlling for self-efficacy and active coping with health situation, using regression modeling). The effects of religious behaviors on immune function was not confounded by disease progression (i.e., as disease worsened and immune function decreased, persons unable to participate in religious activity).

## UTILIZATION OF BELIEFS IN HEALTH AND WELL-BEING

Below I review studies that link beliefs with mental and physical health. Religious belief is used here as an example of a common belief that Americans possess. Other beliefs, however, might likewise serve as examples of the power that beliefs have in affecting health outcomes (i.e., belief in a drug or medical treatment, belief in a surgical treatment, belief in one's physician, etc.).

*Beliefs and Well-being*

Beliefs have been shown to affect mental health by preventing or relieving psychological stress and thereby influencing a wide variety of psychiatric disorders.



*Reducing Stress and Preventing Depression*

Koenig, H.G., Cohen, H.J., Blazer, D.G., Pieper, C., and Meador, K.G., Shelp, F., Goli, V., and DiPasquale, R. (1992). Religious coping and depression in elderly hospitalized medically ill men. *American Journal of Psychiatry*, 149, 1693–1700. In a consecutive sample of 850 elderly men acutely admitted to the hospital, investigators found that patients who used prayer and religious belief to help them cope were significantly less depressed; among a subgroup of 201 subjects, extent of prayer and belief predicted lower depression scores 6 months later. There are over 100 other studies showing that those who are more religiously active experience lower rates of depression, commit suicide less often, and have greater well-being (Koenig et al 2000).

*Speeding Recovery from Depression or Adaptation to Stress*

Koenig HG, George LK, Peterson BL (1998). Religiosity and remission from depression in medically ill older patients. *American Journal of Psychiatry*, 155, 536–542. One year prospective study of 87 medical inpatients with depressive disorder to determine predictors of being to remission. Twenty-eight physical health, mental health, social, and treatment factors were examined. Investigators found that depressed patients who had strong intrinsic religious belief recovered over 70 percent faster from depression than did those with weaker religious commitment. In a subgroup of patients whose physical illness was not improving (not responding to medical treatments), intrinsically religious patients recovered over 100 percent faster. Other investigators have reported similar findings in children (Miller et al 1997) and elderly persons in Europe (Braam et al 1997).

Propst, L.R., Ostrom, R., Watkins, P., Dean, T., and Mashburn, D. (1992). Comparative efficacy of religious and nonreligious cognitive-behavior therapy for the treatment of clinical depression in religious individuals. *Journal of Consulting and Clinical Psychology*, 60, 94–103. Examined the effectiveness of using religion-based psychotherapy in the treatment of 59 depressed religious patients. The religious therapy involved use of religious beliefs to counter irrational thoughts associated with depression. Religious belief therapy resulted in significantly faster recovery from depression compared to standard secular cognitive-behavioral therapy. What was surprising was that the benefits from religious-based therapy were most evident among patients who received religious therapy from non-religious therapists.

Rabins, P.V., Fitting, M.D., Eastham, J., and Zabora, J. (1990). Emotional adaptation over time in caregivers for chronically ill elderly people. *Age and Ageing*, 19, 185–190. Followed 62 caregivers of persons with either Alzheimer's disease or recurrent metastatic cancer, examining factors that predicted adaptation two years later. Strong religious belief ( $p < .0001$ ) and frequent social contacts were the two major predictors of adaptation in this group.

*Preventing Substance Abuse*

Cochran, J.K., Beeghly, L., and Bock, E.W. (1988). Religiosity and alcohol behavior: an exploration of reference group theory. *Sociological Forum*, 3, 256–276. These investigators used survey data from General Social Surveys conducted between 1972–1984. During this time, 7,581 adults ages 18 or older were surveyed. Results indicated that four measures of religiousness (attendance at services, belief in life after death, strength of religious belief, and religious group memberships) were all inversely related to alcohol use or misuse, after controlling for age, race, sex, urbanity, region, education, income, and prestige. This study involved a large random national sample of Americans of all ages.

Amey, C.H., Albrecht, S.L., and Miller, M.K. (1996). Racial differences in adolescent drug use: The impact of religion. *Substance Use and Misuse*, 31, 1311–1332. These investigators surveyed a random sample of 11,728 senior high school students. The dependent variable was substance use (LSD, cocaine, amphetamines, barbiturates, tranquilizers, heroin, other narcotics, and inhalants). Religious involvement was inversely related with all substances. Frequent church attendance was associated with 29 percent less cigarette smoking, 45 percent less alcohol use, 33 percent less marijuana use, 21 percent less other drug use. Importance of religious beliefs was associated with 25 percent less cigarette smoking, 55 percent less alcohol use, 22 percent less marijuana use, and 12 percent less other drug use.

## BELIEFS AND PHYSICAL HEALTH

Because beliefs impact mental health, they also have effects on physical health because of the link between psychological stress and physical disorders.

*Preventing Cardiovascular Disease*

Goldbourt, U., Yaari, S., and Medalie, J.H. (1993). Factors predictive of long-term coronary heart disease mortality among 10,059 male Israeli civil servants and municipal employees. *Cardiology*, 82, 100–121. This was a prospective study of 10,059 Jewish males aged 40 or over working as civil servants or municipal employees in Israel. Subjects were first assessed in 1963 and mortality from heart disease (coronary artery disease) (CAD) was assessed in 1986 (23-year follow-up). Religious orthodoxy was measured by 3 items (religious vs. secular education; self-definition as orthodox believers, traditional believers, or secular believers; and frequency of synagogue attendance) summed to create an orthodoxy of belief index. The most orthodox group had lowest rate of mortality from CAD (38 vs. 61 per 10,000) and other causes (135 vs. 168 per 10,000) than did non-believers. The risk of death from CAD among most orthodox believers during the 23-year follow-up was at least 20 percent less than among non-orthodox Jews or non-believers. These results remained significant after controlling for age, blood pressure, cholesterol, smoking, diabetes, body mass index, and baseline coronary heart disease.

Koenig HG, George LK, Cohen HJ, Hays JC, Blazer DG, Larson DB, Larson DB (1998). The relationship between religious activities and blood pressure in older adults. *International Journal of Psychiatry in Medicine* 28, 189–213. (noted earlier) This was a study of 4,000 randomly selected older adults in North Carolina participating in the NIA-sponsored EPESE study. Persons who both attended religious services regularly (reflecting belief) and who prayed/meditated regularly were 40 percent less likely to have diastolic hypertension than those who did not ( $p < .0001$ , after controlling for age, sex, race, education, smoking, physical functioning, and body mass index). Among Black persons in the sample (54 percent of subjects) and younger elderly (ages 65–74), the effects on blood pressure were even greater. In these groups, religious activities at one wave predicted blood pressure levels three years later, after controlling for baseline blood pressure and other compounding variables.

*Enhancing Recovery from Cardiac Surgery*

Oxman, T.E., Freeman, D.H., and Manheimer, E.D. (1995). Lack of social participation or religious strength and comfort as risk factors for death after cardiac surgery in the elderly. *Psychosomatic Medicine*, 57, 5–15. These investigators at Dartmouth followed 232 adults for six months after open-heart surgery, examining predictors of mortality. The mortality rate in persons with low social support who did not depend on their religious beliefs for strength was 14 times that of persons with a strong support network who relied heavily on religion, after other covariates were controlled. Even when social factors were accounted for, persons who depended on religious beliefs were only about one-third as likely to die as those who did not.

*Preventing Cancer*

Dwyer, J.W., Clarke, L.L., and Miller, M.K. (1990). The effect of religious concentration and affiliation on county cancer mortality rates. *Journal of Health and Social Behavior*, 31, 185–202. These investigators used county-level cancer mortality data from the National Center for Health Statistics (3,063 counties) for 1968–1970, 1971–1974, and 1975–1980 to examine the relationship between religious affiliation and death from cancer. Investigators found that religion (defined as percent of population with full membership or as degree of religious conservativeness) had a significant impact on mortality rates from cancer, even after controlling for 15 factors known to affect cancer mortality. Conservative Protestants and Mormons had the lowest mortality rates and counties with higher concentrations of Jews or liberal Protestants had the highest cancer mortality. Investigators concluded that the general population in areas with high concentrations of religious participants may experience health benefits resulting from diminished exposure to or increased social disapproval of behaviors related to cancer mortality.

*Enhancing Immune System Functioning*

Koenig HG, Cohen HJ, George LK, Hays JC, Larson DB, Blazer DG (1997). Attendance at religious services, interleukin-6, and other biological indicators of immune function in older adults. *International Journal of Psychiatry in Medicine* 27:233–250. First study to examine the relationship between religious activities and immune system functioning. Investigators found that frequent religious attendance (reflecting religious belief) in 1986, 1989, and 1992 predicted lower plasma interleukin-6 (IL-6) levels in a sample of 1,718 older adults followed over six years. IL-6 levels are elevated in patients with AIDS, osteoporosis, Alzheimer's disease, diabetes, lymphoma and other cancers. High levels of IL-6 indicate a weakened immune system. Findings suggest that persons who attend church frequently have

stronger immune systems (lower levels of IL-6) than less frequent attenders, and may help explain why better physical health is characteristic of frequent church attenders.

Woods, T.E., Antoni, M.H., Ironson, G.H., and Kling, D.W. (1998). Religiosity is associated with affective and immune status in symptomatic HIV-infected gay men. *Journal of Psychosomatic Research*, in press. (noted earlier) Study of 106 HIV seropositive gay men; religious activities—prayer or meditation, religious attendance, spiritual discussions, reading religious/spiritual literature (indicators of religious belief)—were associated with significantly higher CD4+ counts and CD4+ percentages (T-helper-inducer cells) (controlling for self-efficacy and active coping with health situation, using regression modeling).

#### *Extending Overall Survival*

Strawbridge, W.J., Cohen, R.D., Shema, S.J., and Kaplan, G.A. (1997). Frequent attendance at religious services and mortality over 28 years. *American Journal of Public Health* 87:957–961. Major study by researchers at the University of California at Berkeley reporting results of a 28-year follow-up of 5,000 adults involved in the Berkeley Human Population Laboratory. Mortality for persons attending religious services once/week or more often (reflecting religious belief) was almost 25 percent lower than for persons attending religious services less frequently; for women, the mortality rate was reduced by 35 percent. Frequent attenders were more likely to stop smoking, increase exercising, increase social contacts, and stay married; even after these factors were controlled for, however, the mortality difference persisted.

Multiple other studies (Duke, UC, and Michigan studies) soon to be published. The effects of religious attendance (once per week or more frequent) on survival are equivalent to 40–60 pack years of cigarette smoking.

#### MIND-BODY MEDICINE AND REDUCTION OF HEALTH CARE COSTS

A number of studies have now demonstrated that Beliefs may help reduce health care costs. This may occur (1) by reducing physical disability (which leads to lost productivity, high caregiver costs, and expensive nursing home placement) and (2) by directly reducing the most expensive form of health care, acute hospitalization.

#### *Reducing Physical Disability*

Pressman, P., Lyons, J.S., Larson, D.B., and Strain, J.J. (1990). Religious belief, depression, and ambulation status in elderly women with broken hips. *American Journal of Psychiatry*, 147, 758–759. Investigators studied time to recovery in 33 elderly women hospitalized with hip fracture. Women who expressed greater religious beliefs and devotional practices experienced less depression and were able to walk further at the time of hospital discharge (reflecting less disability and faster recovery).

Idler, E.L., and Kasl, S.V. (1997). Religion among disabled and nondisabled elderly persons, II: Attendance at religious services as a predictor of the course of disability. *Journal of Gerontology* 52B, s306–s316. A 12-year longitudinal study of 2,812 older adults in New Haven, CT, conducted by Yale University researchers. Found that frequent religious attendance (reflecting religious belief) in 1982 was associated with significantly less disability during the 6–12 years of follow-up. These findings persisted after controlling for baseline physical functioning, health practices, social ties, and indicators of well-being.

#### *Reducing Use of Acute Hospital Services*

McSherry E, Ciulla M, Salisbury S, Tsuang D (1987). Spiritual resources in older hospitalized men. *Social Compass* 35(4):515–537. Heart surgery patients with higher than average personal religious beliefs on admission had post-op lengths of stay that were 20 percent less than those with lower than average belief scores.

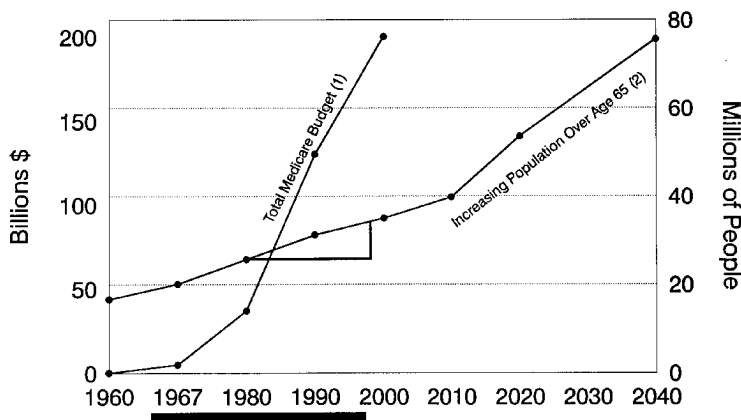
Bliss JR, McSherry E, Fassett J (1995). Chaplain intervention reduces costs in major DRGs: An experimental study. In Heffernan H, McSherry E, Fitzgerald R (eds), *Proceedings NIH Clinical Center Conference on Spirituality and Health Care Outcomes*, March 21, 1995. Investigators randomized 331 open-heart surgery patients to either a chaplain intervention (supportive of religious belief) or usual care. Patients in the intervention group had an average 2 days shorter post-op hospitalization, resulting in an overall cost of \$4,200 per patient.

Koenig HG, Larson DB (1998). Use of hospital services, church attendance, and religious affiliation. *Southern Medical Journal*, in press (October issue). Found an inverse relationship between frequency of religious service attendance (reflecting religious belief) and likelihood of hospital admission in a sample of 455 older patients. Those who attended church weekly or oftener were significantly less likely in the

previous year to have been admitted to the hospital, had fewer hospital admissions, and spent fewer days in the hospital than those attending less often; these associations retained their significance after controlling for covariates. Patients unaffiliated with a religious community had significantly longer index hospital stays than those affiliated. Unaffiliated patients (reflecting religious belief) spent an average of 25 days in the hospital, compared with 11 days for affiliated patients ( $p < .0001$ ); this association strengthened when physical health and other covariates were controlled. Intrinsic religious belief was also associated with fewer days in the hospital.

Something needs to be done about rising costs of health care, particularly among persons aged 65 years or older. There will soon come a time when we will not be able to afford expensive medical and surgical treatments for all elderly people (Figure). For that reason, it is essential that we focus on relatively low cost mind-body therapies that patients can learn and practice themselves in order to maintain wellness and speed recovery from illness when it occurs. Supporting healthy belief systems may also help empower the self-care process.

### Increasing Population Over Age 65 and Federal Funding of Health Care



1 Health: United States. Healthcare Financing Administration, Office of Medicare Cost Estimates, Office of the Actuary & Bureau of Data Management & Strategy. DHHS Pub # PHS96-1232. National Center for Health Statistics, Hyattsville, MD, May 1996.

2 Schick and Schick. Statistical handbook on Aging Americans (Series #5). New York: Oryx Press, 1994

#### WHY ARE CENTERS NEEDED?

First, current study sections and programs are not equipped with the sufficient expertise. This is a new area and in the case is being made for centers precisely because it doesn't fit typical NIH programs.

Second, only centers can launch the ambitious, multi-disciplinary research projects needed to advance this field. No single investigator can do what must and needs to be done. A critical mass of investigators is essential.

Third, centers help with dissemination, since they typically have a "dissemination core." Dissemination means creating manuals, holding workshops and symposia, communicating with media, and moving the research into clinical practice. Developing practical applications based on rigorous research are not typically a component of conventional NIH grants. So there is often a temporal lag between scientific findings and their use by clinicians and the public.

#### SUMMARY

There is highly credible scientific research that has established a link between psychological and social stress and a host of debilitating and costly medical illnesses, particularly cardiovascular disorders and cancer, the major killers and disablers of Americans. Traditional medical and surgical treatments typically do not

include mind-body approaches that may empower and motivate patients towards self-care, prevent illness, speed recovery, and reduce the costs of health care that are quickly spiraling out of control. Patients have become accustomed to relying on medical and surgical approaches to their illnesses (rather than focusing on things they can do to improve their conditions), and physicians have become accustomed to treating sick people like broken down cars (fix them when they're broke and send them on their way). Patients and physicians need to be educated about and encouraged to participate in self-care activities that help to maintain wellness and speed recovery.

The Relaxation Response and ways of eliciting it (like prayer) is easily taught and widely acceptable to the American populous. These techniques have been shown to enhance well-being by alleviating or reducing anxiety, chronic pain, and stress, and by preventing or treating alcohol and drug abuse. Consequently, given the relationship between psychological stress and physical illness, it is expected and has been found that these techniques reduce blood pressure, coronary artery ischemia, cardiovascular risk factors (like smoking and cholesterol level), lower the risk of cancer or prevent its spread, and enhance immune system functioning.

Likewise, certain Beliefs have been associated with greater well-being and better physical health. Taking religious or spiritual beliefs as an example, these have been associated with lower levels of acute stress and prevention of depression, faster recovery from depression and adaptation to chronic stress, and prevention or treatment of alcohol and drug addiction. Likewise, religious beliefs and practices have been associated with a lower risk of death from coronary heart disease, with lower blood pressures, enhanced recovery from open-heart surgery, prevention of cancer, promotion of positive health behaviors, enhancement of immune system functioning, and the extension of overall survival. Finally, religious beliefs and practices are associated with quicker recovery from disabling illnesses and prevention of costly disability in older persons, and (along with chaplain interventions) are associated with reduced use of acute hospital services which are the most expensive form of health care.

Mind-body medicine centers will be equipped with sufficient expertise to develop this new area in a way that typical NIH programs cannot do. Only centers with a critical mass of investigators and core infrastructure can launch ambitious, multidisciplinary projects that are necessary to advance this field. Centers are also the best way of disseminating research findings to the public and to clinicians and of rapidly moving the research findings into practical applications.

#### STRESS AND RELAXATION

Senator SPECTER. Thank you very much, Dr. Koenig.

Dr. Benson, is the essence of mind/body the elimination of stress and relaxation?

Dr. BENSON. It is really much more than that, but stress and relaxation are perhaps the two best areas. Modern neurochemistry, neurobiology is showing us that the mind and body are inseparable. What we think influences our bodies; our bodies influence our mind. Frequently our minds have difficulty in differentiating a reality from a thought. Let me give you one example. I will cite the work of Dr. Harold Koenig—I am sorry—Dr. Steven Kosslyn. Your speech was so nice, I cited you. [Laughter.]

Dr. Kosslyn at Harvard Medical School had people stare at a grid at Harvard University. There was a capital A within that grid. He did a PET scan. A certain area of their brain lit up, their occipital cortex. Then he had these same people stare at the same grid without a letter A.

Senator SPECTER. Without a letter A?

Dr. BENSON. Without the letter, without the capital letter within it. But in their mind's eye visualized the letter A and did another PET scan. Exactly the same.

The point is this.

Senator SPECTER. They said to the individuals to visualize the same letter?

Dr. BENSON. That you had been looking at previously within the grid, but this time they are simply visualizing it without actually seeing it. He did another PET scan, Senator, and the same area of the brain lit up. In other words, whether you are actually viewing something or think you are viewing it in your mind's eye, from the brain's point of view it is a reality. So, you see our thoughts are often interpreted as realities to our bodies.

Senator SPECTER. Well, how would you specify the work that you do with the mind as to how it impacts on the body? Dr. Anderson, I am going to come to you next on this question. You have all these dotted lines going back and forth between the behavioral and the physiological factors and the genetic factors.

But, Dr. Benson, in laymen's language what goes on in the mind which then has a physiological impact on the body? Two examples were given by Dr. Koenig. He talked about cancer and about heart disease. Could you start with cancer as to how you could specify that?

Dr. BENSON. Yes; stress affects the immune system and enhanced stress depresses many immune functions. By focusing on a word, a sound, a prayer, a phrase and disregarding everyday often stressful thoughts when they come to mind, what happens is a set of physiologic changes within the body that are opposite to those of stress. Instead of increased metabolism, there is decreased metabolism. There is decreased blood pressure, decreased heart rate, decreased rate of breathing, and slower brain waves.

Senator SPECTER. When the stress is relieved.

#### IMMUNE FUNCTION

Dr. BENSON. No; when stress is relieved by focusing on thoughts that break the train of everyday stressful thoughts.

These physiologic changes are opposite to those of stress and counteract the harmful effects of stress and, for example, have been shown to enhance immune function when regularly practiced.

Senator SPECTER. Define the immune function please.

Dr. BENSON. Immune function is the ability of the body to counteract internal defense systems to foreign invaders. Cancer could be viewed as such a foreign invader. If the immune system is depressed, perhaps the growth of cancer would be enhanced by stress because the immune function would no longer be fully operant and controlling the cancer.

Senator SPECTER. Well, is that really a good example in light of the fact that—or to what extent do we understand the causes of cancer so that that would be a factor in inhibiting the growth of cancer?

Dr. BENSON. There is no evidence whatsoever that stress causes cancer. There is evidence——

Senator SPECTER. Is there evidence of the absence of stress stops the growth of cancer?

Dr. BENSON. There is no evidence for that, as far as I know, Senator.

However, it has been shown that immune function, the protective aspects of the body, do influence perhaps the growth of cancer, and there are several studies that have shown that relaxation response

based therapies do lead to longer survivals in patients who regularly carry out these behaviors.

#### HEART DISEASE—STRESS AND HIGH BLOOD PRESSURE

A much clearer picture is possible in heart disease where stress brings forth the hormones epinephrine and norepinephrine, also called adrenalin and noradrenalin. These can directly influence high blood pressure. They directly influence the amount of blood flow through the coronary arteries to the heart muscle, decreasing it, sometimes leading to angina pectoris and sometimes, when quite severe, even leading to or contributing to a myocardial infarction but certainly contributing to atherosclerosis.

Senator SPECTER. Are there scientific tests which support the conclusion that relief of stress has a direct impact on heart disease?

Dr. BENSON. There are considerable studies that Dr. Koenig has, in fact, reviewed or at least alluded to that show that stress is a direct contributor to high blood pressure and that relief of stress can lower blood pressure which in turn lowers the risk of heart disease.

Furthermore, stress has directly contributed to angina pectoris, and it is shown that belief system, for example—thoughts of a person can directly influence angina pectoris. Let me be specific.

Therapies have been used for angina pectoris for over 200 years. The diagnosis has never been changed, but a number of bizarre therapies have come along. These include cobra venom, xanthines, aminophylline, vitamin E, bizarre surgeries such as ligation of the internal mammary artery. Absurd. It should not work and it does not. But at one time they were believed in by physicians, and we did a study that was published in the *New England Journal of Medicine* that showed when these therapies were believed in, before they were shown to be bogus, they were 70 to 90 percent effective in alleviating angina pectoris. And not only did the relief of the pain of angina occur, but also the exercise tolerance of these patients improved and their electrocardiograms normalized. When these therapies were no longer believed in by patients, specifically by their physicians, their effectiveness dropped to 20 to 30 percent. In other words, belief here translated itself into a marked healing capacity.

Senator SPECTER. So, you have relaxation and stress and you have belief as two big factors. Any others?

Dr. BENSON. Yes; health and well-being is best viewed as being akin to a three-legged stool being held up by one leg of pharmaceuticals, a second leg of surgery and procedures, but there should be a third leg to that three-legged stool and that third leg is self-care.

#### SELF-CARE AND RELAXATION

Now, two components of self-care are relaxation procedures and another is the belief system of patients. Several other components are nutrition, exercise. The cognitive, behavioral stress management approaches are also aspects of the third leg. So, in addition to relaxation—

Senator SPECTER. Say that again. Cognitive what?

Dr. BENSON. Cognitive restructuring, psychological approaches, where your thinking is used to actively change your thoughts themselves which in turn influence the physiology.

Senator SPECTER. Is that like belief?

Dr. BENSON. It is akin to belief. Yes; in a sense because it does restructure your belief system, but whereas belief tends to involve not only secular but also religious/spiritual approaches and cognitive/behavioral approaches are generally in the secular/psychological realm.

Senator SPECTER. Cognitive is in the secular/psychological realm, unlike belief which has a religious component.

Dr. BENSON. As well, yes.

Senator SPECTER. Dr. Anderson, would you amplify that dotted line between physiological factors and genetic factors?

Dr. ANDERSON. Yes.

Senator SPECTER. I always thought that the genes were pretty much out of our control.

Dr. ANDERSON. Actually no. The genetic makeup that we are born with certainly is out of our control, but really one of the most exciting frontiers in genetics research is the question of what turns genes on and what turns them off. I think the area of gene expression now is showing very clearly that things outside of our genetic structure actually determine whether genes are activated.

Senator SPECTER. So, genes are not immutable? If you have two parents who were 90, those genes are not going to carry you to 90 by themselves. They have to be turned on?

Dr. ANDERSON. It depends on one's exposures across the life course, whether one is exposed to certain types of diet, perhaps even chronic stress. Other environmental factors will determine exactly which genes are turned on and turned off.

You asked specifically about—

Senator SPECTER. I can understand that genes might not be the sole determinant, but explain a little further, if you would, the turn on or the turn off of genes.

Dr. ANDERSON. Well, I will go back to your original question about the physiological factors and genetic factors and that interaction. Research is now showing that neuroendocrine factors, such as adrenalin, noradrenalin, actually act on genes to cause the genes to produce proteins which then go on to produce other factors that affect health and illness. So, genes are not operating alone. They interact with physiological factors and, as we are learning now, behavioral factors.

#### SUSCEPTIBILITY TO BREAST CANCER

Senator SPECTER. Dr. Anderson, when we talk about tests which would examine the genes, say, of a young woman to make a determination as to susceptibility to breast cancer and we face all the difficult ethical questions about how to handle that and whether to tell the insurance company, are you saying that the analysis of the genes alone would not be determinative as to her developing breast cancer but it would depend upon other factors intervening to turn on or turn off the genes?

Dr. ANDERSON. Yes; again, I will qualify my comments by stating that I am not a geneticist, but it is very clear that genes are signifi-



cant risk factors—and I underscore that term, risk factors—for cancer. However, everyone who carries a genetic risk for cancer does not go on to develop the disorder. One of the areas of research that NIH is very interested in is determining among those people who have a genetic risk which ones then go on to develop cancer. The direction of this research is looking in part at nongenetic factors.

Senator SPECTER. Are there scientific tests which have shown some basis for concluding what would prevent somebody with a gene, a predisposition to cancer, to avoid developing cancer?

Dr. ANDERSON. I do not know of any specific test as yet. This is one of these areas of scientific opportunity that NIH is interested in, and we cannot say conclusively what factors, among those people with a genetic risk, will prevent them from going on to develop cancer.

Senator SPECTER. How long has medical science really understood the genetic factor even to be able to conduct tests as to whether that is the dominant or influenceable by other considerations?

Dr. ANDERSON. Well, interest in genetics has gone on for some time, but I think in the last decade or so with the advances in molecular biology, there has been obviously an increased interest as evidenced by the Genome Institute at NIH.

What we have not done as yet is linked these boxes in the figure. We know a lot about genetic factors. We know a lot about behavioral and physiological factors, but we have not done as good a job as we could of linking these factors. Ultimately the things that cause disease are interdependent and linked.

Senator SPECTER. I am just inquiring of staff how long the Genome Institute has been in high gear and I am told since 1990. Are they, to your knowledge, conducting tests to see what would stop the path from predisposition, say, in the genes to cancer to eventuating in cancer?

Dr. ANDERSON. I cannot answer that conclusively. I do not know all of their portfolio in the area. I would be happy to find out from Francis Collins about that.

Senator SPECTER. Do you know whether they are studying any of the mind/body aspects as to what happens when there is a genome predisposition?

Dr. ANDERSON. They do have a portfolio in their ethical, legal, and social aspects of genetics research.

Senator SPECTER. Ethical, legal, and social.

Dr. ANDERSON. Yes.

Senator SPECTER. Would that cover mind/body?

Dr. ANDERSON. Mind/body would be a part of that, yes.

Senator SPECTER. So, you are saying the Genome Institute does have some mind/body in it?

Dr. ANDERSON. Well, again, it depends on one's definition of mind/body.

Senator SPECTER. Say Dr. Benson's definition of mind/body.

Dr. ANDERSON. Well, what I would like to do, if I could, is go back to the figure. I am not sure that the Genome Institute—and again, I can determine this conclusively—whether they are looking at these interactions, the interactions of physiological factors on genetics or behavioral and social on genetics. I am just not that famil-

iar enough with their portfolio to say conclusively if they are doing that.

Senator SPECTER. Well, we will check that out. Staff will do that. I would like to find that out.

Dr. Koenig, you had mentioned cancer as a disease which would be influenced by mind/body studies. Would you amplify that please?

#### STRESS AND IMMUNE SYSTEM FUNCTIONING

Dr. KOENIG. As Dr. Benson said, cancer has many different types of causes, and there is again this connection between stress and immune system functioning. Now, when people become depressed or stressed out, their body starts pouring out what is called cortisol. Cortisol comes from the adrenal glands, and what that does is that directly then impacts on the functioning of the blood cells that then attack cancer cells as they develop. It is called the theory of immune surveillance where the immune system actually guards and grabs hold of these cancer cells as they are initiating in the body, which is probably happening all the time.

Now, again if people are less depressed, if they are experiencing less stress because of the mind/body techniques, belief, repetitive prayer, the relaxation response, then those negative health consequences, the cortisol being released, is not going to happen as likely.

Furthermore, belief systems determine whether or not someone will drink alcohol, smoke cigarettes, and do a whole host of different activities that can lead to cancer.

Senator SPECTER. When you feature so prominently, as you do, Dr. Koenig, the religion/spirituality aspect of mind/body, are there any scientific studies that show that people who are more religious have fewer diseases or fewer ailments?

Dr. KOENIG. Yes; there are, Senator. In the psychological health realm, there are probably well over 200 studies that have shown this. We have done at least 10 at Duke.

We are also now looking again at physical health consequences. We have been able to show that people who attend religious services regularly and who frequently pray, read the Bible, that those people have a 40-percent reduction in the likelihood of having diastolic hypertension which is directly the factor that causes stroke and heart attack. We have also been able to show that people who are more religiously involved do not smoke cigarettes as often, and so invariably you are going to see lower rates of chronic pulmonary disease and lower rates of cancer.

#### RELIGIOUS BELIEFS AND PRACTICES—BETTER IMMUNE FUNCTIONING

We have also been able to show that religious beliefs and practices are associated with better immune functioning. We can measure interleukin-6 levels in the blood stream and show that people who have a strong faith and are participating in religious activities actually are less likely to have high levels interleukin-6 in their blood stream which is an indicator of a weakened immune system. People who have AIDS have high levels of interleukin-6 in their blood stream. So, people who have a strong faith seem to have lower levels of this substance in their blood stream, suggesting that they have stronger immune systems.

There have been at least six studies now that have shown that people with strong beliefs simply live longer, and these are studies performed at the University of California-Berkeley, as well as at Duke and institutions in different areas of the country. So, it is not simply one single research group that is finding these positive health effects. It is multiple, different, prominent investigators.

Senator SPECTER. So, the religious aspect impacts on a number of areas related to this field. One is the belief in and of itself. When people pray, they have faith that they will get better because of divine intervention. So, they do get better?

Dr. KOENIG. That certainly can be a mechanism by which it occurs.

Senator SPECTER. Is there any scientific evidence to support that in isolation?

Dr. KOENIG. Well, there are certainly lots of case reports that have shown that. For example, there is a case report published in, I believe, Archives of Internal Medicine that shows that an older woman who had atrial fibrillation, which is a serious cardiac arrhythmia, was going to go in for cardioversion.

Senator SPECTER. How serious is atrial fibrillation?

Dr. KOENIG. Atrial fibrillation can increase the ventricular rate so that people can develop congestive heart failure and certainly, if they do not have cardiac reserve, they can die from it.

Now, she was going to have a cardioversion where they put the paddles on and kind of snap the rhythm back, but she and her family got into a prayer group before the procedure and they prayed for and she prayed and did some chanting and it reversed completely.

Another example is—

Senator SPECTER. That can happen without prayer too, can it not?

Dr. KOENIG. Yes; it can.

Senator SPECTER. Dr. Benson, you had your hand up. We are going to get back to you, Dr. Koenig. We are just beginning, but go ahead, Dr. Benson.

#### HEALING POWER OF BELIEF

Dr. BENSON. Thank you. Several points.

Supporting what Dr. Koenig says, I would like to point out how we in medicine have dealt with belief system. We know in medicine that belief can heal, but we have dealt with the healing power of belief in a very pejorative fashion. We have labeled it the placebo effect: It is all in your head. What has evolved over these—

Senator SPECTER. What is wrong with that? I thought if it was all in your head, it was good.

Dr. BENSON. All in your head is terrific, but take the case of a woman who was suffering from multiple symptoms of unclear etiology, four to five doctors all saying it is in your head. She was so upset because it was a pejorative that when she received—

Senator SPECTER. Like gulf war syndrome.

Dr. BENSON. Pardon?

Senator SPECTER. Like gulf war syndrome, told all the veterans from the Gulf it was all in their head. They became very distressed

about that. It added a new level of distress to the gulf war veterans.

Dr. BENSON. Exactly.

Let me finish up, if I may, Senator, with this woman's case. When she got the diagnosis of multiple sclerosis, which in her case was life-threatening, she was thankful for that. She was so put down by it is all in your head, that she would rather have a life-threatening disease.

Now, we in medicine over this last 150 years have developed marvelously, awesomely, spectacularly effective treatments, the antibiotics, insulin, surgeries that by biblical standards are producing miracles on an assembly line basis. The blind can see again with cataract operations. We became in medicine depending only on the first two legs of the three-legged stool, pharmaceuticals, surgery and procedures, and said we do not need that third leg. We can do it all by your simply taking the drug or having this surgery.

It is not enough because beliefs are effective and we know this in medicine when we test a new substance against, let us say, a placebo tablet, as we often do. Placebos are effective in 50 to 90 percent of cases that involve angina pectoris, asthma, congestive heart failure, rheumatoid arthritis, all forms of pain. In fact, death itself can be caused by belief. If you believe in voodoo and you have a hex placed on you, you could die.

But we in medicine, comparing the placebos against a new drug, if both were 60 percent effective, we would drop them both because we are looking that the drug was better than belief. We have not focused enough on the power of belief and asked the question what is it that makes belief and placebos work? Now, that is the way we deal with belief in medicine and that has been a problem.

Now, in America some 95 percent of people believe in God. This, for them, is their most powerful belief. It is no surprise then that such powerfully belief-related therapies, such as belief in God, can result in healing. We must pay more attention to it.

Now, that is a long introduction to answer what I believe was your question, Senator, and that is, is religious belief the only way? No; belief itself is what is important, but the belief of the individual has to be honored. It could be secular. It could be religious. And that is what we are in a position to do now by paying attention to belief, by studying the mind/body effects whereby beliefs do lead to the findings that others have found, and I think mind/body centers would be a way to emphasize that. That is why belief related therapies will, of course, include religious beliefs but will include other beliefs as well.

Senator SPECTER. What kind of beliefs other than religious beliefs?

Dr. BENSON. Belief in your doctor, belief in the healing power of your body to heal, nature's power to heal, belief in relationships. All of these are powerful beliefs.

Take one study, if I may, that was done by Dr. Ochsman—

Senator SPECTER. Because these beliefs will reduce stress and anxiety?

Dr. BENSON. Yes; and can have direct effects on disease.

Men undergoing bypass surgery at Dartmouth Medical School—this was a study by Ochsman. These were all men over 54. Those

who believed in God had one-third the mortality. Those who believed in God and also had a very strong social support system, the very sort of aspects that the Office of Behavioral and Social Sciences Research look at, those who also had a strong support system, Senator, had one-tenth the mortality of those who did not. Support system is vital. This is a behavioral factor related to belief as well.

Senator SPECTER. Let me come back to you, Dr. Koenig. When you were talking about the religious aspect, we started to talk about the belief, the religious aspect would also impact on stress and would also impact on items like smoking. So, there are quite a number of factors on mind/body which the religious beliefs would impact on.

Dr. KOENIG. That is correct, Senator.

Senator SPECTER. To what extent is the issue of religious belief, having this medical benefit which you describe here, talked about and touted in the field of religion to induce people to go to religious services and become more religious?

Dr. KOENIG. Very little I think. I think that I have found that the clergy has not been tremendously receptive to this research, which is surprising to me because I would think that this would be—

Senator SPECTER. A pretty good talking point.

#### SCIENCE AND RELIGION

Dr. KOENIG. Right, but they really have not been all that receptive. I think that the barrier between science and religion—

Senator SPECTER. They do not like to deal with doctors.

Dr. KOENIG. That could also certainly be, or subjective beliefs of the science.

Senator SPECTER. When you talked about belief in the doctor, would that apply to lawyers, Dr. Benson?

Dr. BENSON. Would that apply to?

Senator SPECTER. Lawyers?

Dr. BENSON. Belief in lawyers, belief in your lawyer. Yes; that is an interesting phenomenon and I am not totally qualified—

Senator SPECTER. It is a question, Dr. Benson.

Dr. BENSON. Would belief in your lawyer lead to better health and well-being?

Senator SPECTER. Well, you talk about a social support system. You mentioned doctors. It is just natural to ask a question about whether belief in the lawyer would have a similar beneficial effect.

Dr. BENSON. In my 30 years of answering questions, that is the first time I have faced that one, Senator. [Laughter.]

Senator SPECTER. You ought to do more town meetings. You would find a lot of new questions. [Laughter.]

Well, it is only said slightly in jest, Dr. Benson. You are talking about beliefs.

How do you account for the fact, Dr. Anderson, that at least according to the information presented to me, these mind/body studies are only at Harvard and Duke?

Dr. ANDERSON. I think that probably reflects the panel that is assembled here, but in fact—

Senator SPECTER. No; are there any besides Harvard and Duke?

Dr. BENSON. Are there mind/body medical centers?

Senator SPECTER. Correct.

Dr. ANDERSON. I do not think there are very many things called mind/body medical centers out there, no. But there are research groups at a number of universities around the country who are interested in and who study mind/body medicine, yes.

Senator SPECTER. Can you give me an illustration of where such a study is undertaken and the parameters of it generally?

Dr. ANDERSON. Certainly. Let us start with the University of Pittsburgh. They have a well-developed research program in an area called psychoneuroimmunology.

Senator SPECTER. Psychoneuroimmunology.

Dr. ANDERSON. And it is a field that the very long word suggests. It looks at the interaction of psychological, neuroendocrine, and immune system factors, particularly how stress affects the immune system. There are a number of groups that are interested in that very topic at Pittsburgh, at Ohio State, at UCLA, and the University of Miami in Florida, just to name four.

Senator SPECTER. Well, stress is an important component of what has been discussed here today, but only one component.

Dr. ANDERSON. It is only one component.

Senator SPECTER. Does the psychoneuroimmunology group at Pittsburgh pick up the issue of beliefs?

Dr. ANDERSON. In the broadest sense. I do know of one researcher there by the name of Mike Scheier who studies the influence of an optimistic attitude on the immune system and the cardiovascular system, that is, in a sense a belief in the broadest sense of that term that one will experience positive outcomes as opposed to negative outcomes.

Senator SPECTER. Dr. Anderson, what is your professional opinion on the interest that the Senate, at least through the full Appropriations Committee, has stated on mind/body and allocating some \$10 million? We are interested on the subcommittee in the wide range of research activities. NIH has a budget somewhat larger than \$10 million. I do not know what fraction \$10 million would be of \$13.6 billion. We ought to figure that out. [Laughter.]

And then the second part of the question would be what percentage it would be of \$15.6 billion, if you get a \$2 billion increase.

But do you think that this money would be well spent to try to develop other centers which would focus on the subject matter which your unit heads?

Dr. ANDERSON. Let me provide a multi-layered response to that question. As a representative of the entire NIH and not just my office today, as you know, NIH really prefers maximum flexibility in creating funding initiatives and has—

Senator SPECTER. Do you think for this committee to say \$10 million is too much direction on \$13.6 billion?

Dr. ANDERSON. Well, let me just complete this thought, that we do prefer maximum flexibility. However, if you are asking if there are areas of scientific opportunity enough to warrant funding supporting \$10 million of research in this area, yes, there are a number of areas of scientific opportunity, only some of which were discussed today. If these funds are earmarked for NIH, we would prefer flexibility in creating the mechanism of funding, because for

some research areas, centers are not the way to go. In other research areas, they might be.

#### RESEARCH

Senator SPECTER. What are other research possibilities are you thinking of, Dr. Anderson?

Dr. ANDERSON. They could be research in—well, I will name three areas. One has to do with biological, psychological, and social interactions that we talked about earlier. There is a great deal of scientific opportunity in the psychoneuroimmunology area that I have already mentioned, the effects of behavior and stress on the brain, behavioral genetics, and behavioral cardiology. There is also—

Senator SPECTER. Are those items taken up by NIH at the present time?

Dr. ANDERSON. Yes; they are taken up by NIH, but there are also additional areas of scientific opportunity. These are areas that my office is actively pushing because there are so many questions that need to be addressed.

Senator SPECTER. These are in the behavioral and social sciences research area.

Dr. ANDERSON. Yes; under which I would put research on stress and research on belief.

Senator SPECTER. What is the total budget of your unit?

Dr. ANDERSON. My office? It is about \$2.8 million.

Senator SPECTER. \$2.8 million?

Dr. ANDERSON. Yes.

Senator SPECTER. That is not a very large share of the NIH pie, is it?

Dr. ANDERSON. No; it literally is not, but our recent estimate of how much the Institutes fund in the larger field of behavioral and social sciences research is over a billion dollars.

Senator SPECTER. You say the overall figure for behavioral research is a billion dollars?

Dr. ANDERSON. Yes.

Senator SPECTER. Under whose office does that fall?

Dr. ANDERSON. Well, this is all investigator initiated research. As you know, most of the research that NIH funds, NIH does not ask for proposals or set aside money for specific areas, but tells the investigators, send in your proposals, send in your ideas, and they get peer reviewed once they come into the NIH system.

Senator SPECTER. So, you say a billion dollars is now being allocated on the behavioral subject?

Dr. ANDERSON. Behavioral science, yes.

Senator SPECTER. Behavioral science.

Dr. ANDERSON. Of which the fields we are talking about today are a subset.

Senator SPECTER. How much is being allocated to mind/body studies at the present time, if you know?

#### HEALTH AND BEHAVIOR

Dr. ANDERSON. That is very hard to determine because of a lack of a clear definition. One definition that NIH has been assessing their portfolio based on is called health and behavior. The health

and behavior number includes many of the things that we talked about today, but some additional things as well. The 1997 number was about \$900 million, but that includes things such as research on diet, research on smoking, research on exercise, alcohol use, and drug abuse as well. So, it is much broader than the topic today.

Senator SPECTER. Well, you say some items do not lend themselves to centers. Would you say the center at Duke on mind/body is a good organizational approach?

Dr. ANDERSON. It has worked well at Duke, based on my understanding of the center, but when we talk about centers in an NIH context, we are talking about something very specific, that is, the center grant mechanism, which is a very specific mechanism, actually a set of mechanisms. I think there are about five or six. Most of these are fairly large research grants that have a core facility that a number of investigators use. And for some research areas, frankly they are not ready for centers yet. Others might be. What we would like to do is leave it to the investigators to determine whether the research they are interested in is appropriate for a center or what we call an RO1 or an investigator initiated grant, a program project grant, or a training grant.

Senator SPECTER. What is your thinking on that, Dr. Benson? We have taken the center approach. I am not sure the nomenclature is necessarily the last word, but how do you respond to what Dr. Anderson has said?

Dr. BENSON. The progress that NIH has made with the approaches that Dr. Anderson has just outlined are truly spectacular. To be funded in a so-called RO1 grant, one has to go through appropriate study sections, and the study section approach tends to be quite narrow in its focus—has to be—because the way that kind of science is defined is that it is next-step research, namely that there is ample research that brought you to this point, and the next logical question would be to have a given intervention, something changing, and then see what happens to the system under study.

When you start getting into mind/body areas, you are looking at multiple simultaneously interacting systems. The present mechanisms at NIH cannot really do adequate justice to assessing such approaches because of their traditional narrow, reductionistic approach. This is why centers are necessary to be able to study simultaneously occurring phenomena at different levels, physico-chemical, biological, social, and look at interventions that are not characteristically normally looked at. We are not looking at a new drug or a new chemical substance. We are looking at thought patterns.

Senator SPECTER. Dr. Koenig, what do you think about Dr. Benson's approach?

Dr. KOENIG. I agree that the current NIH programs do need to focus in on specific kind of reductionistic areas, whereas centers have the option of bringing together multiple different disciplines together, the sociologist, psychologists, the medical physicians, the anthropologist, bringing them all together and working together. That is particularly important for a field like this that is relatively new and needs kind of initiation, and because it involves multiple different disciplines and expertise in each of those disciplines as op-



posed to just requiring, say, a single expertise such as in psychiatry.

Senator SPECTER. Dr. Koenig, do you think that a \$10 million allocation is realistic to look toward initial financing of, say, half a dozen centers?

Dr. KOENIG. What I think is that actually probably the money would be better spent on only about three or four centers, simply because there are only about that number of centers that have the critical mass in place and the infrastructure that can really get up and start doing something because this is really—

Senator SPECTER. Would you include Duke as one? [Laughter.]

Dr. KOENIG. Well, certainly we have the—

Senator SPECTER. I would ask you if you would include Harvard as one and ask Dr. Benson if he would include Duke as one.

Dr. KOENIG. Yes; I think Duke has multiple, different disciplines and we have established—

Senator SPECTER. What institutions beside Duke and Harvard, or Harvard and Duke?

Dr. KOENIG. Well, I think Dr. Anderson said Pittsburgh. Pittsburgh and UCLA are probably the two highest runners. There are multiple different investigators at each of those institutions that are already studying it.

Senator SPECTER. Only one in Pennsylvania? [Laughter.]

Dr. BENSON. Where does your support system come? [Laughter.]

Senator SPECTER. It is a challenging matter for the Congress to try to deal with these matters—the Senate, the committee, the subcommittee. There is a fair amount of resistance at NIH for congressional suggestions. There are some markers laid down on the prostate cancer this year, last year on Parkinson's, in the past on other lines. Generally there is not too much tension between the Congress and NIH because the Congress does not know very much and does not get very much involved, so we do not give you much trouble, Dr. Anderson. We pretty much leave you with billions of dollars to spend as you see fit.

#### ALTERNATIVE MEDICINE AND MIND/BODY

But my own sense is that on mind/body there is a different line and a need to develop it. Precisely how is really up to the experts. I have a sense that a center, as Dr. Koenig and Dr. Benson outline it, would be a good approach. It is going to have to be administered by NIH and there is going to have to be cooperation by NIH to whatever line Congress says, but we have given you a lot of money to work on other lines because we think you are so successful and are doing such very important work.

Before we conclude the hearing, I think we ought to have a definition as to the distinction between mind/body which some may confuse with alternative medicine. Let me turn to you, Dr. Benson, to give a definitional distinction between alternative medicine and mind/body.

Dr. BENSON. Let us go back to the metaphor of the three-legged stool, health and well-being being held by a three-legged stool. One leg is pharmaceuticals. The second leg is surgery and procedures, and the third leg is that self-care leg. In that self-care leg, we have

the relaxation response, belief, nutrition, exercise, and stress management, cognitive work.

Now, first of all, mind/body medicine has a great deal of scientific evidence behind it. Mind/body medicine, therefore, is largely scientifically proved. Alternative medicine is not scientifically proved. If it were, it would no longer be alternative.

Secondarily, alternative medicine is not in the self-care realm. There is little difference between an herb and a pharmaceutical. It is given to you.

Secondarily, with the second leg, there is little difference between acupuncture, let us say, and a surgical procedure. It is done to you, whereas self-care is something you do for yourself.

Another element of mind/body medicine that has not been adequately covered in this particular hearing, Senator, is the cost savings. Preliminary data now show that these self-care approaches decrease visits to doctors in HMO settings by upwards of 50 percent, and in capitated HMO settings, this is money in the bank.

In contrast, alternative medicine appears to be cost additive. People do not give up their doctor. They do not give up their surgery, their penicillin, but they take an herb or they take a procedure with it. So, from a cost savings, long-term point of view, these mind/body approaches will save money where alternative medicine will probably add money.

Senator SPECTER. You say mind/body saves money for HMO's. Do HMO's include mind/body in their coverage sheet?

Dr. BENSON. The HMO scene to my assessment is a frightful one. They are simply cutting costs and they are cutting down on some—many of them are responding to anything new in a very defensive way. For example, for a belief to be enhanced, the doctor/patient relationship is vital. HMO's are cutting down on the amount of time that a doctor can spend with his or her patient. That is awful because that is undermining the—

Senator SPECTER. Do HMO's generally cover mind/body?

Dr. BENSON. The HMO's are now beginning for the first time to cover mind/body approaches because they are beginning to see the cost savings aspect. In fact, the Mind/Body Medical Institute, of which I am president, has as one of its major programs teaching and training, and more and more HMO people are coming to us to learn these approaches that are being sponsored. For example, Kaiser in California is now learning our approaches. It is a beginning. We need much help, though. This is another thing the centers would do. They would enhance teaching and training capabilities. For example, we are much too small. If—and I hope—these approaches will catch on to teach and train the health care professionals of our Nation, and the centers would be one way to enhance such teaching and training.

Senator SPECTER. Dr. Koenig, is there anything you would care to add before we conclude the hearing?

#### CHANGING PEOPLE AND THEIR BEHAVIOR

Dr. KOENIG. Well, I would like to actually just continue to respond to your first question. Ten million dollars is a lot of money, and whether or not that should be appropriated. I think truly that is a small investment when you consider the potential benefits of

these belief related and relaxation type responses. These are behaviors that can oftentimes change—changing a belief system can potentially help a person's health for the rest of their life, and learning some of these very simple relaxation techniques can be incorporated and it can last again for years and years. The potential cost savings by changing people and their behavior, particularly with regard to smoking or drinking, could be potentially huge. We have to do something about that, given the costs of the baby boomers that are aging and just are overwhelming our health system.

Senator SPECTER. Dr. Anderson, is there anything you care to add?

Dr. ANDERSON. Yes; if an earmark is given for OBSSR, we would prefer to give investigators maximum flexibility in determining the mechanism, that is, not limiting it to centers, but including centers but also other mechanisms as well.

Senator SPECTER. Could you give me a written response as to whether there are mechanisms you would like to see, how you would like to see it structured?

Dr. ANDERSON. Yes.

Senator SPECTER. In light of your administration of the program.

Dr. Benson, a final word?

Dr. BENSON. We are very thankful. I am very thankful—we at the Mind/Body Medical Institute are—for this opportunity to present these data to the subcommittee.

I would like to end with a financial consideration, that as I noted at the outset, we expect that data are now supporting that \$2.1 trillion will be spent by the year 2007 on health care. This is a doubling. Yet, if we look at mind/body approaches that are inherently cost saving, our calculations show that conservatively they could save \$54 billion per year by people learning to take better care of themselves with self-care approaches that include those we have defined today.

Senator SPECTER. \$54 billion now or by 2007?

Dr. BENSON. 2007. This was published just recently, in fact, this month—these estimates of a doubling to \$2.1 trillion.

#### PREPARED STATEMENT

Senator SPECTER. The following statement was received from Caesar A. Giolito, executive director, National Interfaith Coalition for Spiritual Healthcare and Counseling, Washington, DC, by the subcommittee and I would like it to be made part of the record at this time.

[The statement follows:]

#### PREPARED STATEMENT OF CAESAR A. GIOLITO, EXECUTIVE DIRECTOR, NATIONAL INTERFAITH COALITION FOR SPIRITUAL HEALTHCARE AND COUNSELING

The National Interfaith Coalition for Spiritual Healthcare and Counseling is composed of thirty-two national associations and faith groups responsible for the nationwide delivery of certified pastoral care and counseling services in a wide variety of settings such as medical and mental health facilities, pastoral counseling centers, churches, synagogues, diverse workplaces, military installations, correctional facilities, rehabilitative centers, nursing and long-term care facilities, addictive treatment centers, hospices, and through solo practitioners.

These associations are composed of interfaith ministers and persons endorsed by religious faith groups and trained, certified, and/or licensed in pastoral care and

counseling, including pastoral counselors, chaplains, clinical pastoral care educators, mental health clergy, parish ministers, and seminary professors. The associations also include accredited pastoral counseling centers and clinical pastoral education teaching institutions, as well as over 100 theological schools throughout the nation. These providers of service and education have received specialized graduate training in both religion and the behavioral sciences, and practice and/or teach the integrated discipline of pastoral care and counseling.

The purpose of this coalition is to promote the role of qualified pastoral care and counseling and make it accessible to the vast numbers of people in our nation who have the need and desire to integrate the spiritual dimension into their mental and physical healing.

A vast growing number of the general public, clergy, theologians, physicians, clinical psychologists, clinical social workers, nurses, mental health counselors, medical community professionals and other practitioners, educators, and researchers agree that the underlying principles of spiritual healing are universal; that healing of the spirit promotes and accelerates healing of the mind and body, and that the total healing of the individual and society itself cannot be realized without the effective treatment of the whole person—mind, body, and spirit.

It has been the usual case that spiritual healthcare providers have been the energizing force in the area of belief-related therapy, and continues to be so. Chaplains and pastoral counselors in many medical institutions around the country are very much part of the healthcare delivery team, and, for the most part, physicians, nurses, and other medical personnel have been interested and supporting onlookers.

As studies in the area of the spiritual dimension and its effects on health have proliferated, with mounting evidence that it has positive impact in the healing process, the medical community has become increasingly interested and involved.

Medical researchers such as Herbert Benson, M.D., Harold Koenig, M.D., and numbers of other prominent researchers, from both the medical and pastoral care communities, have uncovered compelling scientific evidence of the efficacy of belief-related therapy in healthcare.

These studies have captured the imagination of physicians throughout the country. Many of them wish to know more about belief-related therapy and the spiritual dimension to consider including it in their therapies, and to provide higher quality and more effective cures for their patients.

Probably the greatest indicator of rising interest in the medical community is the growing number of courses in spirituality, religion, and ethics for medical students and residents. Many practicing physicians, who were not given that opportunity when they attended medical school, are now inquiring into this area.

On May 15, 1998, the National Interfaith Coalition, and the Greene County, Missouri, Medical Society co-sponsored a day-long symposium for the physicians of that area, and 200 physicians, on a weekday, packed an auditorium at Southwest Missouri State University to hear presentations on this subject by a group of expert pastoral care researchers and physicians.

The Coalition and physicians of Greene County now plan to establish a national model in Springfield, Missouri which integrates belief-related therapy into the area's healthcare delivery system. This seminal project, the first of its kind in the United States, will also be sponsored by Springfield's medical institutions, including Columbia Hospital South, Cox Health Systems, Lakeland Regional Hospital, the Medical Center for Federal Prisoners, and St. John's Health System. The Greene County Public Health Department will be a sponsor as well.

The project plans to provide spiritual assessments and belief-related therapy for inpatient and outpatient services and to compare patient outcomes with a twin city that does not provide the spiritual dimension in its healthcare delivery.

General Colin L. Powell, USA (Ret.) stated in regard to the project, "I realize that you, the members of the National Interfaith Coalition for Spiritual Healthcare and Counseling and the Physicians of Greene County, Missouri, are attempting to break new ground. I thank each of you for reinvesting your collective energy, beliefs and special skills back into Main Street—back into America—and I look forward to even greater successes as you enlist others in the cause."

These initiatives must also be tested on "Main Street," as General Powell puts it, if we are to thoroughly and scientifically study belief-related therapy as a component of healthcare in everyday life.

Joni Scott, M.D., Clinical Director of the Breast Center in St. John's Hospital in Springfield, Missouri, and a member of the Physicians' Task Force for the project claims that this initiative to include the spiritual dimension in healthcare has been driven by the element of patient satisfaction, since 95 percent of Americans believe in God and wish to utilize their faith and prayer in times of crisis.

As Dr. Herbert Benson has pointed out in his testimony, another significant factor spearheading this dimension is the rapidly rising cost of healthcare. He states that 60 to 90 percent of visits to physicians are stress related, and that utilization of belief-related therapy could lead to annual cost savings of more than \$54 billion.

Pastoral Counselors and Chaplains are a valuable national resource in delivering this care since they are professionally trained and nationally certified to do so. The Pastoral Care field is interested in making quality belief-related therapy accessible to those who desire it, with a special emphasis on the poor, elderly, disabled, infirm, addicted, incarcerated, and otherwise at risk persons.

The National Interfaith Coalition has a broad spectrum of citizen support as shown by its National Advisory Committee. The members of the Coalition and Advisory Committee are listed herein:

NATIONAL INTERFAITH COALITION FOR SPIRITUAL HEALTHCARE AND COUNSELING

Adventist Chaplaincy Ministries  
 American Association for Ministry in the Workplace (AAMW)  
 American Association of Pastoral Counselors (AAPC)  
 American Association on Mental Retardation-Religion Division (AAMR)  
 American Baptist Churches USA  
 American Correctional Chaplains Association (ACCA)  
 Assemblies of God  
 Association for Clinical Pastoral Education (ACPE)  
 Association of Professional Chaplains (APC)  
 Catholic Health Association (CHA)  
 Christian Church, Disciples of Christ  
 Christian Reformed Church of North America (CRCNA)  
 Church of the Brethren  
 Episcopal Church: The Assembly of Episcopal Hospitals and Chaplains; Office for Bishop of Armed Forces  
 Evangelical Covenant Church  
 Evangelical Lutheran Church of America  
 Independent Fundamental Church of America (IFCA)  
 Kansas COMISS  
 Lutheran Association for Maritime Ministry  
 Lutheran Church-Missouri Synod  
 National Association of Catholic Chaplains (NACC)  
 National Association of Jewish Chaplains (NAJC)  
 National Association of Veterans Affairs Chaplains (NAVAC)  
 National Conference on Ministry to the Armed Forces  
 National Conference of Veterans Affairs Catholic Chaplains (NCVACC)  
 National Institute of Business and Industrial Chaplains (NIBIC)  
 New York Board of Rabbis  
 Presbyterian Church (USA), PHEWA  
 Reformed Church of America  
 Southern Baptist Convention  
 United Church of Christ  
 United Methodist Church

NATIONAL INTERFAITH COALITION FOR SPIRITUAL HEALTHCARE AND COUNSELING

NATIONAL ADVISORY COMMITTEE

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 Dr. Robert Schuller, Crystal Cathedral

Dr. Martin E.P. Seligman, President, American Psychological Assn.  
Harvey Sloane, M.D., former Commissioner of Public Health, District of Columbia  
Dr. Thomas Smith, Executive Director, National Institute for Healthcare Research  
Dr. Gordon L. Sommers, Past President, National Council of Churches  
Sr. Teresa Stanley, General Superior, Incarnate Word Sisters, San Antonio  
Dr. Orlo Strunk, Jr., Journal of Pastoral Care  
Bishop Joseph M. Sullivan, Auxiliary Bishop of Brooklyn, N.Y. Catholic Diocese  
John M. Templeton, Jr., M.D., President, John Templeton Foundation  
U.S. Representative Edward Whitfield (R-KY)  
Dr. Robert Wicks, Loyola College, Maryland  
Bishop Roy Winbush, Chairman, Congress of National Black Churches  
Admiral Frank Young, M.D., former FDA Commissioner  
Mr. Raul Yzaguirre, President, National Council of La Raza

CONCLUSION OF HEARING

Senator SPECTER. Well, thank you very much, Dr. Anderson, Dr. Benson, and Dr. Koenig, and that concludes our hearing. Thank you. The subcommittee will stand in recess subject to the call of the Chair.

[Whereupon, at 12:13 p.m., Tuesday, September 22, the hearing was concluded, and the subcommittee was recessed, to reconvene subject to the call of the Chair.]

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