Systems of Healing and Transforming Medical Practice

A Clinical Conversation with Patrick Hanaway, MD, and Robert Rountree, MD

Patrick Hanaway, MD, is a family physician trained at Washington University. Dr. Hanaway served on the executive committee for the American Board of Integrative Medicine and is past president of the American Board of Integrative Holistic Medicine. Dr. Hanaway became the chief medical education officer at the Institute for Functional Medicine (IFM) where he oversaw the development and implementation of IFM's programs worldwide. He has taught with the IFM since 2005, leads the GI Advanced Practice Module, and continues his support of IFM as co-chair of the Expert Advisory Board. In 2014, Dr. Hanaway helped develop the collaboration between IFM and the Cleveland Clinic, where he was the founding medical director, then research director, and now serves as a research collaborator at the Cleveland Clinic Center for Functional Medicine. In 2017, Dr. Hanaway received the Linus Pauling Award for his outstanding work in medical education and research. In addition, Dr. Hanaway has been initiated as a Mara'akame (indigenous healer) by the Huichol people of the Sierra Madres in Mexico. For the past 20 years, he has worked with his wife in clinical practice at Family to Family: Your Home for Whole Health Care, in Asheville, NC. The focus of Dr. Hanaway's work is to leverage his skill set to transform medical practice, through education, research, and clinical care.

Robert Rountree: You really are moving in a lot of different directions these days! Whenever I call, I never know who is going to pick up the phone. By that I mean, I do not know whether I am going to be talking to Patrick the immunologist, Patrick the microbiome specialist, Patrick the functional medicine/public health expert, Patrick the shaman, or Patrick as a human being experiencing his own health challenges. Knowing you for many years as a man who wears so many hats makes me wonder what kind of kid were you? I know you always wanted to be a doctor, but were you also a kid who was into everything?

Patrick Hanaway: Well, I was kind of a nerd. I was sensing a lot of things that went on around me, and I was just really curious as to the way in which the world worked. I was always

curious in that way of asking questions, trying to sort and understand things.

I think an example of that was being a sophomore in high school and reading about Oparin and Haldane's theory on the primary synthesis of organic life. There were studies done by Stanley Miller at the University of Chicago in the 1950s that looked at creating a reducing environment with electricity and methane, ammonia, hydrogen, and water in a reducing atmosphere. They were able to create amino acids and nucleotides from that. I said, "I bet I could do that."

So I made an agreement with the biology teacher at my school, and I set up this whole chemistry experiment in the back of the biology laboratory and got all these flasks and organic chemistry laboratory equipment from the local college, and figured out how to create a transformer and electricity, and I did it. I was able to make six amino acids and a nucleotide over about a month period of time. I thought, "Well, that is pretty cool." I went to an all-boys' Catholic high school, and the priests said, "Really? I thought that is what God did." And I said, "Well, this is a manifestation of God, you know? This may be how God works."

Soon after I began reading, for unknown reasons, the book *Life After Life* by Raymond Moody, and decided to compare those experiences with the *Egyptian Book of the Dead* and the *Tibetan Book of the Dead*. I was just always asking questions. I had a priest as a teacher who was interested in teaching us about comparative religions and how to think. Someone once said to me, "You are outside the box." I replied, "There is a box?"

Dr. Rountree: So you had an insatiable curiosity?

Dr. Hanaway: Totally—always trying to understand how does this relate to that? You ask about many different hats. To me, it is more like I feel like I wear an umbrella—like those umbrella hats that are multicolored. There are many different facets to everyone that I meet. I like to say "People are interesting." They are curious. I think I understand them, and then I realize that I do not really understand them at all. There is a lot more going on under the hood than meets the eyes. That, to me, is what is fascinating about being a clinician, because it is always asking questions and being curious and that has done me well.

It even goes to talking about science and doing research. I see people who read a paper, and it does not agree with their thought process (i.e., belief system), and they say, “Oh, they must have done the experiment wrong,” whereas I say, “Well, it is possible they did the experiment wrong, but it is also possible that the way I am thinking about this is wrong. Let us evaluate both of those considerations.” If I find that the data are telling me something that is very different than my view, then it is time to examine my view—what is it really telling me? That is supercool to me, because it means I do not know everything, and I am always going to be learning.

Dr. Rountree: Where did you get that attitude? Was it from your parents or a mentor? It is certainly not the norm, especially in the field of medicine. In medical school I had so many professors who would get threatened if I challenged their assumptions. But when you get challenged, that just makes you more curious!

Dr. Hanaway: In medical school, I was one of those who was asking questions, and I learned that “gunner phenomenon,” where the people who were asking all the questions were shunned by our classmates.

I learned early on to not do that. But I would have one-on-one conversations with the professors, and I was perfectly fine to talk to the head of neurology or the head of pediatrics at Washington University, to just knock on the door and say, “Hey, can I talk with you?”

We would have conversations. And they would be interesting explorations, to talk about psychoneuroimmunology, where no one is talking about that in medical school. But I could go and talk to the head of neurology about that, and he would respond, “Yes, that is a really interesting topic—let us explore this and talk about it.”

I found then, and I still find now, that the people who are the top of their field are very open and understanding of the interrelationship between different fields. They are not “siloeed.” As when one moves into the academic silos or into clinical practice, where people do not use critical thinking and discernment, there is less willingness to be curious and there is much more rigidity in the view.

I think that we actually know so little that there is no reason to be rigid in our view, because we are pretty ignorant about most of the things that are happening in the world. If we are only evaluating some of the energy that is coming into our bodies at any point in time, why would we think that we understand the totality of what is going on?

Dr. Rountree: I would like to discuss the talk you just gave at the 2020 Annual International Conference put on by the Institute for Functional Medicine (IFM). Your lecture was titled “Systems Biology and the Journey Into Uncertainty.” I have heard you give many presentations over the many decades I have known you, but this one really stood out. You described your personal journey with your recent health issues, and how the experience of con-

sulting with some of the best minds in medicine helped you realize how little we truly know in the realm of science. What helped you deal with all that uncertainty? Is that inherent in your neural circuitry, or did someone guide you in that direction? Where did you get the inspiration to be so comfortable with all that uncertainty and to respond with even more curiosity about what is possible?

Dr. Hanaway: Well, I am not actually comfortable with uncertainty. I find that it keeps coming up, and so I have to be present with it, and face my own fear.

I was reading something today, and there was a quote from Einstein. In 1955, he published “Old Man’s Advice to Youth.” In it he wrote, “The important thing is not to stop questioning. Curiosity has its own reason for existing. One cannot help but be in awe when he contemplates the mysteries of eternity, of life, of the marvelous structure of reality. It is enough if one tries merely to comprehend a little of this mystery every day.”

That sums it up. For me, I keep asking questions and thinking that I have some level of certainty—I have some “ahas,” and I have some awareness, but then I keep finding that the older I get, the less I know.

This came into sharp contrast in November of 2018, when I was diagnosed with stage IV laryngeal cancer. My sense is that if they had said Stage II or Stage III cancer, I would have felt, “Okay, I got this. I can do this,” But I received the Stage IV label, and I felt, “Jeez, this is serious. I could die. Actually, the data is that five years from now, chances are greater than 50/50 that I will be dead. So maybe I need to pay attention.”

What do I do? I do not know. No one knows. And if I follow these things that they tell me to do, there is a 60% to 65% death rate in five years. So I can do the standard treatment, but I probably want to do some other things, and I try to figure out what is going to work best for me. But I do not know. No one can tell me what is going to work best for me, so I have to be present with the uncertainty.

Dr. Rountree: When you say “no one” knows what is the best course of treatment, this is after meeting with some of the top experts in the field around the world. You are not just saying, “I called my local oncologist, who had limited expertise dealing with my particular problem.” When you say “no one” knows the best regimen, you really did ask everyone who should be in the know.

Dr. Hanaway: Yes. Weizmann Institute, Hopkins, Cleveland Clinic, Mayo, MD Anderson, Stanford, UNC, and top integrative medicine practitioners. The people knew what they were talking about, but they did not personalize it. They did not focus on where I was at.

And the fascinating part of this to me, Bob, is that in that mystery, in that uncertainty, I never felt more alive in my life. I was living right at the edge, and recognized, “Oh, there is something here in not knowing,” and knowing that I do not know allows me, in fact it forces me, to be present and listen to each moment. There is no other option. You cannot think your way through this. You have got to be with it.

That is when I began to develop a little more comfort with uncertainty. But I have got to tell you that a year out from treatment and now dealing with COVID, I needed to be reminded again of that uncertainty of life. This is what the indigenous healers and teachers are telling me, because they live on the edge of uncertainty in the living world all the time—not knowing whether they will receive rain for their crops or animals in the hunt to be able to feed their family and life. That is how their world is. It is not our world of overutilizing resources, hoarding, having huge reserves and a culture of excess, which has its own issues.

Dr. Rountree: Our society is hyperfocused on what the stock market is doing today; meanwhile those guys are wondering whether it is going to rain and their crops are going to come in. Your insights come from having walked in both worlds—in addition to being trained in conventional family medicine, you are a mara'akame (a spiritual healer), and have been initiated as a Huichol shaman. How did that enter the equation? What started you down that path? I know you worked with indigenous peoples in New Mexico, and then rural Alaska. How did you end up going to Mexico?

Dr. Hanaway: Well, that is a long story. The medium version is that ever since I was in medical school, I was interested in looking at systems of healing and seeing the interrelationships of what is going on. There may be one definition in Chinese Medicine, another one in Ayurvedic Medicine, another one in Naturopathic Medicine, and another one in Western Medicine, of what is going on. But ultimately, the person is still the same person. There are just different ways of seeing it. I have been interested in how different people see life, and how we integrate these perspectives.

Through studying Chinese Medicine, Ayurvedic Medicine, and Tibetan Medicine, all topically from 2 to 500 hours studying with teachers in each of those traditions, I focused on being a generalist, never becoming a master. I could see, “There is an interrelationship of these energies that, in Chinese Medicine, they will call the five elements, the Shen cycle and the Ko cycle, and how they work together. I have been fascinated by that ever since medical school, studying the *Yellow Emperor's Classic of Internal Medicine*.

I have always been interested in the five-element approach. I have learned different pulse-taking approaches over time. And my wife, Lisa, started studying with a teacher named Eliot Cowan. Eliot was teaching an approach known as Plant Spirit Medicine, in which the diagnostics are based upon five-element acupuncture. The plant spirit aspect focuses on journeying to local plants and then understanding the gifts that this plant has to offer me—to be able to help patients, through listening and connecting.

It was through Eliot Cowan (a lineage holder) that I was invited to go on a pilgrimage in Mexico with the Huichol people. I apprenticed for many years and then, 11 years ago, was initiated as a traditional healer (Mara'akame). I have been

working with that form of energetic healing and listening in that way—seeing the whole of the person and working to keep my feet in both worlds, in the world of spirit and the world of the physical.

Dr. Rountree: When you do that with your clients, do you actively talk to them about your perspective, or is it more that it quietly informs what you do? In other words, is this simply how you operate, or do you openly participate in formal shamanic practices with your patients?

Dr. Hanaway: I work in both ways. If someone comes to see me as a functional medicine doctor, I talk with them about functional medicine. Sometimes I get a sense, “There is something deeper going on here that we need to focus on. Are you interested?”

Sometimes patients will know that I do other healing work and they ask for it, but the therapeutic decision depends upon what they need. I may reply “No, that is not the right thing for you. Let us work with the functional medicine approach.” Other times they may not have any idea that I do other healing modalities, and I will offer, “I think this shamanic approach would be helpful.” When I work around the fire, we are not focusing on the vitamin D level or the Krebs cycle. We focus on the spirit.

I am always informed by listening, as you are. It is another way of listening to what is being said “in between.” This is more difficult to do in a virtual health setting. It is not impossible, but it is more difficult to do. I am used to being present with people and connecting with, “What is the feeling that is happening?”

Sometimes, when I am listening to someone, they will begin to share something with me that brings forth a sudden crack in their voice or a tear in their eye or a bodily movement that catches my attention. If they move on from that “energetic glitch” I will ask, “No, no, wait, wait, wait, go back there. What was happening right then?”

That moment is an entry point of deepening connection... and that is a little harder, at least for me, to catch while in a virtual setting. It is not impossible, but there is a difference in what I can sense energetically from people in a virtual setting versus being together in person.

Dr. Rountree: Yes. I read an article recently that was talking about the effect of Zoom videoconferences on interpersonal relationships, and the author was saying something really similar, that it is very hard to track people's facial expressions on Zoom. That makes it easy to miss the subtleties of the interaction—the things that aren't being said out loud. What you are saying is that subtlety is what it is all about.

Dr. Hanaway: Well, if 85% of all communication is non-verbal, we have got to pay close attention.

Dr. Rountree: This current pandemic has created a scenario wherein we all feel like strangers in a strange land.

That reminds me of the time when my wife, Karen, and I met you in Beijing to do a training for IFM. It was the first time any of us had ever been there. We arrived in the evening after a long day and night of traveling. We had not eaten, and the hotel restaurants were closed, so we decided to set out to try to find food. We quickly realized that we had no idea what we were doing, because everything was in Mandarin, which we could not read. We did not even know which places were restaurants, unless we looked in the window and saw people eating. Otherwise, you could not tell from the front if it was indeed a restaurant and, if so, what kind of food they served. So we just struck out into the unknown. It was a very sobering experience to do that. In a way, we have all kind of struck out into the unknown here.

Dr. Hanaway: Yes, and in that experience, even when we were in the restaurant, and we ordered, and we were looking at pictures, we had no idea what food we were actually going to get.

Dr. Rountree: We really did not know what to order, or what we ended up eating. All we were left with was our experience in the moment. Just like you pointed out in that lecture on the Journey into Uncertainty, that is the state of affairs we humans are in these days—a situation for which there is so much that we do not really know. The best we can do is try and carve out a way forward. I point this out because of the work that you are currently doing with IFM, in which you have asked, “Where do we start? Let’s see if we can come up with some evidence-based recommendations for lifestyle practices and/or natural agents that may keep people healthy by supporting viral resistance and optimal immune resilience.” Otherwise, the official agencies are saying, “The best we can do is stay at home and wait for a vaccine or hope that a repurposed drug may prove to be helpful.” In contrast, you have been spearheading a group effort to collectively say, “Well, that is not good enough. There is other credible research out there showing a biologic plausibility behind the use of certain natural agents. For example, there is research into Traditional Chinese Medicine, that it may be helpful for prevention and early treatment.”

Dr. Hanaway: And what are the data that we do have of looking at various kinds of natural agents? As we know, the natural agents are going to have multiple targets, and quite often, we see something like Chinese skullcap (*Scutellaria baicalensis*) and we see that, “Wow, this traditional herb actually has multiple different therapeutic effects, many of which impact the SARS-CoV-2 virus. That would be a perfect thing to be able to use.”

Then we see that this is an herb they have been using in Wuhan during this period of time. Well, that is interesting. Look at that name, *baicalensis*. This actually comes from Lake Baikal, just north of Mongolia. Lake Baikal is one of the most diverse ecosystems in the world. It is the largest inland lake in the world. Here is an herb, *Scutellaria baicalensis*, that grows in the area where they still practice traditional Tibetan Medicine. Tibetan

Buddhism was brought to Mongolia > 800 years ago by none other than Genghis Khan. Tibetan Medicine then migrated north to Buryatia, on the eastern shores of Lake Baikal.

It is so fascinating to see how the world works and moves and what we can learn from it. These are the kinds of little bits of information that just bedazzle my mind, because you cannot make this up.

Dr. Rountree: So true! With your help, the functional medicine community has been working on a set of standards to bring together all this diverse information. And then there is integrative medicine, which also aims to weave together many seemingly disparate perspectives into one coherent narrative. Having practiced both, I am wondering how you might distinguish between the two approaches. Obviously, there is a lot of overlap, and the distinctions can be subtle or somewhat nebulous, but the question of how the two differ comes up a surprising amount. Do you have a perspective on what functional medicine is trying to accomplish that might be a little different than, say, plant spirit medicine, and how the two can work together?

Dr. Hanaway: I am one who asks, “How do I understand all these different perspectives of medicine?” I am eclectic. I studied Chinese Medicine, Ayurveda, Tibetan Medicine, herbology with Tieraona Low Dog, osteopathy, craniosacral therapy, and energy work. I have had many tools in my toolkit, in addition to studying cooking and nutrition.

I carried these many tools out into the world, with people of Jemez Pueblo in New Mexico, and with the Yup’ik Eskimo people on the Bering Sea. But the focus was on conventional Western Medicine. When we came back to the lower 48, Lisa (my wife) and I started our own practice, called Family to Family: Your Home for Whole Health Care in Asheville. Soon I realized that even though I had many tools, I did not know how to integrate this knowledge into a systems approach. That was when I began to study the work of Jeff Bland and began to try to understand functional medicine.

I remember reading Leo Galland’s book *The Four Pillars of Healing*, and three of the pillars made sense to me, but the fourth pillar about detoxification was over my head. I thought, “I do not understand this. Am I stupid?” I read this book several times and I would keep asking questions.

What I learned over time is that through integrative medicine I had a broad toolkit of both a knowledge base and a way to solve problems. But, as humans we have a confirmation bias and we tend to distort information to match our belief systems—we are influenced by the thing we did last, or the thing that we learned last, or the thing that matches our values. Why is it that if I am knowledgeable about Chinese Medicine, Ayurveda, herbology, nutrition, and the last new thing I learned was craniosacral therapy, that I will tend to see the next group of people through a craniosacral therapy lens?

There is a bias. To me the issue with integrative medicine is that it is a toolkit of information, but it does not have a

framework for applying those tools. Functional medicine is an operating system that is able to use almost all of the tools in the toolkit. It is an operating system—a set of organizing principles with which to think about complex chronic disease.

The beauty of it to me is that within a whole systems-based approach, such as Ayurveda or Chinese Medicine or Tibetan Medicine, it works through the life cycle, and it works through the continuum from illness to wellness. You can optimize health and vitality and function, or you can use it when someone is dying, and it is the same system that works. Now, there are different tools that you use in different circumstances, but it is the same way of thinking.

The way I think about functional medicine is actually more like five-element Chinese Medicine. The Functional Medicine Matrix Model is an expression of the Shen cycle and the Ko cycle. The way in which movement occurs is not random, it happens in a pattern. We see this in the natural world. Spring follows winter. Summer follows spring. Summer does not follow autumn. You know? Life moves in specific cycles. Let us listen to these cycles.

This is where part of my interest is in research in functional medicine. There are patterns of dysfunction and patterns about how we return people to vitality. You may recall when we were doing work at Sanoviv Medical Institute in Mexico, it became very clear that we should not attempt to detoxify people before we help their gut, or we will stir up problems.

Now we ask, “How do we listen to what this burgeoning operating system offers and how are we able to use it and bring forth these new perspectives?” For example, during this time of COVID, we have some unique approaches and tools that can help people who are at greatest risk, while helping to decrease the progression and severity of illness.

It is clear that public health efforts are necessary to mitigate disease transmission. Functional medicine is not going to do what masks do. However, functional medicine can help to minimize risk and optimize the health of people, so that if/when they are exposed, their mucosal immune system is ready, or the innate immune system is primed, or insulin resistance is decreased, and the furin cleavage complex is downregulated to decrease viral penetration into the cells through the ACE2 receptors, or the risk of cytokine storm is minimized. Functional medicine can help each of these different mechanisms to strengthen the host and decrease viral replication through our systems-based approach.

It is our responsibility to decrease risk by bringing these ideas out into the world rather than saying, you know, “Go home and wait to feel sicker; if you feel sicker, then come to the hospital so we can give you some steroids, put you on a ventilator, and then deal with the long-term consequences after the damage is done.” We can improve that possibility. It is like you often say, Bob, let us not wait for you to buy the jersey that you will have to wear for the rest of your life!

Dr. Rountree: Yes. Do you find that there is any interest among the health authorities in this country of moving in this direction, especially now that the IFM has started

publishing research summaries, doing these training webinars, having the annual symposium, and really starting to put data-driven evidence-based information out there, all together making a very compelling argument for earlier lifestyle-based interventions? This is the same argument we have been making for years. Why wait until you have a heart attack before intervening? Why not prevent the heart attack instead? Why wait until you get neuropathy from diabetes? Why not start fasting to get your blood sugar down? The preventive medicine community has been saying this for years. But suddenly, this is a really pressing issue, because as you know, tens of thousands of people are dying.

Dr. Hanaway: We see some doctors in health systems are bringing innovative ideas forward, and yet there is a bit of a retrenchment—no one wants to appear unknowledgeable. It is stated, “We cannot talk about zinc and quercetin because there is no data,” even when we show them the level of evidence and the safety risk profile, based upon articles from the SARS or the MERS virus, other coronaviruses, because we do not yet have the data for SARS-CoV-2.

In a few smaller institutions they are saying, “Hey, this is interesting. We can do something with it,” but often, as you and I have seen, the leaders fear the unknown and state, “There is just no way that we can do this.” Paradoxically, as I am leaving the meeting, those same skeptics ask a personal question, “Is this supplement that I am taking okay for me or my family member? And is this the right dosage?”

It is fascinating to me when a colleague says, “I would never risk these supplements with my patients.” And I wonder, “But you would risk your family?”

To me, this perspective is backward. When I talk to patients, I say, “If you were my sister, this is what I would recommend.” I am sorting through a series of data, some of which is unknown, acknowledging, “This is what I think is the best thing to do, but I do not know for sure.”

I see many doctors say, “I am waiting for the science—even though it is good enough for me and my family, it is not yet good enough for my patients.” This is confusing to me. It is a slow process, but it is evolving. The German physicist Max Planck said that science advances one funeral at a time, or more precisely: “A new scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die, and a new generation grows up that is familiar with it.”

To go back to your question, when I see the younger clinicians who are looking at teachings of integrative medicine, restorative medicine, antiaging medicine, functional medicine, holistic medicine, mind-body medicine, or whatever other names we want to put on it, they ask, “What is wrong with you people? You are all talking about the same thing to varying degrees, but you are creating silos where silos do not need to exist.” I see that beginning to un-wind, and will evolve over time as new leaders emerge, and we introduce different ways of working together.

On the political side, I am saddened when like-minded groups come together around various issues and say, “Well, we all agree, and we should work together. How about if we work under my group? I have this great idea. Everyone follow me.” But we have learned from the brain about the way change occurs—it is a network phenomenon. It is a community phenomenon, not a hierarchical phenomenon.

So that is how I want to “unpack” this. I remain hopeful and continue to bring this perspective forward, to continue to do the research, and be able to demonstrate value. Let us think, let us create an operating system and let us question the operating system. Let us not assume that we are right. Rather, let us evaluate our approach to see what works and what does not work.

Dr. Rountree: You have been involved in teaching functional medicine from its inception, and have taught it in many different settings. I mentioned teaching together in China and at the Sanoviv Medical Institute in Mexico, and so you have really taken it all over the world. I am wondering what you think is the biggest challenge in getting health care practitioners to understand this operating system. What do you think is the biggest obstacle that people have in actually understanding the concepts and being able to effectively apply those concepts in clinical practice?

Dr. Hanaway: The international aspect of teaching is fascinating, because it helps me to understand where the biggest obstacle is: it is about belief systems. When I teach in China or Peru or South Africa (although that is a little bit different), I find that they are very open to the idea of a systems-based perspective and networked inter-relationships. It makes sense to them because it is resonant with their traditional healing systems.

This is how their cultures have done things for hundreds or thousands of years. They are willing to look at this new model and see how that works. Whereas in the United States, it is not about a systems approach, it is a reductionistic approach. There is no context for a bigger view, especially for the past 50 years in the rise of the randomized controlled trial and the role of “big pharma.” So that is an issue here in the United States.

Another example of belief systems would be the specialty of internal medicine, or any subspecialties thereof. If I do something outside the belief system of medicine—for instance, homeopathy—there is a nonacceptance, because we do not understand homeopathy. It is agreed that randomized controlled trials (RCTs) are the “coin of the realm.” We know there are RCTs of homeopathy for infectious diarrhea in Central America, where the studies are really clear—homeopathy works. And yet they are dismissed because we do not understand *how* it works.

I had a fascinating observation at the Cleveland Clinic when trying to explain functional medicine to, and work with, some internal medicine physicians who were reluctant to

begin a conversation, because they had a belief system that functional medicine is “witchcraft” and outside of the realm of science.

Now, with surgeons, I would suggest, “We can help your surgical outcomes by working with these patients in this way around diet and nutrition, decreasing inflammation.” They would respond, “Really? If this approach can help the outcome of my patients, then I want to do it. Let us do a study together and make sure.”

Whereas with the internists, we could not even do a study. We would argue about doing a study because they did not believe the premise in the first place. However, you do not have to believe the premise. Science asks, “Let us evaluate this and see if it works.” If we use an intervention that is multimodal, what we will do first is to take that as one unit, the whole unit of functional medicine, and apply it, to ask the question, “Does it show benefit?” Thus far we have shown that there are improved outcomes compared with the standard internal medicine/family practice.

We plan to set up a placebo group where people are having the same number of interactions with clinicians, with the nutritionists, with the coaches, and we are evaluating the mentioned outcomes. The next study that we are planning is with inflammatory bowel disease. We are choosing a super-sick cohort of people with Crohn’s disease who need surgery, and we will offer the functional medicine approach after their surgical intervention for Crohn’s disease. We will look at time to recurrence of Crohn’s disease, and how long can they be off of biologic medicines?

We will compare an engaged “interactive medicine” approach versus a full-scope functional medicine approach. How much is the therapeutic relationship making a difference? Now, that is a component of functional medicine, but we are trying to evaluate how much impact does it make?

Thus, we will evaluate conventional care, interactive medicine (i.e., without the functional medicine operating system), and the functional medicine operating system. I want to know which part of it works. Are they required together? I think so. But if the interactive part, if really deeply listening and caring to people and still practicing conventional Western Medicine gets half of the benefit of functional medicine, that would be a good thing to discover and prove.

How do we evaluate which component of functional medicine provides the actual impact? For example, is it the nutritional intervention, or is it the supplements, or are both required? First, let us evaluate the overall approach in a thoughtful way and then discern how it is going to be personalized, using different components of the functional medicine approach for different people. That is a key element of what we are trying to understand.

We have created the operating system to have a way of organizing information, so that we can listen to the stories and personalize the interventions for that individual. That is what Hippocrates and Maimonides and Paracelsus and William Osler have taught us.

Dr. Rountree: You were one of the coauthors of a 2019 article in *JAMA*,¹ where at the Cleveland Clinic you studied the impact of the functional medicine model on people with all kinds of chronic illnesses for about a two-year period, is that correct?

Dr. Hanaway: Yes, the overall cohort was a 30-month enrollment. We measured people for a year of care. We then compared the functional medicine cohort with a similar group of people—similar age, disease process, socioeconomic status, ZIP code, etc. This is called a “propensity match.” We compared with a group of patients from another health care center in the Cleveland Clinic system.

We looked at Patient-Reported Outcomes Measurement Information System (PROMIS), a tool developed by the NIH. There are PROMIS measures for individual diseases, such as asthma or cognitive impairment or back pain, and there is also a global measure, which can be used as a vital sign of the person’s functional status.

We were able to demonstrate a statistically significant and clinically significant improvement in the patients seen at the Center for Functional Medicine versus the patients who were seen in the primary care clinic for similar kinds of medical issues. We are doing follow-up studies. A poster presentation that was given at the IFM Annual International Conference is on a similar study with group visits. There is less doctor engagement—it is using the power of community and groups. The overall cost of the program is less (using coaches and nutritionists primarily), and there was a significant improvement at the end of the intervention. We will see whether that result is maintained over a sustained period of time.

We are also doing studies to look at the total cost of care. These are important parameters to me, because we hope to demonstrate that the Functional Medicine Model provides better care for the same cost or for less cost, as we have already demonstrated it has better outcomes. We observe from our internal data that it is equal to or less expensive over time. We have data that there is a better way to do this, one that provides value.

Value equals outcomes divided by cost. Outcomes are better, cost is the same or less. When I was in medical school and interested in health policy and clinical prevention, I was asking these questions about health maintenance organizations. Can we measure this? It has taken 35 years, but we are now demonstrating value, and I believe that is how we can begin to make a difference in the overall health care system.

Dr. Rountree: What has been the response to that *JAMA* article? It was amazing that you got it published in the first place. Given the confirmation biases you talked about, it is surprising that they would even *consider* publishing it. I can imagine the editors initially saying, “There is no evidence this stuff works.” And you respond, “Well, here is some evidence that we have gathered.” Only then they come back with, “How can you have evidence for something that does not work?” So publication of truly innovative ideas can be a

very circular process. At some point the powers that be have to be willing to take a risk and break the cycle. That is what makes me so curious about what happened afterward. What has been the aftermath or repercussions of your findings?

Dr. Hanaway: Within the integrative medicine community, there were questions about the study. There are ways that any study could be better. We learned that we need to reach out to everybody who comes in. So, if patients did not fit into the predefined visit “windows,” then they fell out of the study, because we were following them longitudinally. The clinic has learned to do outreach to optimize the number of people who answer the PROMIS questions, whether or not they return for a visit at the predefined time.

There were other questions raised about the study design and the results, which is fair. That is how clinical research and science progress. We are aware of those concerns and spoke to them.

Now there is an increased awareness of looking at measures of function—and I say, “You know, that is why we call it functional medicine”—to be able to evaluate whether there is an overall improvement in health care status. Let us use a vital sign that measures the question, are you better, or are you not better?

That, to me, is the real jewel in that article, it changes the conversation. When I would talk about Functional Medicine as we were doing the study, people would say, “That is nice, but... but... but.” Now it is published. We are using this tool, PROMIS, from the NIH. Let us use that kind of data to be able to have conversations in the future.

Some clinicians respond by saying “Yeah, but...” I am not sure why there is a “but,” because when I measure an LDL cholesterol, it does not actually tell whether that individual will get heart disease, whether or not their costs are going to go up, and whether or not changes in their LDL cholesterol of 20% in either direction will affect their lifespan and how much they spend on health care in the next five years.

But this PROMIS measure can tell me the trend of overall health care costs for the next five years. That is a useful thing. Wouldn’t you want to know that?

Dr. Rountree: I realize we could talk for another hour about the question I am going to bring up, but do you think this kind of global assessment tool ties in with our growing ability to collate all the big data derived from personalized multiomics analysis, like what Lee Hood and Nathan Price started doing at Arivale, Craig Venter at Health Nucleus, or Michael Snyder at Stanford, who measured fluctuations in his own biomarkers every day for a year?

Dr. Hanaway: There is also Dr. Larry Smarr at UCSD. These data sets are great for hypothesis generation and to get an understanding of the different kinds of phenotypes that present, but they do not represent a true “n-of-1” study.

For example, I am involved with looking at the gut microbiome. We have moved from stool culture to measuring metabolites to measuring 16S ribosomal RNA probes that are

species-specific. Now we are measuring metagenomics, or shotgun sequencing, in which we measure every piece of DNA that is in the feces, and quantitate what is there. I can measure the 195 species of bacteria that are present in my gut, as well as the parasites and viruses and fungi. That gives a more complete picture of the gut microbial census. To me, being able to correlate that census with diet and symptoms provides a great opportunity to deepen our understanding of nutritional root causes of illness.

This is something that we will have in the future to be able to really understand what is going on with someone's gut, their diet, and the interface with their environment. That is a very useful set of information.

Then we move into being able to correlate the metabolomics that are in the blood that are measured in different ways. I have been using a tool that measures ~100 different biomarkers for the past 10 years. Soon we will measure 400–1500 different biomarkers to personalize recommendations.

There is a need to analyze this information and apply it to medicine using this systems-based approach. How do we integrate this information into an operating system? We ask, "How do you assimilate the nutrients that you take in? How do you produce energy? How do you have defense and repair? How do you have an elimination function? How do you have transportation and communication and infrastructure?" Those are the functions in functional medicine.

We demonstrate that the data are telling us about where there are imbalances in the system, and then it will allow us to personalize recommendations. For example, you could have an imbalance in your microbiome that is then manifesting itself as an immune dysfunction, whereas other persons have an imbalance in their mitochondrial system and energy production that may be related to toxin exposure, and there are different persons who have elimination problems arising from a genetic predisposition or because of a sympathetic overdrive decreasing their gastrointestinal motility. Here I have offered three different imbalances that will require different therapeutic interventions.

Thus, we see a need to understand the phenotype and how it relates to the genetic predisposition (i.e., genotype). Genetic predisposition is somewhere from 5% to 20% of the issue, but it is not the majority issue. In some people, it is a big deal, but it is not the main driver of disease. Genes are bathed in the environment. Thus, the environment that you need and the environment I need to optimize health are a little different. So let us find the best environments within which to bathe your genes and my genes.

This highlights the multiomics opportunity. We have to do it by interrogating the data based upon a network or systems approach. If we just throw everything at the wall and we do not have a hypothesis of how it relates together, we can be fooled by what is happening. We may make incorrect inferences about causation or how movement occurs, how or what the cycles are, or how they interrelate with each other.

This is fascinating to me...and this is science. Earlier I noted, "This is how things move in the natural world, in the cycles of the seasons, in the cycles of the weather, in the cycles of colors,

in the cycles of light and energy. Let us listen to the natural world to create hypotheses and inform us about what is going on, rather than using our minds to make stuff up." This is a different view...but that is my story, and I am sticking to it!

Dr. Rountree: Well, it sounds like you are sticking to that story with a certain level of hope and optimism about the future of medicine. These days it seems like every time there is a discussion about medicine in this country, all people can say is, "It is broken. Our system is broken. It is a mess. We have no idea how we are going to deal with this problem," et cetera. But what I hear you saying is, with enough curiosity and enough attention to accuracy, there is a way forward.

Dr. Hanaway: Accuracy is not the right word. I would say discernment. The culture of genius requires diversity—diversity of opinion, diversity of view, and diversity of elements engaged. The culture of genius also requires dialogue. That is, a conversation that allows these diverse elements to interact and learn from each other. Finally, there is discernment—to separate "the wheat from the chaff."

When we have these three conditions together, we come up with new ideas that we did not come up with before. It is often in times of crisis that we are faced with a conundrum, "We need to do this differently than we did before, so let us bring a diversity of opinion, have a dialogue and use critical thinking to find a new solution."

It has been amazing to see how quickly many businesses and people's behavior have pivoted in the past three months. There are new ways in which people are engaging. And we are still in a learning process.

But I want to come back to what you said about hope. My hope is more in health than in medicine, because I think that we need to change the conversation to be one that is focused on resilience and well-being. How do we move toward health, and allocate resources that really focus on well-being, rather than on the end stage of life in the hospital?

We grew up in this golden era of medicine, but we found in our training in the '80s that it seemed we spent all of our time in the hospital, metaphorically at the bottom of the cliff, taking heroic measures. We must spend time and energy learning how to prevent people from falling off the cliff in the first place. That was almost 40 years ago, and it is still not yet happening.

There is an analogy when people talk about our criminal justice system and our police system. The biggest issue appears to be prevention—how do we help and support people earlier, rather than being aggressive when things are out of control? How can we use our resources to be able to intervene upstream and create a milieu that promotes a decrease in crime, or create prevention programs to promote a decrease in disease?

I am hopeful about being able to do this, because I think that we are understanding systems of how to be able to do that better than before. It is not that one day you wake up and you have diabetes, one day you wake up and you have an autoimmune disease. No, it does not happen that way.

So let us work on understanding the steps in that process and saying, how do we intervene earlier on in the process? And the earlier we intervene, the less aggressive the interventions need to be.

Dr. Rountree: Definitely. I wanted to end with something I heard you say in your recent lecture, which blew me away immediately. My world came to a halt for a minute. You said, “Immunity arises from community.” I think that addresses a lot of what you were just talking about. You know, prevention ultimately comes from how we work together as a society.

Dr. Hanaway: Yes, the evolution of functional medicine to me is how will we be able to bring it into the sphere that is reaching *all* people? And there is a greater interest now in being able to do that. That is where I want to put my energy, because that is where the need is greatest.

Dr. Rountree: Well, I wish you luck, inspiration, energy, and excellent health for years to come so you can accomplish that mission.

Dr. Hanaway: Thank you. As for the next 20-plus years, we will be on that journey together, Bob. I am really appreciative of you and the other colleagues, teachers, and mentors along the way who have helped to keep this big-picture view in mind.

I want to give a “shout out” to my mentors, Jeff Bland, David Jones, Sid Baker, and Tieraona Low Dog, who continue to provide a big view of how we can work with these kinds of tools to be able to help people. Functional medicine has given me hope, and it has also given me the opportunity to help many people.

Dr. Rountree: If people want to track what you are up to, how do they either get in touch with you or follow you?

Dr. Hanaway: Our practice is (www.familytofamily.org). That is my wife, Lisa Lichtig, and me. We are still offering patient care, because, as clinicians, it is humbling and inspiring. I am humbled by the great ideas that do not work and the need to continue learning. I am inspired by the courage and vulnerability and incredible healing response of individuals.

We continue with clinical care, and we are beginning to work with small groups and retreats, reaching deeper into our community. That is one request I ask each of the readers—have the courage to step forward and bring this medicine into the community. Offer what you have. It is formidable, but it is a gift that is incredibly needed right now.

Dr. Rountree: Wonderful. Well, that is a great place to bring this particular conversation to a close. And I am sure you and I will be talking soon.

Dr. Hanaway: I am sure we will. ■

Reference

1. Beidelschies M, Alejandro-Rodriguez M, Ji, X, et al. Association of the functional medicine model of care with patient-reported health-related quality-of-life outcomes. *JAMA Netw Open* 2019;2:e1914017.

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