How Your Gut Influences Heart And Artery Health Transcript

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Introduction and summit context

Welcome back to another interview on Reversing Chronic Gut Conditions. I'm your host Sinclair Kennally and today I am joined by the wonderful Joel Kahn.

Dr. Joel Kahn is an esteemed colleagueand he is a phenomenal practicing cardiologist, a clinical professor of medicine at Wayne State University. And he also is known as America's Healthy Heart Doc.

He had an amazing summit just a couple of months ago, and he'll be doing an encore of it this coming February on reversing cardiac editions naturally.

What's the name of that summit, Joel? Reversing Heart Disease Naturally. Thank you. Perfect. Perfect. And so this is so important to me to get you in front of our audience today.

I was really excited to have you here because I want people to start drawing more connections between chronic gut issues and heart conditions and start connecting the dots here.

This is all happening in the same body. So let's explore those connections together in depth today. Perfect. Yeah. Well, you know, probably the two areas that I would call gut heart and that's, you know, a lot of people use the term like gut brain connections.

Actually talking about gut heart connections are still pretty early in scientific adventures. But the two that are out there and one is just obvious when you eat, it becomes part of your body and what you eat determines a significant portion of your health and your gut health and your whole body health and your lifespan.

And there is a phenomenon that's pretty well described called metabolic endotoxemia. Every meal you eat causes a little inflammation in your gut lining, causes a little reaction from, you know, the scary gluten that people like my friend David Perlmutter made many people run away from, even though in studies of longevity, whole grains always show up as maybe the number one and number two most preferred foods for longevity whole grains.

So if you're not celiac, don't run away from whole grains with even whole grains. Cause a little mini inflammation. Even healthy foods, fruits and vegetables, legumes.

Gut-heart connections and inflammatory foods

Again, another friend, Dr. Gundry, scared the world about legumes. Those are killer lectins and lentils. But in reality, longevity studies show that legumes lentils are most often associated with actually excellent longevity.

So don't fear them. But the point I'm making is almost every meal causes a small little wave of irritation, inflammation in the gut lining, very small.

We're not even aware of it. There may be a few bacterial products get into the body. Those are called endotoxins. So the break down products from gram negative bacteria.

So there's this well-described literature finding of metabolic endotoxemia. But you can have it to a pathological degree and very often we might call that leaky gut or, you know, dysbiosis of the gut where maybe even a healthy meal causes more than average leaking of those nasty little critters and their byproducts.

There are certain foods that seem to be most associated and some of them are shocking and surprising and still much research to do, but high saturated fat foods.

And in animal studies, coconut oil causes more of that metabolic wave. This wave of little toxic particles in the blood for nobody knows for sure. 30 minutes, 60 minutes. And it all settles down.

But high, high saturated fat diets do it more than sugar. Sugar does it to some degree. Obviously, there's other chemicals were bombarded with glyphosate and pesticides and Roundup and the rest herbicides.

So they all contribute. But, you know, be aware, obviously, the quality of your diet and maybe you've got to figure out for your own individual health or maybe by whoever's guiding you or neutral genomic testing, try and figure out what diet works best for you.

I personally have eaten a whole foodplant based exclusively plant diet for about 45 years, a very long time totally, and have thrived on it. Maybe that's just my genetic makeup and my good luck that I gravitated that way and in on that at age 18.

So I'm a big proponent of it because there's all that data for heart disease and Whole Foods plant based diets like Dr. Dean Ornish and other famous researchers.

But the Mediterranean diet, the dash diet, interestingly, you know, the extra virgin olive oil in the famous Mediterranean diet, like they might eat in Sardinia, Italy or Crete in the Grecian Islands, doesn't really incite that same advanced wave of and no toxic particles, lipopolysaccharide particles that coconut oil does for most of us, coconuts are not a natural part of our ancestors background.

I mean, there might be somebody here who comes from Polynesians, as we always had coconuts around or Hawaii, but many of us, you know, it's not a food of our grandparents and great grandparents and may not be optimally adapted for it.

So that's just my spin on part one of this topic, which is the quality food I'm sure that's going to be brought up by many other speakers. As a preventive cardiologist, I used to put nutrition and quality nutrition as the number one goal of my educational process with patients.

I actually put sleep a little out of it. Then number two is nutrition. But there's been such a breakdown in quality of sleep and duration of sleep. And whether it's Wi-Fi or cell phones or MF or world news or economic news or wildfires or something going on all the time, there's literally it's a little unsettling time.

Obviously, the whole pandemic and that disruption to what we used to call normal life. So anyways, I sleep number one, but nutrition is number two so that okay that I covered that is, you know, Gut Heart episode one and I can move to episode two.

Absolutely. I think this is a great groundwork for everybody. So is there anything else you want to say about which foods are worst for the heart? Well, sure, there actually, you again, we don't have to guess.

I mean, there is science. So what comes to mind within the last 12 months in the research world in LSA is a preface. Nutritional science is hard. There's a study, for example, of 7000 people in Spain that was published in 2013 called The PREDIMED study.

They really struggled to put 7000 people on. I'm trying to remember it was two or three different diets. I think there are three different diets and get them to maintain three different diets for seven years.

I mean, virtually impossible. It's like getting, you know, herding cats and getting kids and snowshoes to get 7000 people to really commit. That one's going to eat a very high olive oil nut fat content diet.

One's going to eat a moderate one. One's going to be the control group. And it sort of fell apart. Even though the PREDIMED study is a very famous Spanish intervention study, and the higher nut group and the higher olive oil group actually proved to be of some advantage.

It wasn't striking and there's a study right now in Spain called CORDIOPREV CORDIOPREV like heart prevention in Spanish and they've got 1002 heart patients, people that had had heart attacks and they've got half of them doing a very healthy, low saturated fat Mediterranean diet, but a lot of extra virgin olive oil.

And the other group is doing a very similar diet with small amounts of extra virgin olive oil. And I will tell you that they've published many papers already, and it's 1002 people for seven years.

So far, they've been able to hold that research group together, partly because they stopped the study early because the high extra virgin olive oil group was doing so much better.

These were actual heart patients. Wow interesting. And yeah, they really they had cleaner arteries. They had better lining of their arteries as called your endothelium.

But very advanced tested. And when they actually just counted bodies and heart attacks and hospital admissions, that was a great advantage to a traditional, you know, in I bring back the island of Crete because that has been a site studied very extensively.

They have 40% of their calories in Crete. Traditionally and could be very different now if there's a McDonald's down the street. But the 40% of their calories from fat, which many people would say, you know, pretty high, it's not ketogenic high, but pretty high.

And it's almost all olive oil. But they have exceedingly low heart disease rates in other parts of the world, have diets with 40% of calories from fat.

And I'm talking about Finland right now in Finland in the sixties and seventies. And they had insane rates of heart attacks. But they're fat intake was largely butter and sausage and occasionally cheese.

So was saturated fat versus olive oil. Being very rich in mono and saturated oleic acid fats, which are seemingly very anti-inflammatory, very healthy.

TMAO, microbiome, and cardiovascular risk

So interesting little tidbits there about that. So that was the preface actually how difficult it is to do nutritional science. And, you know, we can talk about so many studies of a drug randomize 18,000 people to one drug or a placebo.

It's much easier study to do getting people to eat in a certain pattern for 3 hours. We can do it for a week or eight weeks in a metabolic study at a university where you lock the door.

We can do it by getting people to really do the, you know, randomized study is tough. So we got to take every little tidbit. How do you feel? Case studies, biochemistry.

This is all stuff laid out by my nutritional guru, Dr. Valter Longo, at the University of Southern California, very famous founder of the five day fasting mimicking diet.

And he calls it the five pillars of nutritional longevity in science and how hard it is to just advise a person what's the best diet to eat? I believe it's in that spectrum.

Mediterranean dash clean, whole food, plant based diet. And then you got to pick high olive oil. Medium olive oil. And some people prefer the low or no oil and they find they lose weight and feel best on that.

So you got to judge all that. So that's the end of chapter one, I think. And sounds good. Let's progress to chapter two. One of the things I want to make sure we leave time for today is your thoughts on TMAO.

Yeah, that's true. That's true. Let's do it. So, you know, when you talk again about, you know, got heart, one of the

most interesting stories and it's only a story of about a dozen years right now was a research team at the Cleveland Clinic.

And they're still together and they're still fantastic. That studies they're called metabolites things that show up in the blood that we just haven't yet fully conquered.

You know, we know there's things in nature, probably in the Amazon that might be therapeutic. And people go search for little purple flowers and find out what's in them and what they do to our body.

People are doing that with our own blood and chemical analysis and all. So in 2011, these researchers, one is a cardiologist, Stanley Hazan, M. D., found three substances that they thought were pretty hot as may be new cholesterols, new potential, damaging particles in the blood to cause heart disease.

And they ended up doing a whole series of studies that were published in 2011 that prove that one of those three chemicals and it is a chemical called T Mayo, some people call it a metabolite and it has a longer name, trimethylamine and oxide.

But TMAO is how it's known had very good evidence that it was harming arteries. They looked at over 4000 heart patients. The higher your blood level of TMAO because they developed the blood test, the higher was your heart disease blockage rate, the lower was and that could be an association could be causative.

So they went to animal models and they went and they actually created plaque in animals by raising their TMAO and then they figure out how this all revolves around our gut.

And so the bottom line now, after 12 years of research, is at least the story seems to be that based on our diet choices, we may convert particularly to nutrients.

Colleen. Carol and that is important for brain health and is important for maybe longevity, but there may be a sweet spot and too much may be a disadvantage Colleen.

And the other one is L-Carnitine, which you can find in a monster energy drink, but you also find in a tomahawk steak because it's the kanté of chili konkani.

It's in meat. It's not really in your asparagus. And choline and carnitine can be converted by the bacteria in the gut. It's still not clear which bacteria do it.

So there's not a probiotic we've got yet to intervene, but they get converted to a substance called TMR A and TMJ gets in the blood and gets to the liver.

And there's an enzyme called FMO, and FMO makes it TMAO. And then TMAO circulates and there's some data that TMAO may create plaque and may actually cause blood, the clot.

And if you're creating plaque and your platelets are clotting, you might have a heart attack, you might have a stroke, you might develop an aneurysm, you might develop a leg circulation problem.

And now there's a dozen years that largely support this idea, even to the point you have people you measure. So since about 2015, you can order a TMAO blood level.

Originally at Cleveland Heart Labs and Quest Labs. Now I think it's more widely available. I've ordered them 10,000 times. I mean, it may be the most abundant practice for ordering TMAO right from day one.

And if people are elevated, I'll ask, do you drink monster energy drinks? How much red meat you eat, how much? Choline is largely from egg yolk, not egg white, I joked.

Maybe we'll go three weeks. It will stop those things or recheck it and the level comes right down. Now I don't know

for sure that I just improved that person's life.

They're going to have to struggle with the idea. What do they do without egg yolks? Are less egg yolks or what do they do with that red meat or less red meat?

It's not white meat, but talk about fish in a minute. But it seems to be that gut heart health as measured by TMA TMAO is a real story. It can be manipulated with diet changes, as I mentioned.

Interestingly, it's something about your microbiome because in these early Cleveland Clinic studies, they took some vegans and they paid the vegans to eat an eight ounce steak, got some bagans would do anything for research and vegans don't make TMAO when they eat steak.

They don't make TMAO when they eat egg yolks because they don't have those bacteria that are habitually there because their diet is different. Vegans have diet different from junk food.

Ideas have, I mean, gut bacteria rather different than junk food eaters and gut bacteria different than people on the Mediterranean diet. It obviously can shift around.

It's rather complex to measure, but it's an interesting observation. So just recently, just to bring this up to this summit and have your wonderful audience, you know, know the greatest latest, there's a small little group they're most vocal on Twitter that believe the TMAO story has a flaw that, you know, they're not people that really want to give up eggs and meat so quick.

So they tend to be more keto paleo oriented advisors that it may be that it's insulin resistance that relates to TMAO. And really what's causing the heart problem is the insulin resistance, not the TMAO. The that meal is there.

There's no doubt it's in the blood. I think that story is largely a small little fraction that supported by the science. But there's a report this week that there's a condition that affects a couple hundred thousand people a year in the United States called an aneurysm of the abdominal aorta and your belly button.

And it can be a weakness in your aorta that gets larger, larger, larger and either needs a procedure or can rupture. And you could die. So the Cleveland Clinic Group, the same group, asked the question and they got 2000 heart patients and they measured their blood TMAO levels.

And the higher the TMAO, the more frequently there was a abdominal aortic aneurysm present that doesn't prove it caused it, that association. But then when they went back to the mouse studies because that really interesting researchers and they really showed pretty convincingly that you give calling to mice their TMAO level goes up and there's certain research models that promote abdominal organisms.

They develop these aneurysms faster and quicker and you give a choline blocker and they don't develop the aneurysm or you give an antibiotic that kills all the gut bacteria and you don't develop an aneurysm.

So another thing on the list that I would urge people, particularly if you're an egg eater or a red meat eater, to ask the question, I wonder how my gut is doing and how if I have those bacteria.

I wonder if I've got a gut, heart, gut blood vessel connection, ask for a blood test, mayo level, you know, probably can be billed to your insurance. It's not a very expensive lab.

It's just a quest lab. And I'm not sure probably LabCorp offers it, and most doctors have never ordered it. Most doctors still haven't heard it. Just wait.

I'm sure in the next five years there'll be a pharmaceutical drug to block the production of TMAO, and that's usually how doctors learn about things, you know?

Hey, Dr. Jones, we brought you Pappa Romano's pizza. And I want to tell you about a new drug for TMAO and why

you should draw it. That's how doctors learn.

Sometimes it's not the optimal way to learn that. It's all based on a expensive pharmaceutical drug. Of course, I would say alter your diet and let's just recheck it.

But not everybody wants to alter their diet. So that's Goodheart and Taylor, as I just want to say, there's one other little facet to the got hard TMAO story.

There are a few fish out there that are that have TMAO. So in their flash pre formed you don't have to go through this all eat egg yolk make tea may make TMAO pathway way okay there and I freeze there we go back.

I think I froze ramen. There's a few fish that have pre-formed tomato in them. It may help fish be more buoyant and avoid cold water and high pressures.

So Dr. Hazen talked about the fish that you use in fish sticks. I didn't know those were cold weather, deep water fish. I would think it'd be like a a ga fish that lives way down.

But some people argue, well, fish are always healthy and fish have TMAO. So the TMAO story is wrong. And I'm not certain fish are always healthy. There's actually, you know, just the same nutritional science argument.

It's hard to sort everything out in a journal. Science, there's at least one mouse study that actually shows eating fish in a mouse, promotes atherosclerosis, and there's only one study, so you can't make a big conclusion.

But I just want to point out, I would add the pleasure about five years ago being on the Joe Rogan Show for 4 hours debating nutrition and the fish TMAO story came up and my very capable opponent had all the slides and I had a little bit of data.

So now to protect myself and not get trapped by that situation, I have to read about fish sticks and gut heart health. But anyways, there's clearly obviously, I mean, eat smart.

It's going to affect your heart health. I mean, I'm an advocate for prevention. Prevention, prevention. And as I said, maybe sleep number one, but right next to it is quality diet and spend more money on food, maybe buy as much organic as your budget will allow because of the deterioration of our food chain and the safety of our food chain.

Leaky gut, anti-inflammatory eating, and key labs

So the I think you've laid out a lot of really interesting concepts here that need to be unpacked a little further. I mean, in a sense, you could boil it all down to, hey, let's eat anti-inflammatory because that can only support heart health.

And and then you have a lot of resistance from a lot of different camps today. Everybody's got a diet, religion, and everybody is debating how to actually do that.

And you could argue that, you know, toxicity is definitely complicating this. Herbicides, pesticides, you know, that you are arguing all of this against a backdrop of leaky gut.

And I'd love to know your thoughts on that and how you see food choices in leaky gut as president affecting heart issues and what needs to change when that is the case.

Yeah, I mean I think people can biohacking these issues. Number one, you know, I happened to find a whole food plant based diet at age 18. I felt well and it my GI tract work the regularity of all that stuff that happens once or twice a day.

You know, I have a famous statement on the Internet that if it takes you less time to poop than to pee, you might be a vegan. Because put that fiber, put those lentils.

But those beans and beans, you're not going to be reading a book on the toilet like many Americans are going to be. You're not going to have time to send a text.

It is going to be done to be a little graphic. But, you know, if, for example, you said anti inflammatory diet that term probably made famous by Andrew while at university Arizona and certainly a very smart man and you know resulted in the restaurant chain with some nice little teachings on the wall about anti-inflammatory diets, as I recall last time I was in one.

So how do you know if you're in a flame? Well, you might feel it. So is your diet making you feel good? Are you bloating and gassy and constipated? Well, maybe you're lactose intolerant.

And obviously, if you're African-American or Asian, the odds are insanely high. You're lactose intolerant. If you're just an average American, you got about a 5050 chance.

That's pretty high. So I'm all for ditching dairy and reevaluating how you feel, and particularly if you feel either GI distress or actual inflammation in your tissues or just feel puffy.

I mean, ditch dairy, that's always step one, you know, add in more fruits and vegetables. But I got off track a little bit, actually. You asked me about some of the healthiest foods, and they're actually interesting and controversial.

There's a research project funded by the Gates Foundation that already turns some people off immediately, but they have a lot of money to give away. It's called the Global Burden of Disease Study.

GBD. It's been going on for 20 years. It's just a way to give research dollars out and they study nutrition all over the world. I think the Global Burden of disease study is in 190 countries and they accumulate massive data and they published in the last 12 months.

And I think I did not say this already, what foods are most associated with health and longevity? What foods are least associated and what are the others?

And surprisingly, the top three health and longevity foods were number one whole grains and all that conversation about whole grains maybe being gut inflammatory, but whole grains in the big picture or on the list as they are in so many blue zones.

Number two was actually legumes. Legumes always come up as healthy. Now, you may have a problem eating lentils, peas and beans, but in general, they're not scary.

Foods are to be encouraged and number three was actually nuts and seeds. And that's not the only time. And by eating more whole grains, more nuts and seeds, more legumes, you could add years to your life span, as I recall, about 2 to 3 for each of those.

But if you eat a lot of all of them, the next two on the list were the two foods that most decrease lifespan, and they were processed red meat, which always comes up hot dog, pepperoni, baloney, salami, corned beef.

People cry when you say that, but it's the science over and over, at least as reported in these large association studies and then red meat in general after processed red meat.

Processed red meat always gets a little bit more of a negative statistical play. Interesting. Some foods were neutral, fish were neutral. They weren't better. They weren't worse.

Dairy was neutral. And then a little further down the list and I don't know how they organize this, it's a famous graph. We're actually fruits and vegetables and fruits and vegetables promoted longevity, but nowhere near the statistical power of whole grains, legumes and nuts and seeds.

So I just share that with people. There's more gut health, gut longevity data pretty hard of course, science. It's hard

to argue with that. There wasn't some message to come from such a large, robust, carefully done study the Global Burden of Disease Study.

So figure out what's working for you, figure out how you feel, and then is it be a biohacker if go to your doctor and say, I want to check my inflammation and you usually check the high sensitivity.

Siri reactive protein clinic. If you were by heart patient, I'd be doing more than that, but I'm happy if you get that one done. I had a patient the other day. It came back.

It's supposed to be less than 1.0 and came back 7.6, which is not a world record, but it's concerning. And all you can do, I got to take the diet history and I got to take the dental history and I got to take the sleep history.

Got I take the skin health history and I got to take, you know, general medical history, too. They have autoimmune or inflammatory disorder. Have they had a recent cold or flu or, you know, virus or something that might have triggered it and then change your diet?

So at New York University, I think back in 2018, they took 100 heart patients and they either put them on the American Heart Association, heart diet, clean living, you know, not junk.

Although the American Heart Association puts their damn label on some breakfast cereals, that just creates nothing but ridicule. It's just silly stuff because they have whole grains or they have all that added sugar that nobody should eat and then they put them on a whole food plant based diet.

It was randomized and the C-reactive protein went down much more and the whole food plant based diet, strictly whole food plant based, vegan. So if you're looking for an anti-inflammatory play again, the science suggests that you're better off with plants, plants, plants, and don't leave out those whole grains, lagoons, nuts and seeds.

And so this is a really good textbook for people that are trying to work with preventative medicine. And if their CRP is high, then, you know, this is a great next step for them to go.

What are other markers that you want people to be measuring? What that show, what should they be asking their doctor to take a look at if they're concerned about their gut in their heart health?

Yeah, I'm certainly frustrated as a yeah, I have a very busy practice. Real doc C Labs from a lot of other doctors come over and if they're referred by an integrative doctor, I'm always, you know, pleased that they're getting more than average.

But the wonderful internist, family doc gynecologist out there in the community is still pretty much drawing the same labs that I saw 30 years ago. And I'm not slighting them, but, you know, they're not hearing about.

So I want to know your C-reactive protein. And if you're a heart patient, there's a couple others. One is called Myeloperoxidase, one's called Lp-PLA2.

These are all available. These are not exotic. Your insurance will cover these of your heart patients. There's homocysteine which may relate to your diet, may relate to your genetics, may relate to your vitamin levels.

High homocysteine levels aren't good for the brain. They're not good for the blood vessels. And they're treatable with changes in diet. Maybe using b-complex methylated vitamins, using NAC and N-acetylcysteine.

Even recently, creatine has been shown to lower homocysteine, so there's things to do to get it back to normal. People may feel better, but you'll certainly make their lives better.

I absolutely want to see light bulb protein literally. That's a genetic cholesterol. It's a long word, lipo, lipo, protein. And you have to say little because it's a lowercase a it's a genetic cholesterol that about 2 billion people in the world are born with 2 billion people, 100 billion people in the United States, baby.

And it can destroy your arteries and destroy a heart valve aggressively during life. You know, usually not kids, but can cause a heart attack when you're 44.

It can cause a stroke when you're 52. Now, there are people like smokers that never get lung cancer. There are people that have a very high genetic lipoprotein cholesterol level and they seem okay when you check them.

But you should know so you can use it as a springboard to check your artery health. And it really doesn't fit this particular conversation because lipoprotein A is nowhere nearas responsive to diet changes as standard LDL cholesterol.

I mean, some people will lower their cholesterol from 250 to 1, 50 and eight weeks with a big diet change. Usually all plant based labor broke. Today is not easily responsive to diet.

It also doesn't respond to stat like Lipitor and Crestor and the pharmaceutical industry right now is chasing and they will be successful. Three new products that will be injections that will be available probably in the next couple of years and I think will be a great breakthrough for that patient that's had a stroke, heart attack, a bypass, a stent and a super high lipoprotein level.

But the research has to be completed before we open the champagne and celebrate a new breakthrough. You know, vitamin D, you can check Omega-3 fatty acids in the blood.

And I see so many people, they either don't like fish or they don't eat flax, chia, hemp, walnuts, or they don't process flax, chia, hemp, walnuts. And their brain is very deprivedby Omega-3 as well as our cardiovascular system.

So might ask for that.

Empowering prevention and closing remarks

And yeah, you can always go beyond the hemoglobin A1c, you know, how's my average three month blood sugar working for me? Maybe fasting insulin, but I don't like to go.

I do more labs now, but I don't like to get too much beyond that because Primary Care Doc will already be looking bug eyed at you. You know, I never draw these things.

And you are these seven or eight advanced labs. You also can order them on your own. You can go to lifeextension.com, wellnesseffects.com. Lifeforce.com.

Those are three sites where you can order your own advanced labs for a few hundred dollars and it might be worth doing. I really appreciate you sharing that because one of my biggest goals out of any summit education experience is that people feel more empowered to take their health into their own hands and to at least ask the questions so that they can be more discerning in the choice of practitioners and see how they can take the next step to assess deeper.

Right? So this is fantastic. So any last words you want to share with our audience, whether they're just taking their health into their own hands or, you know, they're gobbling up these advanced labs ideas because they they really know it's got to be it's you got to be the CEO of your own health.

Well, you have to be the CEO of your own health. I use a little hashtag on social mediatest. Not guess, it's sadly in my field of heart disease. Just routine to feel fine the day before your heart attack or the day before your stroke.

And it comes on like a snake out of the woods. But you had no clue. This a very slowly, progressive, relentless disease that you can detect ten years before a heart attack and make major interventions.

So don't assume because you went to the gym and got a decent workout out that know you're young inside. You

may be you may not be. I don't want to depress people, but between bloodwork, simple heart CT scans, measuring your blood, TMAO level, measuring your C-reactive protein, you really can dissect your health and maybe sadly identify that you have an illness, but at least get on top of it and get it under control when it's very manageable.

Heart disease is reversible. Diet is a portion, an important component of heart disease. You may not get arteries back like when you were 20, but you definitely can shrink and reverse plaque in arteries very successfully.

For spreading this message of hope and for really emphasizing be proactive. We've got to change our culture around this stuff before it's too late. So I. Agree.

Thank you, Dr. Joel. Really appreciate your time today. And where can people find you and learn more about your work? I'm in practice in Suburban Detroit, but I'm licensed in about 30 states, so I do a lot of telemedicine.

drjoelkahn.com, drjoelkahn.com And that takes on my podcast, books, clinic, blogs, videos, fun stuff. Awesome. Thanks so much. Thank you.