



DAVID M. EISENBERG, MD: INTEGRATIVE MEDICINE RESEARCH PIONEER

Interview by Karolyn A. Gazella and Suzanne Snyder • Photography by David Gilbert

David M. Eisenberg, MD, is the Director of the Osher Institute and the Division for Research and Education in Complementary and Integrative Medical Therapies at Harvard Medical School, Cambridge, Mass. He is also the Bernard Osher Associate Professor of Medicine at Harvard Medical School. Dr Eisenberg is a graduate of Harvard College and Harvard Medical School. He completed his fellowship training in general internal medicine and primary care and is board-certified in internal medicine. In 1979, under the auspices of the National Academy of Sciences, Dr Eisenberg served as the first US medical exchange student to the People's Republic of China. In 1993, he was the medical advisor to the PBS Series, "Healing and the Mind" with Bill Moyers. More recently, Dr Eisenberg has served as an advisor to the National Institutes of Health, the US Food and Drug Administration and the Federation of State Medical Boards with regard to complementary, alternative, and integrative medicine research, education, and policy. From 2003 to 2005, Dr Eisenberg served on a National Academy of Sciences committee that was responsible for the Institute of Medicine report, "The Use of Complementary and Alternative Medicine by the American Public." Dr Eisenberg has authored numerous scientific articles involving complementary and integrative medical therapies and currently oversees Harvard Medical School's research, educational, and clinical programs in this area.

Alternative Therapies (AT): Why did you become a doctor?

David M. Eisenberg, MD: When I was 10, my father, who was 39 at the time, developed chest pain, went to the hospital, and died of a sudden heart attack. It was unexpected and very sad. He had not been sick before. Sadly, my 2 grandmothers had died 6 weeks before—1 week apart—due to unrelated acute medical illnesses.

During those formative years, from age 10 to 18, I began questioning what I wanted to be and why I wanted to help people. At the time, none of the physicians involved explained these deaths in a way I could understand them. There was not a lot of discussion about why my father or my other relatives passed away so suddenly. I think the mystery of it all inspired me to want to study health and medicine. There's also the issue that, when faced with a challenge, people either rise to it or sink because of

David M. Eisenberg, MD, shown here at his office at Harvard Medical School, oversees the school's clinical, research, and educational programs on complementary and integrative medical therapies.

it. My siblings and I rose to the occasion. I have a brother who is a physician, a brother who is a lawyer, and a sister who is a lawyer. We all, out of deference to our mother, wanted to do well and to be of service to others.

I was a good student and was accepted to Harvard University. Just a few months before I entered Harvard, President Richard Nixon and Secretary of State Dr Henry Kissinger were "opening" China. This was also the time that news reports started coming to the West about acupuncture anesthesia. As a teenager about to enter college, I decided I wanted to major in biology and pursue pre-medical studies. I also thought acupuncture anesthesia was about as interesting a topic as any. When I started college, I asked my new biology teachers if I could do an independent study about it. One of them, Dr George Wald, who had won a Nobel Prize, and his wife, Ruth Hubbard, who was also a biology professor, encouraged me to do an independent study. Unfortunately, there was no literature in English on acupuncture anesthesia in any of the Harvard libraries. So, here I was in my first semester, facing a potential failing grade for an independent study project because I couldn't find anything resources in English. Many years later, I realized that the reason there was nothing in English was because acupuncture anesthesia was born in the 1960s and 1970s. At that time, there was a political directive by the Chinese government insisting that Chinese medicine doctors figure out ways of working with conventional surgeons and other Western-trained physicians. Acupuncture anesthesia for surgery did not exist before this mainly because surgery, an invasion of the body, in Asia—China specifically—was prohibited. Doctors there didn't operate intentionally on any live human being. So the application of acupuncture to the surgical amphitheater is younger than I am. Although I didn't know it at the time, that explains why there was nothing written about the topic in English.

In an effort to salvage this independent study project, I happened upon a book called *The Yellow Emperor's Cannon on Internal Medicine*, which to this day is regarded as one of—if not the most—precious texts of Asian medicine and the one from which most other Asian medicines draw extensively. Whether you're talking about Japanese medicine, Korean medicine, or medicine of Southeast Asia, most draw on this book that was written 24

Reprint requests: InnoVision Communications, 169 Saxony Rd, Suite 103, Encinitas, CA 92024; phone, (760) 633-3910 or (866) 828-2962; fax, (760) 633-3918; e-mail, alternative-therapies@innerdoorway.com.

centuries ago. There were 2 things about this book that clearly inspired me and probably set me on a path that has lasted 30-odd years. One was the notion that prevention is always superior to disease treatment. There's a famous quote in that text, something to the effect that, "to administer to diseases that already have occurred is like beginning to dig a well after one is already thirsty, or beginning to build weapons after already engaging in battle. Would these actions not be too late?" And the other thing that really made me think is the notion that lifestyle and psychological state affect one's health, one's proclivity to develop illness, and one's ability to recuperate from illness. In other words, diet, exercise, sleep, spirit, psyche, and emotion all matter in health spheres, and we cannot separate the way we live and feel spiritually from the way we are materially.

AT: That's an amazing realization for an 18-year-old.

Dr Eisenberg: I think it was born of my own personal losses at a young age. I wondered if this realization would help me personally as well as help me to help other people. And even though it was the heyday of reductionism by the National Institutes of Health (NIH), it resonated with me. So when you're a college freshman, you can do things like say, "Well, I'll just study Chinese!" Because when you're young and naïve you think it's just another course, right? But it was very hard. However, I immediately fell in love with the language and started to take courses in Chinese history, philosophy, and art. The Chinese aesthetic and the Eastern approaches to health were truly inspirational to me.

During that same time, the United States was making positive gestures toward China, its enemy of 30 years. My professor of East Asian studies, John King Fairbanks, was really a legend in that field, arguably the leading Chinese scholar of the last century. In fact, the Center for East Asian Studies at Harvard is named in his honor. He was the chairman of the department, and he had been the US ambassador to China throughout World War II, and had trained most of the Chinese scholars of the late 20th century. It was his opinion that the experiment going on in China in 1972—the so-called "cultural revolution"—would, to a large extent, in his words, "alter the landscape of human civilization." The cultural revolution was a struggle between the political, economic, and pragmatic in China. Even Professor Fairbanks was ill-informed—

as we all were—of what exactly was happening. In hindsight, it was a holocaust. But he was quite prophetic, because you could argue now, looking at the front pages of *Business Week*, *Time*, *Newsweek*, and *The Wall Street Journal*, that China is changing and that the struggles that went on in the 1970s helped shape what has happened over the past 3 decades and has allowed China to evolve into a 21st-century super power.

I was a very impressionable young man, and the combination of my professor's influence, really loving the language and the culture, and feeling a bit humbled in terms of learning about an

entirely different culture really encouraged my interest in China. Although I'm of Jewish background, there's something about ancient culture and traditions that resonate with me. So, even though I was very committed to pre-medical studies and interested in many other subjects in the humanities, I always kept part of my time to study about Asia and Chinese philosophy. As a result, rationally or irrationally, I became more determined to study about Chinese medicine.

Those are the origins that caused me to choose medicine early on. Then politics and geopolitics created the wind at my back. I

say that because I applied for a very unique scholarship called the Luce Scholarship. Henry Luce had funded an endowment at Harvard for scholars to go to other countries for a year. Of course, I really wanted to go to China. I was nominated by Harvard College but ultimately I was rejected because I spoke Chinese and they wanted a pure dilettante. That stuck in my craw.

Fortunately, however, I entered Harvard Medical School at a time when the notion of primary care, an interdisciplinary approach to medical care, was just beginning to be formed. As a medical student, I was fascinated by trans-cultural work and still had a strong desire to go to China. And that's when politics played a role. The Harvard faculty got an invitation to send the first delegation of Harvard professors to China. I went on that delegation as a guest of one of my mentors, Robert Lawrence, who had a financial fund that could pay my way. I felt like a spy because I was the only member of the delegation who spoke Chinese. That single trip, which was only a couple of weeks long, changed my life. We all were amazed at what we saw. In hindsight, we were fed truths and non-truths, but we were all inspired by the notion that there were as many women as men in medicine and that they were—at

LIFESTYLE AND
PSYCHOLOGICAL
STATE AFFECT
ONE'S HEALTH, ONE'S
PROCLIVITY TO
DEVELOP ILLNESS,
AND ONE'S ABILITY
TO RECUPERATE
FROM ILLNESS.

least according to their own account—trying to deliver healthcare to everyone. They also aspired to do it at low cost while attempting to use the best of science. All the right intentions were clearly conveyed to us. And they took us to see acupuncture anesthesia, which was one of my key interests. I came back from that trip and was absolutely certain that part of my destiny was to really immerse myself in Eastern medicine, to evaluate it, and to see what I could bring back to the West.

AT: Did you go back?

Dr Eisenberg: Yes. Within 6 months of that trip, the United States normalized relations with Beijing and then the National Academy of Sciences advertised for the first year-long scholarly exchange with China. I applied and was one of two finalists for the slot in medicine. The other finalist is my dearest friend and colleague in this field, Ted Kaptchuk. Ted and I actually first met at the final interview to be the medical exchange student to the People's Republic of China. I had my Bar Mitzvah suit on and he had a ponytail. I think they picked me because I had the more conservative credentials

(and clothes!). Who knows what our respective fates would have been had he gone and I stayed. But I'm just glad I met him, because as most people know, I consider him really my partner in all the work I've done, and it was the beginning of an extraordinary 30-year friendship.

The year was 1979. I packed my bags and went to China for 12 months to study at the Beijing Institute of Traditional Chinese Medicine. That immersion was what began my inquiries into which "complementary therapies" worked simply because they worked, which of them worked because of profound expectations, and which of them worked and could be amplified by belief, expectation, or cultural conditioning.

AT: Did your desire to do research in the area begin back then as well?

Dr Eisenberg: Yes. When I was in Beijing, the challenge crystallized. I knew then that I wanted to spend the rest of my career studying these things and figuring out which ones could and should be appropriately incorporated into Western healthcare.

AT: How did you make the transition when you came back to such

a conservative organization with new ideas that to a large extent were not readily accepted?

Dr Eisenberg: It was actually very traumatic. It was traumatic just to come back to Western society. China only had a few dozen Americans in the whole country when I was there. When children on the streets of Beijing looked at me it was as if they were seeing an alien. They had never seen a Caucasian before. On a crowded bus people would routinely stare at my blue eyes because they had never seen blue eyes before. One woman in particular, on a daily

trip back and forth would stare every day until I asked her, "Why are you staring at me?" and she then said, quite embarrassed, "I'm an ophthalmologist, and I've never seen eyes like yours, but I have read about them." It was also a year during which I lived without heat or air-conditioning in an 8-by-10-foot room, had few possessions, and rose at dawn to do tai chi with my teachers. So coming back to Western society was in and of itself a shock.

Even though Harvard Medical School had offered to give me credit for my year in China, I wanted a year of re-entry so I did do a 4th year of medical school to complete my rotations. That

gave me some time to reflect. During that year, at the encouragement of my dean for education, Daniel Federman, MD, I wrote the book, *Encounters with Chi*, as really a minimalist memoir of what I had seen. But then I was determined to fulfill my desire to be well trained in medicine. To me, this meant learning about lifestyle, prevention, and psychiatry as well as internal medicine. I also wanted very much to study what I had seen in Asia.

It was at that time that I received some very good advice from my mentors at Harvard. They said, "If you want to study these other therapies, and if you want to study the impact of belief, expectation, conditioning, and the effect of the therapy, you surely should do these things because they're important. But this will be a tough road, and this is a road where people will be trying to disprove you and will not be receptive to the inquiry, let alone the findings. So you better arm yourself well and earn your stripes as a conventional internist, pass your board exams, be respected as a clinician, then do research training, and *then* you can look at these things that you find interesting." What they were really saying was, "You've got another 6 years of work ahead of you before you touch this." They were telling me that I was not ready. Would I believe

I CAME BACK FROM CHINA CERTAIN THAT PART OF MY DESTINY WAS TO IMMERSE MYSELF IN EASTERN MEDICINE AND TO SEE WHAT I COULD BRING BACK TO THE WEST.

them and take their advice? Yes, I did. To this day, several of them remain my staunchest champions because they believed in me even though they questioned some of the validity of my hypotheses and the value of this work. But they said, “If you’re going to do it, learn the rules of engagement. Know the rules of evidence. And if you’re going to study these things, then simply because they are from a distant place and not ours culturally, you really need to apply the best of science. You need to earn the right to do it.” It was very good, “tough love” advice.

AT: But that takes a lot of discipline and patience.

Dr Eisenberg: Yes, it does. Maybe my appreciation of the Asian notion of delayed expectation, delayed gratification, and long-term view also impacted my decision. But I also really revered these people’s wisdom, and I knew they were trying to help me. They were not trying to thwart me; they were just saying, “You need to prepare yourself and it is going to take time.” Ironically, I had heard something similar in China from my mentor there, Dr George Hetem, the famous American expatriate who joined Mao Tse-tung on the Long March in the 1940s and who became China’s first de facto Health Minister in 1949. He said, “Be patient because your desire to learn about China will take time in order for you to be trusted.”

AT: It’s interesting that the culture that you were studying and enjoy so much gave you the foundation to be patient.

Dr Eisenberg: Yes, that’s right. I came to realize it would be a long-term investment. Asian cultures believe that things of value take time. A common Western notion is that if you invest in something now you want and must demand a return on your investment almost instantaneously. That is not only misguided but a fallacy.

AT: That’s not only true in financial investing; the quick-fix mentality has permeated our healthcare system and our health.

Dr Eisenberg: Yes. And yet all of the Chinese clinicians I worked with knew that if a patient presented with an acute illness, a very high and spontaneous fever, or an injury after a car crash, or with an acute rash, they shouldn’t go a traditional Chinese doctor. That’s where Western medicine is unquestionably superior. But if you had a chronic illness or a chronic syndrome or symptom that did not respond to the best of Western medicine, it was worth trying Asian approaches, including herbs, diet, acupuncture, meditation, lifestyle change, and individualized treatment, which would take time. The Asian patients with chronic problems rarely expected immediate cures.

AT: What led to your widely published work in *The New England Journal of Medicine* in 1993?

Dr Eisenberg: After I trained in internal medicine, I did 2 research fellowships at Harvard, one in general internal medicine research and the other in behavioral medicine, learning mind-body tech-

niques and how to teach patients about stress-management, mindfulness, stress-reduction, meditation, and relaxation. It was an excellent training, but I knew then that because my colleagues were quite skeptical, I would have to do some serious research to convince them of the value of any of these techniques.

Before I did research in complementary medicine, I had a different job. While on the faculty between 1986 and 1989, I was asked by the Dean of Harvard Medical School to reestablish the exchange of faculty, fellows, and students between Harvard Medical School and the Chinese Academy of Medical Sciences. Up until 1949, there was a regular exchange of faculty between China and Harvard. I wanted to rebuild that bridge. Six months before the Tiananmen massacre in 1989, I was shuttling back and forth to Beijing in an effort to plan a gala fundraiser. This was going to have the first President Bush, Secretary of Health Louis Sullivan, MD, and Secretary of State [George] Schultz to be the US counterparts to the Minister of Health of China along with the heads of the Chinese Academy of Medical Sciences and Harvard, to engage the titans of industry in the West to reinvigorate scientific and medical exchange between the United States and the People’s Republic of China. I was literally on my way to Beijing to go over the guest list for that extraordinary event the weekend of the Tiananmen shooting. The Minister of Health called me at my home and said, “Don’t come.” And the next day, many people were killed. So this notion



of wanting to create bridges between East and West has clearly stayed with me for a long time.

As for the 1993 published work that received broad attention, I could not have anticipated how powerful the results were going to be, and how powerfully they would be perceived. I just knew instinctively as a primary care clinician in Boston that when I asked patients if they were using any complementary therapies, they would routinely say yes. My gut told me if we could systematically look at this question nationally, we might, for the very first time, have the evidence we needed to convince the medical establishment that these things needed to be rigorously studied. It was a strategic position. First we would showcase the prevalence of use of complementary therapies, and then make the argument about testing them for safety, efficacy, and mechanism. So that was a strategic insight on my part. I was very fortunate at the time to get a grant from the John B. Fetzner foundation; they were just reinventing themselves and they believed in what I was doing so they wrote the first check in support of my work.

Then I did something else, which became the prototype of every grant I've written ever since. I sought out those with the greatest methodological expertise to study the question at hand and asked them to serve as my co-investigators. In this instance, I worked with a number of health service research teams, one in Boston, and later, one in Michigan, headed up by Ronald Kessler.

Ron was (and is) among the best in the world at designing randomized, national surveys. Again, my instincts told me that if I was going to write a grant that would be successful, I should partner with methodologically rigorous skeptics who might be inclined to disprove my findings but whose integrity would hold up my results, positive or negative. This advice came from one of my mentors, Howard Hyatt, who's still working at Harvard and who had been chairman of medicine at the Beth Israel Hospital and then dean of the School of Public Health. When I asked him if I should pursue this line of research, he said, "Yes" and agreed that if I could do it at Harvard, it might have a greater impact. I think his unsolicited advice is so profound. He said, "If it's possible, find people in fields other than your own with whom you don't share a similar language, but with whom you share a question. Build bridges with those people in these other disciplines to jointly answer that question. And from that collaboration," he predicted, "you will make your greatest professional contributions and have your greatest personal satisfaction." And he was absolutely right. Every project I've ever undertaken and cared deeply about has involved people outside of my area of expertise. We learn anew from each other and jointly address important questions. Those projects have been the ones that have been the most successful and satisfying to me.

So, that survey was actually a test case. I found people who were health service researchers, survey researchers, sociologists,



and statisticians—not people who were primary care internists—to guide me, using state-of-the-art technology that would help me answer my question. I'm doing the same thing with the research that I care about now, whether it's in the clinical, sociological, or biotechnology domain.

AT: Was the intention always to do a follow-up?

Dr Eisenberg: The first study was done in 1989, the second study was done in 1997, and then the government did the last study in 2002. So I'm done with that work. I think the government should periodically replicate that same survey because if you ask the same questions at 4- or 5-year intervals, you'll possibly get different answers. That extensive set of questions should continue to be asked of thousands of randomly selected adults to draw dots on the curve to illustrate the trends in complementary therapy use over time. It's not enough to simply ask whether people have used certain complementary and alternative medicine (CAM) therapies but also to ask why they did, whether they have before, if they do so concurrently with conventional medicine, what their beliefs are about these therapies, whether their insurance covered their therapies, and how much they pay for these therapies out of pocket. All the questions we asked about in our survey need to be embedded into periodic national surveys. There also needs to be more ethnographically valid questions. Why are people doing this and where are they getting their information? However, I'm no longer in the business of doing surveys.

AT: So, you are on to the next project?

Dr Eisenberg: The design for those studies was written when I was a research fellow in 1984, so that idea took shape 21 years ago. When I began on that tact, it was always meant to be a strategic investment that, if successful, would either provoke or shame the establishment into looking at more important questions: do these therapies work; how do they work; are they safe; can they be incorporated with efficacy and safety into mainstream conventional care? What can we discover scientifically with regard to mechanism of action? Now the questions are much more interesting, so I think I'm continuing on the track I embarked on a long time ago.

AT: And what is your plan?

Dr Eisenberg: Well, it's worth mentioning that in 1995 I received the opportunity to build a center of excellence in the field of complementary and integrative medicine at Harvard. My colleagues and I were able to secure NIH research support and began to publish our findings in major medical journals. We developed educational programs for medical students, post-graduates, and continuing medical education. We also began attracting colleagues within Harvard and outside Harvard. I wanted to apply the best of rigorous science and constructive debate to this area of medicine. When we were able to do this, I knew this field of study would likely be sustainable.

The next break occurred in the year 2000, when the Dean and Faculty Council of Harvard Medical School agreed to establish a new division for research and education in complementary and integrative medicine across all Harvard-affiliated hospitals (which number 17), as well as all of Harvard's centers, institutes, and affiliated departments and divisions. Its principal objectives include (1) research; (2) development of educational programs; (3) supervision of research fellows; (4) the implementation of a botanicals research program; and (5) the design, testing, and implementation of sustainable models of integrative care in academic settings. The establishment of this new academic division was a major statement for Harvard Medical School and has allowed this program to grow and mature. In addition, a very generous financial gift from the Bernard Osher Foundation has helped provide some of the research infrastructure necessary for a program of this scope. I am very proud of the fact that the faculty of the Osher Institute now oversee 6 NIH-funded research fellows, have a lengthy portfolio of sponsored research projects, both clinical and basic science in nature, and have published more than 120 scientific articles in major medical journals. As another sign of our progress, all of the graduating fellows of our program have secured full-time clinical and research positions in the area of complementary and integrative medicine nationwide. In addition, we have been working on a model of integrative care within one of the Harvard-affiliated hospitals and hope to see this model launched in the near future.

It's important to mention that the direction of the NIH in this area has also evolved over time. There is a renewed appreciation on the part of many that clinical studies of efficacy alone will be insufficient to change the behavior of the larger skeptical biomedical community. Explanatory models and reproducible mechanisms of action of complementary and integrative therapies need to be described and validated in order for these approaches to be fully adopted over time. In addition, the NIH has mentioned in its recent 5-year plan its desire to encourage and support international collaboration—something I am obviously very enthusiastic about—as well as studies aimed at documenting cost effectiveness or the lack thereof. These are very sound strategies that will be important elements in the maturation of this field, especially as it pertains to clinicians, scientists, policy makers, administrators, and corporate leaders.

Lastly, the NIH has also begun to support rigorous scientific inquiry into the question of how expectation, patient-provider interaction, and so-called “placebo phenomena” work. Ted Kaptchuk heads up our placebo research initiatives and has put together an extraordinary team of talented investigators. The question of whether there is such a thing as a placebo responder is of great importance. There is also an interesting question as to whether people are genetically predisposed to have higher or lower placebo responsivity. The mechanism through which belief, expectation, and patient-provider interactions can increase or decrease the effect size of *any* therapy, regardless of its origins, remains a fundamental and important scientific issue. We and others around the world are beginning to take up this challenge and to work creatively to address it.

AT: What else do you find interesting about healthcare right now?

Dr Eisenberg: One area I'm passionate about is the issue of cost effectiveness. The Holy Grail is to determine whether that having access to an individual complementary therapy or to an integrative care team improves clinical outcome and reduces cost. Many researchers, working on multiple projects, have attempted to demonstrate that this may be true. By the way, medical and disability expenses for low back pain, for instance, cost us about 200 billion dollars a year. If an integrative care model can reduce that by just 10%, that's a savings of 20 billion dollars for one common medical problem. We know that integrative medicine can potentially reduce prescription medication costs, office visits, expensive testing, and lost productivity. Reducing just one of those would probably provide sufficient cost savings to pay for integrative care facilities in most major hospitals and outpatient facilities. These, in turn, could become very useful training facilities for the next generation of healthcare providers.

If we can prove that any of these interventions can provide improved clinical outcome at reduced cost, then we could make them available to everyone, regardless of their socio-economic background. That would be a major contribution. It would also prove that integrative medicine is sustainable and defensible. So, cost effectiveness is critical. If we can impress upon the people who pay the bills—large corporations and the government—that access to some of these therapies individually or in combination (ie, through integrative care) improves outcome and reduces cost, they would insist that these things be covered by insurance and would require that medical, nursing, and pharmacy schools train the next generation of healthcare providers to work in a more trans-disciplinary, comprehensive healthcare system.

Medical technology and its application to scientific discoveries involving complementary therapies is also very exciting to me. I am particularly interested in the application of biotechnology, systems biology, chemical biology, molecular biology, and diagnostic radiology to assist us in the systematic evaluation of herbs, dietary supplements, and nutrients, as well as acupuncture, meditation, and placebo phenomena. If we can figure out how these therapies work using modern technology, we can better predict which ones should be used for which individuals and at what dosages. If we could figure out how individual gene types respond not only to drugs but also to dietary supplements, different types of stress, and exercise, we could then have a more effective, individualized, integrative approach to the prevention and treatment of disease. Living in the post-genomic era, we are gaining accuracy in predicting individuals' risk for developing a range of diseases (eg, obesity, diabetes, cancer). I think 50 years from now, we'll be on much stronger terrain scientifically to argue in favor of many of the ancient healing traditions. We'll also know which herbs and supplements interact with specific drugs, and we'll be in a better position to anticipate and prescribe complementary therapies accordingly. Science is, after all, our best navigational tool.

I am very optimistic about the future of complementary and integrative medicine. The future is especially bright in the areas of

neuroscience and genetics research as applied to complementary or integrative approaches.

AT: It can seem overwhelming and it's difficult to look ahead 50 years. Do you think we will see dramatic changes sooner?

Dr Eisenberg: I think it depends where you're starting from. For those of us who have seen this field blossom during the past 3 decades, the pace has been staggering. The challenges ahead are not really as daunting as the ones we have overcome. I'm not worried. I'm a patient guy. I see the basic scientists as the cavalry who are now beginning to ride up, to figure out how these therapies work and what new discoveries can be made as we systematically investigate them. I think we're now walking downhill.

There are still frustrations, however. There is no vested interest by the pharmaceutical industry. There is no incentive for them to invest in the kind of mechanistic approaches I have mentioned because they can't secure a patent and get a return on their investment. That's a political puzzle that we need to address collectively. We need to think of financial incentives for research from the private sector, including pharmaceutical companies, Fortune 500 employers, and insurers. We can't just expect the government to pay for all of the research in this area. There is also a sociological trend to be less physically active, to pay less attention to stress, and to eat foods that are convenient and satisfying but not necessarily healthy.

In addition, we're still terribly reliant on the NIH for principal funding in this field. There is a need to increase federal funding beyond NIH, to also include the US Department of Health and Human Services, Medicare and Medicaid, the Department of Defense, the Centers for Disease Control, etc. I'm not looking for a handout as much as I am for an alliance of multiple federal agencies as well as the private sector to sponsor research in this important area.

The advancement of this field and healthcare in general relies on the patience and professional contributions of people who are either trained across disciplines or are comfortable working across disciplines—people who are “bilingual” in their professional lives and/or comfortable in domains and professional cultures other than their own. Leadership is the ability to work across disciplines and facilitate collegiate relationships. The next generation of healthcare professionals can anticipate in a way that I can't which disciplines need to be brought together to look at these issues to continuously refine and improve healthcare. Which disciplines now need to shake hands and admit that they don't speak the same language but they share the same questions? We need to encourage them to do just that because that's how contributions are made and progress happens. That's how we will determine how this field ends up. It will happen across disciplines and across international borders. Over time, we, our children, and our children's children will benefit from these collaborative efforts to enhance medical care in the 21st century.