Ivor Cummins	00:00:42	A very special podcast today because I have none other than William “Wheat Belly” Davis, a cardiologist extraordinaire who has incredible knowledge, patient experience and huge quantities of research all around heart disease, but in recent years going way beyond heart disease. So it's an honor to meet you finally directly, William.
William Davis	00:01:04	Thank you, Ivor. I'm glad to be here.
Ivor	00:01:07	Excellent. Well, the first question I was going to start with, and actually I won't start with the question yet. I just want to talk a little around my sponsor, David Bobbett, who I know you are very well familiar with. And you are a huge support to him, along with many other top cardiologists back in 2012 when he had discovered he had enormous heart disease, even though he was acing all his ECGs, treadmills, he had a score of nearly 1000 calcium and he had three primarily blocked arteries. So maybe we could have a quick word about that story.
William	00:01:39	Well, David's story Ivor, is a great illustration of how ridiculous the conventional approach to heart disease is, which is “treat your cholesterol” is lousy, outdated marker for the factors that actually do cause heart disease that should have been abandoned, by the way 40 years ago, but still in use because the statin drug industry profits from that ridiculous piece of misinformation. And so they use cholesterol values and the development of symptoms to determine whether you have heart disease or not.
	00:02:14	Well, that's ridiculous. Because when symptoms appear, you're in deep trouble. Half the people who have a heart attack for instance die before they get to the hospital. So we all know this. But the conventional notion is wait until symptoms appear or something like a normal stress test, which is a very, very late marker, develop. Because that's how it pays better.
	00:02:36	I was an interventional cardiologist, I was the guy doing stents and angioplasty and atherectomies, and all that stuff. I'll tell you Ivor, it pays great. I can get paid several thousand dollars per patient, I could do several procedures a day. It wasn't uncommon to do 6,7,8,9,10 procedures a day, so it paid very well. Why should I be bothered identifying people before they have a catastrophe, a heart catastrophe and prevent it? Why would they do that? They don't do it. So there's a willing ignorance, there’s a willful ignorance. I really mean that. There's an absolutely willful ignorance in identifying people who are at risk a year, two years, five years for a heart catastrophe,

because it pays so much better. You put in stents, bypass, do heart catheterization, etc.

00:03:26 That is a sad state of affairs in heart disease. And so there's very little interest in identifying people beforehand. But that's where the whole world of heart scanning came from. They came from dissatisfied people like David, who said, “What the hell is going on here? You mean, you tell me my cholesterol is fine, I'm slender, I'm a long distance runner, I'm fit. I'm really healthy, and have advanced heart disease?” Why are we not looking for that? And so he had a CT heart scan of course, or coronary calcium score, and he had as you point out advanced heart disease. So now the question becomes why? What can we do about it?

Ivor 00:04:01 Yeah, exactly. And I always with David, we talked about a two hander, you must have the early identification of those at risk. So they have an option, a right to know and an option to take steps. And the second thing is you must do the right stuff. Because meds can help somewhat with people who are not going to do the right stuff. But to fix the root causes, it’s the holy grail, essentially. So maybe we could have a word on that.

00:04:27 In your book “Undoctored” recently, it's a tour de force, it's very uncompromised. They got the whole medical system, of course, and you go through so many drivers of disease and ways to counteract them. But for you, what are the top several, the top few key things to do when you find out you have heart disease, and you want to attack the root causes?

William 00:04:50 One, don't pay any attention to cholesterol. It's ridiculous. It's outdated. It came from 1950s, 1960s understanding of heart disease causation. Unfortunately, that's all the conventional doctors pay attention to. They they think that cholesterol is a wonderful marker and reducing cholesterol is the answer to all heart disease, which of course is absurd. As you have helped point out, cholesterol is a lousy marker. It distracts everybody from the real causes. And that's what shocks me. No one's paying attention to the real causes. So if all you do is reduce cholesterol with a cholesterol reducing drug, like Lipitor, take aspirin and follow a low fat diet, you have no impact, for instance, on the progression, the rise, expected rise in a heart scan score. So if we did nothing, these people with positive heart scan scores, as you know, let's say 1000, let's say around David’s score, about 1000, if you do nothing, the score will be about 25% higher, so 1000, 1250 a year later. And then the year after that, another 25% higher. And of course, the more it

progresses like that, the more certain it is you're going to die of a heart attack or have a heart attack, or have other coronary syndromes, angina, get a stent, etc.

00:06:06 So if you do nothing, the score increases 25% per year. What if you go on aspirin, Lipitor at high dose, or other statin drugs and a low fat diet? How fast your heart scan score increases? 25% per year. We help publish those data 20 some years ago. Ivor, for 27 years ago, and it's been corroborated repeatedly. Conventional notions of heart disease prevention do nothing for stopping the progression, in fact, may even accelerate it. They may even rise faster. So the question becomes, “Well, how do we stop the otherwise relentless progression?” So by the way, the conventional consensus opinion is, “Ah, don't repeat the heart scan, just let them have a heart attack or develop symptoms and have them come to the hospital.” No kidding. That is the consensus opinion, which is absurd, of course. Because that essentially says, “Ah, let them develop symptoms,” and you know, a bunch of people will die as a result. Well, what can you do?” Right?

00:07:02 So that's when I said about trying to find what does impact progression of heart skin scores. And that's what led to the collection of crazy strategies that I used to call track your plaque and then now we call undoctored. Though people see this as means of losing weight and others, “No one wants to talk about heart disease,” right? “So you're a brave young man, because you want to know about heart disease.” Most people don't give a crap about heart disease until something bad happens to them or somebody close to them. But that's what we're doing.

00:07:27 So the number one thing we do is eliminate all causes of small LDL particles. Small LDL particles, as you likely know, are unusually persistent. If you consume a foods caused by food, it lasts about five to seven days as opposed to the 24 hours of a large LDL particle. So obvious question, what causes small LDL particles that we know are potent causes of coronary atherosclerosis? Two things: grains and sugars. Not fat, not lack of statin drugs, but grains and sugar. Though amplified by other factors such as insulin resistance and inflammation, as you’ve been very good at pointing out. But first step, eliminate grains and sugars. And if you're falling, let's say in Mr. Lipoproteins, which just a means of gauging lipoproteins, the real causes of heart disease, not cholesterol, you'll see a small LDL drop, for instance, from 1800 nanomoles per liter (particle count per volume) to zero, or something close to that. So it's not like a

		statin like 30% drop. It's an obliteration of this thing that causes heart disease.
	00:08:34	So diet is crucial. It starts the process of unwinding the expression of small LDL particles. By the way, when you do that, all this other good stuff happens. HDL goes way up. Triglycerides come way down. Fatty liver regresses. Insulin resistance, begins a powerful process of reversal. Blood sugar drops. Hemoglobin A1c drops. C-Reactive Protein, drops. IL-2, other inflammatory markers drop. It's not the full answer, but it's the start of a very powerful answer. Vitamin D, when I added vitamin D, this is back, I forget now, 10, 12 years ago, and I didn't do it for coronary purpose; I did for other purposes, because it was clear for instance, even back then that it helped contribute to a reversal of insulin resistance. Very important thing. And it's anti-inflammatory, as you know. That was the first time I saw. So up till then before vitamin D, heart scan scores would increase 25% per year. We threw everything we could add it, fish oil, you know, exercise, etc. and maybe we slowed it to 12%, 18%, 8% for your progression. Added vitamin D, it was the first time I saw a heart scan score say of 900 become 400 or 500 or 300, or something like that. It happened over and over and over again, we saw actual regression of coronary calcium stores. Not to say that vitamin D is the only answer. But it became clear that there was a very, very critical component of an effort to prevent the progression of at least coronary calcium as an indirect gauge of coronary atherosclerotic volume.
Ivor	00:10:08	Yeah. So vitamin D, low carb diets, low sugars, low grains, insulin resistance abatement, all pretty much key factors. What about vitamin K2 which has got a lot of focus in recent years and trials are beginning and the effect that can have to moderate calcification or possibly even help towards regression.
William	00:10:30	The conversation is tantalizing. I've been dealing with K2 for about a decade now, based on the Rotterdam Heart Study, which of course is lousy data because it's observational. We know that observational data, as you point out, is almost as good as no data at all. Eight times out of 10 observational data are disproven by the true clinical trial data. We know that K2 though still plays a role in calcium metabolism. We know that from Japan for instance, where K2 as menaquinone, the MK-4 form, is helpful in reversing osteoporosis/osteopenia. The problem with coronary issues is there's virtually no data outside of experimental and observational data that suggests that K2 plays a role.

00:11:13 I'll tell you, when I added K2 as 180 micrograms of the MK-7 the long acting form or 5000 micrograms of the MK-4 short acting form, (this is anecdotal) I never saw any effect, whatsoever on contributing any incremental benefit to stopping the progression of heart scans scores, nor on other calcium dependent phenomena such as aortic valve stenosis. And so I become skeptical. I think what we're dealing with here Ivor, is let me digress for a moment, is the same issue we see with homocysteine. So people have homocysteine know that if you're above 14 micromolar, you have greater risk for stroke, heart attack, cancer, depression, right? And we know that we can reduce homocysteine very effectively with B vitamins - B6, B12, and folate - B9. So, obvious question, what happens when we treat people with high homocysteine with a collection of B vitamins? 15 trials now you reduce homocysteine 25, 30, 35% with no effect whatsoever on reducing cardiovascular events, stroke, etc. What the heck?

00:12:25 So what's wrong with this? Well, could homocysteine be a marker for something else? And I think the scientists is suggesting homocysteine is a marker for dysbiosis, disrupted bowel flora, because lactobacillus and bifidobacteria species are very good. They're very avid producers of B vitamins, especially folate, B6 and B12. So no surprised brat if we buy this idea that giving people those B vitamins doesn't reduce risk, because the cause is not the lack of B vitamins and lack of B vitamins is just an epi phenomena. It's just that side occurrence. The real issue here is unaddressed substantial dysbiosis, like SIBO (Small Intestinal Bacterial Overgrowth) where the entire length of the intestine is infected, which is extremely common, by the way.

00:13:13 So I wonder if the same issue applies to K2, because we know that there are probably about a half dozen species that convert K1, that is the K1 and green vegetables like kale and spinach to K2. So is the apparent lack pf K2, is that really reflective of dysbiosis? And the solution is not give you K2, like giving B vitamins for homocysteine with no effect, is the real solution address that dysbiosis that allows a lack of K2? This is an emerging conversation. I won't pretend to have all the answers but I think that's where that conversation is going. That all said, there's no harm mentioned though in taking K2. Take your 180 micrograms of MK-7, or take your 5000 micrograms of MK-4. There's no harm, there's never been any harm shown. But there has never been any benefit shown in cardiovascular disease either.

	00:14:13	So as you point out, those trials are are being put together. And so we'll have better information soon. Though, as often happens, the attention is given to products that have a potential pot of gold at the end of the trial that is some kind of supplement or drug. I wouldn't be surprised if this proves to be a positive try the drug companies somehow get hold of it and lock it up with patents (that's how they work) when the real solution is probably more address the universal dysbiosis that all Western Europeans and Americans now have because of all the things we're exposed to.
Ivor	00:14:48	Yeah, William. Absolutely. There's trials underway, but there is an absolute dearth of human data. And I've been digging into it in the past few weeks, got a lot of papers. The only thing besides association really are animal studies. So there's a series of animal studies where they have antagonists for K2 and they accelerate calcification impressively, and then there's some rat studies where they add high dose K2 and K1 combo, but the standard doses, human corrected, you know, grams per whatever, didn't really do anything, but the high doses had quite a strong effect. But again, animal models, like you say, we got to be really careful with those as well.
William	00:15:31	You know, I have a bias in a lot of the things I do. I always ask if something is beneficial. Did primitive humans do it this way, and or did they have some means of obtaining this thing? Like vitamin D, you know, I was shocked when I started seeing the effects of vitamin D 10 to 12 years ago. Personally, I had something close to seasonal affective disorder. I live in Wisconsin, where it got dark really early, we got cold, and it was extremely depressing. I stand in the shower six in the morning. Depressed, think I had to go through a day. When I added vitamin D within three days, I felt the entire thing lift. I felt the physical lifting of that feeling. But then you have to ask, "Well then, how did primitive humans get vitamin D?" Well, you know, they ran naked or semi naked in a tropical to subtropical sun, they eat liver, they lived outdoors for the most part, we live indoors, we wear clothing that covers 90% of the surface of our skin. We don't eat liver, unfortunately, things like that. So we all have profound vitamin D deficiency. But in other words, but it's consistent with the primitive human experience with its need programmed into human genetic code.
	00:16:39	So I always ask, so if there's an apparent benefit with K2, why is that? Is it because we relied on pasture fed ruminants, for their meat and organs? It could be that, but the consumption of of ruminants has been spotty, and there are populations who

		don't consume ruminants. So it makes me wonder where does need comes from? That's why I'm getting to the point where, "Could it be once again, the dysbiosis of modern humans," that we've yet it's another expression of how much we've mucked up the microbiome. And maybe part of that is the loss of species that convert K1 to K2. I think that's where this was gone. But this is just my speculation of putting two and two together.
Ivor	00:17:24	Yeah. No, that's a perfectly reasonable postulation there. And as you said, the data is not in yet. If you take though, your people that vitamin D was so critical in, well there's a couple of questions. One, and I gave a talk in this some years ago on vitamin D. I was concerned over the years that the D3 pharmaceutical or nutraceutical might not confer the same benefits that achieving D3 through the sun, would because of the vessel dilation of UV, and there's multiple other photoproducts in the sun, we don't even know what they do. So how do you feel about that, trying to get real sun or UV lamps, like from Sperti, as maybe more favorable than the vitamin D supplements?
William	00:18:08	Yeah, I think that's true. That is taking vitamin D does not absolve you of the need for sun exposure. I think the best strategy is to take vitamin D, just because it's impractical to get vitamin D from the sun. Your latitude, my latitude, what if it's February, you can't get D. You could sit outside naked the entire day and still not get vitamin D. So it's impossible and impractical. And it's something that often talked about, as you get older, you lose the capacity to activate vitamin D in the skin.
	00:18:41	Taking vitamin D is a partial solution. I think you're right, getting sun exposure is a better solution though the means by which that works is not entirely clear. It might be some pineal mechanism. It might be something else. But there seems to be additive effects of sun exposure over and above that. Most that data is observational, but we have to be careful about that. But you know what? It's benign. And as you know, this ridiculous advice to avoid sun exposure that comes from dermatology, as often happens in conventional healthcare, conventional advice ruins health. This is true in dermatology, it's true in heart disease, it's true in diet. Conventional advice is wrong and actually ruins health many ways. I think that's true also for this idea of avoiding sun exposure.
	00:19:30	By the way, when you take vitamin D and get your blood levels up to 60, 70, 80 nanograms per milliliter range or 150, 180 nanomoles per liter, you are protected, not impervious, but

protected from sunburn. It's sunburn, of course, that has all the deleterious effects, and we are protected from sunburn. So there's that crazy issue where the better off you are with vitamin D status, the more protected you are from excessive sun exposure.

Ivor 00:19:57 And indeed, increasingly, it's coming out that a lack of vegetable oils in your diet or seed oils makes you much more impervious to the burning effects of the sun and all the biochemistry and science is getting behind that. So that's another good one. No vegetable oils, which I guess, of course, is one of your big rules as well. No seed oils on industrial vegetable oils.

William 00:20:19 Yeah. It's amazing how much conventional dietary advice has gotten wrong. You know, I'm kind of grateful for how much they screwed up because it taught us what is true, what is not true. I mean, lesson after lesson in diet has proven wrong, right? Avoid saturated fat, avoid total fat, eat more healthy whole grains, use more corn oil, use more mixed vegetable oil. I mean, over and over the conventional advice, not only proven ineffective, it's proven harmful. I mean, it's a vivid illustration of how wrong things can be, particularly when you allow industry to get involved in decision making, policy making.

Ivor 00:21:00 Yeah, for sure. And you know what I used to say years ago, William, that if you took all of these decisions on what good nutritional advice was, and you take seven or eight of them, like you've listed, if you flipped a coin, you couldn't get it more wrong. I mean, the only one they can really I mean, even salt, you know, arguably telling people to eat very little salt now is a negative thing as well, in many people's case. Cigarette smoking was the only one they were really correct on.

William 00:21:29 Good point. Very good point. Anyway, I love, you're an engineer, right? That wisdom is coming from outside healthcare. Wisdom on health is not coming from healthcare. You know, healthcare is designed to maximize revenue return for healthcare insiders, for doctors, medical device companies, pharmaceutical industries, the hospital systems. Healthcare is not geared towards providing health. So I love that people like someone outside healthcare saying, “What the hell is going on with this ridiculous stuff you're doing?” Like take giving people statin drugs, and time to lower their fat intake. So it's wonderful. We live in a time. So there's a lot of bad, especially in U.S. in healthcare. But the great thing here is someone like Ivor Cummins can say, “What the hell's going on here?” I look at the data as an engineer, and the data has been massively

misinterpreted, misrepresented and lead to the wrong conclusions. And here are the right conclusions.

Ivor 00:22:26 Yeah. Hey, thanks William. I was kind of hooked from the very start, from the first couple of weeks of research in this, because, you know, compared to engineering, I so rapidly found out so much stuff was wrong. It just became a playground. It was fascinating. But we also got some amazing doctors who are engineers originally, I mean, the way of thinking, the thought process like Dr. Michael Eades, Dr. Ted Naiman, Dr. Bernstein with his type 1 diabetes solution. So there's a lot of docs.

00:22:54 Now you yourself, I'll have to say, I don't want to be flattering here, but early in my journey back in 2012, coming into '13, I sat with my wife and watched your original, I think it was AHS, possibly, your original talk on wheat. And I was just stunned at whole series of things that you as a cardiologist had started looking at your patients degree of disease versus what they were eating, trying to find out where the patterns and you saw that cholesterol being high you could have in a person with very low heart disease or cholesterol low and not in a person with high heart disease, and you found your way to wheat so quickly. And then again, outside your specialty, you completely research the whole history and evolutionary and biochemical side of wheat. So that was quite amazing. We were just blown away by that lecture.

William 00:23:46 You know, a lot of it... this gets kind of boring, people's eyes glaze over. But you know, who knows a lot about nutrition? The anthropology community. I'm always astounded how much they know, how much they've learned by tracking the behavior of humans and the impact on health. Now, of course, there's no such thing as fossilized livers, of course, but there's still a huge amount you can extract from the remains of humans going back thousands and millions of years. Anthropologists have known this for decades, that when humans first turn to even the ancient form of wheat, [Inaudible 00:24:20] corn wheat in the Middle East, as well as millet in sub-Saharan Africa, to some degree rice in Southeast Asia, and maize and TSN in Central America. The theme repeats itself over and over again. When humans first turned to the seeds of grasses (that's what grains are) there was an explosion of tooth decay.

00:24:41 I find this fascinating. I'm surprised dentists don't make more of this. Prior to the consumption of grains, dental decay and misaligned teeth are virtually unknown. 1 to 3% of all teeth recovered prior to the consumption of grains show decay, which

		makes sense if you're a wild human and you eat some of your food raw, you need a full mouth of intact strong teeth. When grains were added 16 to 49% of all teeth recovered showed misalignment, tooth decay tooth abscess. By the way, that same experience is repeated in primitive cultures that have persisted to modern age who have adopted Western diet, explosion tooth decay such that number one cause for suicide among tribes or cultures living in ancient life, si life is tooth abscess, because it [Inaudible 00:25:32] the surface extremely painful. But we know, the anthropologists know with confidence that when we consume grains, with explosion in tooth decay, tooth misalignment, a doubling of knee arthritis, iron deficiency and other diseases. In other words, it was a dramatic change in human health and human behavior. It did lead to the burst in agricultural activity and perhaps a civilization so it did some good things as well. But it was their response for a major downturn in human health. And modern people don't recognize that. They think that eating a loaf of bread or a sandwich, they don't recognize that that's a major cause for tooth decay, heart disease, autoimmune diseases, metabolic diseases, inflammation, arthritis, psoriasis, [Inaudible 00:26:19] acid reflux, [Inaudible 00:26:21] colitis, Crohn's disease, on and on and on. But the realization that this was a mistake, a huge dietary mistake made 10,000 years ago, sets us free to do the opposite. And once again, diet, conventional diet information not only gave us ineffective diet information; it gave us destructive diet information.
Ivor	00:26:41	For sure it doesn't [Inaudible 00:26:42] those tasks to be called out. I often say to people, when we say “junk food,” and we mean like a burger or fries, the refined carbohydrates and seed oils, the meat is not actually that bad, probably, it's the bone. But then when we talk about bread, we talk about it as healthy whole grains, but constitutively, it's the same seed oils and refined carbohydrates as the stuff we call junk. And no one sees the irony.
William	00:27:08	It is amazing, isn't it? Just because the observational data suggested that people who replace something awful for diet, white processed flour with something less awful (whole grains) and there's a benefit, and by the way, that is true, we all know that's true. There's less colon cancer, less heart disease, less weight gain, less type 2 diabetes.
	00:27:28	For instance, my favorite example is the Nurses Health Study, which is a huge epidemiologic study out of the Harvard School of Public Health. They showed over about 10 years that women

		who ate lots of white processed food gained 12 pounds. It's a lot more than that, of course, but they gained 12 pounds. Women who ate more whole grains gained 11 pounds. Conclusion, eating whole grains helps manage weight. No, conclusion is anything made with grains makes you fat.
Ivor	00:27:56	Exactly!
William	00:27:57	[Inaudible 00:27:58] what makes you fatter. This is the kind of budget used over and over and over, by the way, and the epidemiological studies used to support ridiculous notions like eat healthy whole grains. Of course, what they should have done was followed a group prospectively that ate no grains, and of course, they would have shown that there is no weight gain, or there's weight loss. There is not just a slight reduction, type 2 diabetes, there's actual reversal of type 2 diabetes or dramatic reduction. And in other words, it's the flawed reasoning that is widely used in in epidemiology and in nutrition.
Ivor	00:28:30	Yeah, and WIH?? [Inaudible 00:28:34] I mean, it was six $700 million and there was there to prove the low fat theory and the healthy whole grains and there must have been a huge disappointment when the whole thing fell on its face. But they deserved it, they deserved it.
	00:28:45	I got to actually switch subjects back a little now because I don't want to forget this one. You have a paper that seminal study published, 2008, and I've repeatedly assented to people on the internet. It's one of the only published papers demonstrating regression of calcification. And you mentioned earlier it was vitamin D, fish oil, and at the time, you're using lipid lowering drugs as well. But I think you had 45 patients, around half regressed, around half were fairly stable and a small percentage increased. So maybe talk a little about that paper, it didn't get a lot of coverage out there, I believe.
William	00:29:23	No, a small paper not guilty of not having updated all the strategies. If I were to update the experience, it would show that there's dramatic regression when you do these things. One of the problems, it's the same problem that people like Bredesen have, Bredesen is the end of Alzheimer's guy, who he tried to get approval, you have to get approval to perform clinical studies nowadays, appropriately. So you have to get through an Institutional Review Board (IRB.) And every time he tried to propose a study that had numerous moving parts, he got turned down because it's very difficult for these IRBs and other people to understand programs that have multiple

moving parts, as opposed to a drug company study say, which is Lipitor versus Placebo, or high dose Lipitor versus low dose Lipitor. But when we do real health studies, where in my case would have been the diet that eliminates expression of small LDL particles, vitamin D that reverse and some resistances, anti inflammatory, Omega-3 fatty acids, its anti inflammatory and has effects on subduing postprandial after meal like a proteins, magnesium that reverses endothelial dysfunction and causes the reduction of blood pressure, iodine and fiber optimization because of disruption of thyroid states in the world. And then cultivation of healthy bowel flora correcting dysbiosis everybody has. Now try to get that to an IRB. They'll say, “No, no, there's too many things here.” Though, I know this works like crazy, because we've done it so many times. So you have to do studies that are kind of silly and stupid. Like, we're just going to do the diet, or just vitamin D. And what happens when you do those things, of course, you may show a modest effect or no effect. Because the magic in a lot of this occurs with the synergies among different strategies that all contribute to a much more meaningful whole.

00:31:06 So it's very tough. But nonetheless, that little trial I published, the retrospective trial did show that it was at least conceivable, at least it’s feasible, to stop or reverse heart scan scores in a lot of people. I'll tell you, the experience is much more effective today. I've been distracted by the whole Wheat Belly Undoctored experience. You know, as I said before, people don't want to talk about heart disease, it's scary. I learned long ago that people are much more interested in money, weight loss, food and sex. And so you got to get people’s attention. So lot of my message is not driven by coronary disease reversal. It's driven by Mary Jane, who can drop her dress size from a 36 to a four, and look great in a bikini, and is 10 years younger, because she lost her skin wrinkles and her eye puffiness. That's how humans. But then it's your opportunity now to educate them about coronary disease, or cancer, or high blood pressure, or whatever.

00:32:07 Because of that, I've gotten distracted and not republished, updated some of the data. But I can tell you, at least anecdotally, on a large scale, regression of coronary calcium scores is relatively easy, but it won't involve a statin drug, a low fat diet or Aspirin. The best, what they call optimal medical therapy which is laughable, of course.

Ivor 00:32:30 And again, I tend to avoid getting into the whole pharmaceutical or drug discussion just because I rather focus on the root cause

and the nutritional fixes, which you're all over. So regression, this is a key question. If someone does the right thing synergistically together, regression is possible. That it means a much more positive risk profile or future outcome, right?

William 00:32:56 Yes. So if you achieve stabilization, that is no change or aggression, heart disease events, heart attack, death, sudden cardiac death, rupture, development of angina, is virtually zero. So you have virtually zero risk if you achieve that. Now, people say things like, “Well, if you remove calcium, you remove the stabilizing component of plaque.” Well, one that's ridiculous. A calcium is not stabilizing. It's a consequence, not a cause. It's a consequence.

00:33:28 I have the advantage of having done thousands of intracoronary ultrasounds and all that means is you actually put a millimeter wide probe down the coronary arteries themselves over a wire, and you image the arteries in cross section, you see what they're made of. And you learn very quickly, there's no such thing as hard plaque and soft plaque. But there can be, but most plaque is a hodgepodge. It's a smorgasbord of all kinds of things, just as you'd expect. It's got some calcium, it's got some soft elements. It's got some fibrous elements. It's got all kinds of different shapes and sizes, over rounds, and all kinds of crazy things. So this idea that removing calcium is somehow de stabilizing is contrary to what we know. And that is when you reduce your score, you have virtually zero events. By the way, the idea that calcium is stabilizing is a speculation from people who apologize for the effects of statin drugs. That's where that came from. Because when you give people statin drugs... so we talked about how heart scan scores increase if you do nothing 25% per year. If you give somebody a statin drug, heart scans scores progress even more rapidly, 27, 28, 30% per year. So the statin apologists say, “Oh, well, that's good, because calcium is stabilizing.” Of course, that's ridiculous. Why would calcium be the exception only in statin treated people? So that's complete speculation. It's probably wrong, but that's where that idea that calcium is somehow stabilizing. It comes from the statin apologists.

00:35:03 So regressing calcium as a surrogate for coronary atherosclerotic plaque volume, not hard plaque, but meet all components of plaque is a wonderful thing. Regressing calcium is a wonderful thing. And it's also a great index of the effect you're having with vitamin D. Perhaps K2.

Ivor	00:35:59	Excellent, William. And then the regression, obviously from the published literature, there are papers from [Inaudible 00:36:07] and others, as you say, where people who stabilize their progression, even the risk plummets incredibly lower. But you've actually seen regressions, is that in volume and density or general Agatston?
William	00:36:22	Both in Agatston score as well as the volumetric scoring. Would not correlate the two, is there a difference in some people who let's say get more Agatston reduction than volumetric scoring. We're talking about courses. Volumetric scoring is a little different, it's probably better than Agatston scoring though Agatston still persists a density and area score. So no one's really proven beyond a doubt that one is better than the other. In truth, both are pretty good. But we do achieve regression in both. And it's relatively easy. It's the exceptional person who doesn't. You know, there's just genetic variation of course in a number of things. So even though small LDL particles reverse in the majority people who eliminate all grains and sugars. And by the way, the reason for that is it's just as you know, carbs cause small LDL particle formation and the carbohydrate of grains, amylopectin-A, which is a really bad carbohydrate, because it's so highly digestible by the enzyme amylase, that it yields at big rise in blood sugar that fuels the liver conversion of carbs to triglycerides de novo lipogenesis. That's why you get fatty liver. It's where you get hypertriglyceridemia, high triglycerides, and insulin resistance from consumption of grains because amylopectin, as you would point out the the amylopectin-A and white flour is a very same amylopectin-A in whole grains. It's the same stuff. So the grain elimination is an exceptionally powerful. It doesn't seem like it's not intuitive. Green elimination is an extremely powerful cardiovascular protection strategy.
Ivor	00:38:02	Yeah, for sure. I mean, the grains have a lot to answer for, and the regression then that you... regression in your patients, you have the clinical experience of seeing their progress. And I remember you once saying many years ago, that you effectively don't see repeat heart attacks or repeat business. Your whole practice changed. So you yourself have seen regression with this synergistic kind of implementation of root cause fixes. You've seen the regressions and the stabilization directly linked to no future heart attacks are extremely low levels, way lower than will be expected.
William	00:38:40	Yeah it's anecdotal, but on a large scale at a very, very big practice. Other cardiologists expected several heart attacks per

week in your patients who you took care of that is on a beta blocker, on aspirin, on a statin drug, on a fibric drug, etc. And you just knew that you'd be called 3:00 o'clock in the morning with heart attacks, or recurrent chest pain (angina) in your own patients, or you'd meet people, you'd have to do a procedure on them, and they'd be back in six months. So part of the theme of coronary disease is that it repeat itself over and over and over. Which by the way is a financial bonanza. If you're a cardiologist, if you're a stent manufacturer, if you're a hospital, you love that stuff. Because every time somebody comes back in, kaching, kaching, not just for $10 but for thousands of dollars.

00:39:35 You know, somebody comes in for three stents at the hospital, and you make something like 80,90 $100,000. Comes in, they come in for bypass, the price tag starts at about 150,000. So it's a huge financial bonanza to do these kinds of things. Why started do all this stuff, we can grant elimination, eradicate small LDL particles, reverse insulin resistance, vitamin D, anti inflammatory, Omega-3 fatty acid, high dose, magnesium, etc. Heart disease (coronary disease) came to a grinding halt. I went from 3, 4, 8 procedures a day to essentially zero. Now people who said, “Screw you, I'm going to smoke cigarettes,” they continue to have problems. But people who said, “Oh, okay, this is interesting, you're showing me how I'm reversing small LDL particles, you're showing my C-Reactive protein drop from three to zero. You're showing me how my HDL went from 32 to 98. You're showing me how my triglycerides dropped from 245 to 39.” In other words, we're showing them that the markers for coronary risk are undergoing a broad and powerful, profound change back to ideal or normal. And then along with it. So that's how I convince people that you know, stick with the program because they saw their markers improved, and diabetics become non diabetic type 2, of course. People with pre-diabetes became non pre diabetic - blood sugars drop hemoglobin A1c drop. And of course, what people really want too is, “Oh, I lost 43 pounds.” “I now wear my jeans from 10 years ago,” or “I now fit back into size for dress,” they feel great about themselves. Even their shoes gets smaller, their feet gets smaller.

00:41:13 So there's all these surface changes as well. But along with that is we saw a regression of coronary disease. And it makes sense because we're seeing this broad landscape of metabolic transformation and coupled with it is regression of coronary disease, as well as other diseases.

Ivor	00:41:30	Yeah, and that's another point that they're all connected together. There's a common soil of causes of modern chronic disease as you laid out in Undoctored. And of course, what you do to prevent or eliminate heart attacks and fix all the markers is going to greatly reduce the risk for cancers and many, many other diseases too.
	00:41:50	We've done a documentary and we've scanned around 45, middle aged men, 58 years old approximately, prior sports stars. But in our documentary, we've seen certain regression phenomena, and magnesium, low carb, use of a blood glucose meter, and K2 and some other things were used. So we see these regressions. And you would say that that means really good stuff, right?
William	00:42:18	Absolutely. I love how we're all kind of converging. So we're all starting to realize that the conventional notion of statin drug, low fat diet, aspirin, is not only ineffective, but may even be harmful. And then you, me, David Bobbett, other people, we're all kind of converging in the same kind of findings that is, “No, it has to do with diet, not a low fat diet, though. Vitamin D, etc.”
	00:42:50	We’re getting smarter every day. So one of the great insights I think into coronary disease as well as so many other conditions is the dysbiosis, we've all experienced the disruption of bowel flora. So Parkinson's disease is looking like a disease of dysbiosis. Lou Gehrig's disease, Amyotrophic lateral sclerosis (ALS). Dementia is looking increasingly like a disease of dysbiosis. And specifically, probably, if we believe the data is, it's flooding out of Spain, a disease of fungal overgrowth, interestingly, intestinal fungal overgrowth and coronary disease is looking like not entirely, but to a large part of disease of dysbiosis. What that tells us then, is then purposeful reconstruction of a healthy microbiome may be a key strategy in achieving control over such things as Parkinsonism, Lou Gehrig's disease, dementia and coronary disease.
Ivor	00:43:47	Right. But William, you're talking about transforming the biome at through what you put in your mouth primarily.
William	00:43:55	Yeah. Nobody knows what you [Inaudible 00:43:57] looks like. That is a healthy microbiome. It's tempting to believe that the primitive cultures on earth who have never taken antibiotics, don't drink chlorinated water, have never been exposed to herbicides or pesticides, etc. like the Hadza of Tanzania or the [Inaudible 00:44:15] in the highlands of Peru, a handful of other primitive cultures, they have had their microbiome

characterized. And by the way, such as the Hadza and the [Inaudible 00:44:24] on two different continents have almost identical microbiomes, intestinal gut flora, suggesting that that may represent the microbiome that humans have had for millions of years, the so called Stone Age microbiome. It looks completely different than ours. They had maybe more Prevotella, they have more Fidus bacteria, they have more power Bacteroidetes. And we have completely different [Inaudible 00:44:51]. Should we try to recreate their bowel flora? Well, no one knows. I'd love for somebody to encapsulate some of the key species from one of those populations and deliver it to us as a probiotic. And we give it a try and see what happens. No one's done that yet. There's been sporadic efforts at fecal transplants doing that, which is kind of hazardous because those people may have other things going on too, like pathogens like worms. So there may be other issues here. But no one knows what a truly healthy microbiome looks like. So we're zigzagging little by little towards what is truly. But there are pieces of wisdom emerging.

00:45:34 Before we started recording, we talked about this crazy thing. I'm doing this Lactobacillus reuteri yogurt. That is restoration of a species that most modern humans lack now, but had most of us had up until all throughout history, up until the mid 20th century. So something antibiotics (herbicides, pesticides, whatever) has eliminated this bacteria that we typically got from mother's milk during breastfeeding years when we were babies, but is now absent. Now, here's something for you. Lactobacillus reuteri exerts all its age reversing effects, like smoother skin, thicker dermal collagen, increased muscle, increase bone density, increased libido, increased testosterone in male, it exerts all those effects via a boost in hypothalamic release of oxytocin.

00:46:22 What else does oxytocin do? It increases empathy and a desire for connection to other humans and feeling good about other people. Well, I wonder then, is the loss of lactobacillus reuteri and thereby higher levels of oxytocin, is this part of the explanation? To tell us why, there's record, social isolation, record suicide rates, record divorce rates, and who knows, maybe even gun violence in the US, which of course, is out of control. So is this target idea that what we're doing is restoring like Lactobacillus reuteri, we're doing specifically by making yogurt from the Lactobacillus reuteri, and people saying, “Hey, I feel closer to my partner. I understand the problems of other people more.” So I wonder if we're going to have an impact on the social fabric, not just health, by re cultivating what we're

		supposed to. But that's just one little piece of an answer to I think what's going to be a very, very exciting collection of strategies for rebuilding our healthy microbiome.
Ivor	00:47:34	Yeah. I think it's going to be fascinating in the coming years, the whole microbiome and everything that you mentioned there. I haven't got into it much yet but I'll be watching. We need more science on it and more proof. I think there's been quite a lot of science, doing transplants that's been questionable. And it's also arguable that simply transplanting isn't enough, that you need to change the whole environment that cultivates the microbiome, to actually get the affect. But the microbiome, it's kind of the second brain or the gut is your other brain? It's going to be an interesting times at.
William	00:48:08	I agree. One of the things I love about it is the strategies to recall debate a healthy microbiome have nothing to do with Big Pharma.
Ivor	00:48:21	Well, don't even say that, because if it becomes apparent to be important, there will be loads of drugs to help your biome.
William	00:48:28	True, true.
Ivor	00:48:30	So one you mentioned several times, which I love, is magnesium, but you didn't get into so much some of the mechanisms. So because I'm so hot on magnesium, myself, and I have a mountain of papers on it. It's a biochemical effects, the apparent deficiency in the modern human race of magnesium, the depletion in the soils. Maybe we talk a little bit about magnesium, because I kind of find it a super important thing to maybe supplement or at least ensure you get particularly high magnesium foods.
William	00:49:01	Absolutely! I agree. Magnesium is huge. And as I mentioned before, for me the Litmus test is to ask the primitive humans get greater quantities of magnesium. And as you point out, yes, they did. Because they eat wild plants that had much greater content of magnesium. Soil had more magnesium, not the mineral depleted soil of commercial farming. They didn't filter their water. They went to the river or a stream and waters flowing freely over rocks and minerals and is rich in magnesium. We of course have to drink filtered water. Whether your city filters it or you filter it in your home, water filtration removes 100%, nearly 100% of all magnesium. And of course, if you consume grains, phytates, the phytate acid content of grains binds most magnesium in your gut, you poop it out, and you

		don't absorb the magnesium. So all modern people have profound deficiencies. And that has consequences. Bone is the repository for a lot of magnesium. That's why people who are magnesium deficient have much more osteopenia, osteoporosis, and hip fractures. And one of the great benefits of course of magnesium depletion is a dramatic uptick in bone density and a reduction in fractures.
	00:50:13	So I agree, magnesium is huge. And we see such things as much reduction in blood pressure, reduction in arterial constriction or so called endothelial dysfunction. That's the process that leads to more atherosclerosis, hypertension, and coronary cardiovascular events. So magnesium is a relaxing agent. You know, in my heart disease practice days, working in ICU and Coronary Care Units, etc, if someone came in with a heart rhythm disorder, like atrial fibrillation, or multifocal atrial tachycardia, or ventricular tachycardia or ventricular fibrillation, they were survivors sudden cardiac death, or torsades, these are all heart rhythm disorders. First thing you do, mega dose magnesium. Even conventional. Like three grams of magnesium sulfate. You can give them mega dose, 3000 milligrams. If you did that orally, you've had diarrhea for extended period. You can't do that orally, but you can do it intravenously, and you restore magnesium. And you'll see it's dramatic. If they're having unstable heart rhythms, it goes back to normal within moments. That's how powerful magnesium is. But then you see all these other wonderful effects.
	00:51:31	And by the way, the way I do it, you may have noticed is we do it with something like magnesium water. Which is a little recipe I have for making magnesium bicarbonate by mixing. I don't know what you call in Ireland but we call it Milk of Magnesia here.
Ivor	00:51:47	Yeah.
William	00:51:48	Okay. It's a laxative. It's magnesium hydroxide, and we react it with carbonic acid. That is carbonated water, like seltzer water, something similar. And you generate water and magnesium bicarbonate. Magnesium bicarbonate is the most absorbable form of magnesium. You can't buy it, you have to make it. It's very easy. And if anybody's interested in getting this extremely observable form of magnesium, I put it everywhere, it's in my books, "Wheat Belly Total Health" "Wheat Belly 10-Day Grain Detox" "Undoctored." It's on my "Wheat Belly" blog, it's on my Undoctored Blog - the recipe for making magnesium.

	00:52:26	I'll tell a quick story. So I learned about the power of magnesium water when I had some patients way back when, with something called magnesium losing nephropathies. These are people who for a variety of weird reasons, like having gotten Cisplatin, a chemotherapy agent. One of the side effects is it eliminates your kidneys capacity to retain magnesium. So these people pee out their magnesium. And no kidding, they're dead within a week. From super duper low magnesium, they just dropped dead, sudden cardiac death. So these people end up going to the ER and Acute Care every five or six days or so for a magnesium infusion. And if they don't, if they miss a day or two or three, they're dead. That's how bad the squats. We can imagine what kind of effect this has on your emotions, your finances. It's very expensive to do that. And so I tried to devise a means to restore magnesium or at least reduce reliance on intravenous magnesium. Well, I give them all the tablets; high dose magnesium citrate, high dose magnesium malate, all that stuff. Nothing. No rise in magnesium at all . They remained completely dependent on magnesium intravenously.
	00:53:45	So I tried making this magnesium water, reacting magnesium hydroxide with carbonic acid yield magnesium bicarbonate. The proportions were in those places I mentioned. You start by drinking four ounces three times a day. These people did. We build up to eight ounces as [Inaudible 00:54:03] because it does cause diarrhea still. And lo and behold, I got them off intravenous magnesium. It's the only thing I ever, ever (get.) So these poor people, I'm on to the magnesium like every three days in the beginning, and lo and behold, magnesium stayed up. And they didn't die, of course, didn't have to intravenous magnesium. So it was a very, very vivid illustration of the variation and absorbability of various (magnesium). Not to say that tablets can't do the job, they can but they're extremely slow, extremely poorly absorbed. So if you have a low either serum or RBC magnesium, you're going to have to wait two, three years to see a real effect. You take the magnesium water, you wait weeks, and it rises. And if you have magnesium dependent phenomena, like leg cramps, which are very annoying, very painful, or heart rhythm disorders, or high blood pressure or erratic blood sugars or migraine headaches, you'll get relief much faster with magnesium water.
Ivor	00:55:04	That sounds like a great tip, William. Yeah, I've one pound bags of magnesium citrate just because it was very easy to get. It's quite absorbable. But again, we mix it in with food or I take it in the evening after a large meal. I don't think it works too well with me on an empty stomach.

William	00:55:21	Interesting idea. Never tried that. Great idea!
Ivor	00:55:25	But magnesium has an extraordinary amount of literature out there. It's just stunning, where it can be beneficial in so many conditions. Now obviously, it's not promoted much because it's not patented. No one has any interest. But you mentioned osteoporosis, and when I repeatedly find when I researched the calcification mechanisms at a fairly deep level is there's always an inverse relationship. You know, higher osteoporosis and calcium loss with higher deposition and calcification. And magnesium is one of the nexus of that whole relationship, that when you have an imbalance magnesium or myriad other things that drive calcification, the irony is you're losing calcium from your bones (that's the pathology) and you're building calcification in your arteries. It's a very fascinating seesaw that nearly always applies.
William	00:56:17	Yeah. As you know, coronary disease often occurs concurrently with osteoporosis osteopenia. So there's a real connection via the vitamin D/calcium/magnesium disruption.
Ivor	00:56:30	Yup. Well, I'm going to unconscious your time, William, and I really appreciate this chat we're having but I know you're going to run out pretty shortly. I'd like to just have a quick word again on the calcium scan and the whole philosophy aroundits. So myself and David Bobbettt (my sponsor) see it as a right to know. So the Widowmaker Movie went through all the controversy and why the medical system hated it. The drug manufacturers, not at all the prescribed people. The interventional cardiologists not at all take away a load patients who don't need angiograms, but they can give them anyway. And there's all these other reasons. But it's fundamentally a right to know, we believe, that many people may choose not to find out their level of heart disease. But for the people who want to do something, isn't it such a shocking shame that people will go and die of a heart attack when there's a test that would actually tell them there's a problem and wake them up?
William	00:57:27	Ivor, absolutely. I helped open one of the first heart scanners in the Midwest way back over 20 years ago. And back then it wasn't a multi detector scan; it was the old electron beam tomography device. A very excellent device by the way. That GE scrap and locked up the patents because of financial reasons. Nonetheless, we opened up the early heart scanner 20 some years ago, and you think the fights bed now was very bad back then. But you know what? Ironically, you and I, people like you

and I and your listeners recognize that CT heart scan for coronary calcium score is an enormously empowering measure. It's like getting a blood sugar, blood pressure. It tells you with precision, with accuracy and track ability, how much coronary atherosclerosis you have. There's no reason to not do it. There's modest radiation exposure, about eight to 10 chest x rays equivalent, but it's modest, and it gives you such an enormous empowering information.

00:58:19 But sadly, what's driven it is not that realization. It's that very quietly, the hospitals and my colleagues and cardiologists call CT heart scans a loss leader. In other words, they say, "Oh, David Bobbett has a score of 1100 or whatever. He needs a stress thallium, that's $4800, he may need a heart catheterization, another 38 to $40,000, he needs a stent, another 60, 70, $80,000 in the US." In other words, they see and they often use the heart scan score as an excuse to do even unneeded procedures. They say, "Oh, Mr. Bobbett, you have a score of ____. Very serious. You need a real test, a heart catheterization to see if you need..." Even if David says, "I'm jogging, I run, I have no chest," and they said, "Well, we can't be responsible for your safety. You're walking time bomb."

00:59:16 You've heard all this stuff. My colleagues are very good at scaring the hell out of people. And then nice guy like David Bobbett ends up with three stents and tied to the medical system because of recurrent disease bypass surgery. That's what has sadly, Ivor, that's what has driven hard scans. Because now the hospitals, so none of the hospitals would have anything to do with heart scanning 20 some years ago when I set up the first heart scan in Milwaukee in Wisconsin. But once they learned, it was a loss leader, leading to CT coronary angiography, heart catheterization, etc. Now, the hospitals do heart scans, and they say things like "$99," and you'll know for a fact, and then you'll have to talk to a cardiologist that says, "Ivor your score is 782, a very serious score. Maybe you need a stress nuclear study heart catheterization." So that's what's driven it.

01:00:07 I say that because when people have a heart scan, it's wonderful. It's empowering. It's hugely helpful. But don't listen to the bullshit from my colleagues who try to use it as an upsell technique. Be very, very skeptical of that.

Ivor 01:00:24 Yeah. That's a great point on the warning too that people who find out about the calcium scan via myself, yourself, they're going to get the full picture with all those caveats about the medical business. Or if they watch the Widowmaker Movie,

they get to see as hence do not prolong life and they're a bit of a scam unless they're going to save a life in an acute situation. But you're right, the person who comes across the CT scan, the calcium scan without having heard from myself, yourself or others, the realities, they could be exposed to overtreatment, for sure. And that's just kind of a downside. But we still need to make progress and get the CAC scan out there widely to save the people who need it.

William 01:01:05 And use properly. You know, I had this conversation every day, one of my websites, it's called "Undoctored Inner Circle" where people come and they say, "Hey, my heart scan score is 325, and I feel good. I ride my bike, I have no chest pain, I'm perfect health otherwise, and my doctor says I need a heart capitalization to see if I need a preventive stent or bypass." This is a common occurrence. Even though we recognize that as malpractice, it's very, I think it's less common in Ireland. But in the US where healthcare is massively profit driven. People are told every day they need unnecessary procedures.

01:01:51 When we talk about heart scans and how wonderful they are, how helpful, how empowering, and it's a trackable device you can follow along, we also have to say, "But watch out for the nonsense that comes to scare the hell out of you into a procedure."

Ivor 01:02:06 Yeah, watch out for the upsellers and stick with the people. If you put it simply, if you get a high score, you've got yourself a personal project to do to prevent your death. And you need to fix all the root causes. And there may be some medications that will stabilize plaque, whatever. But yeah, the operations and more invasive work is often not really needed. You've got your wake up call, and now you need to go and take care of the problem. I think that's where the power is, yeah.

William 01:02:36 Absolutely. And the strategies that it work, as you've pointed out to stop aggression, or actually achieve aggression are easy things you can do in your own kitchen, like vitamin D, change your diet, magnesium, efforts to cultivate healthy bowel flora, etc.

Ivor 01:02:52 And just to recap, if you achieve regression by doing several synergistic key improvements to your life, it's all positive, right?

William 01:03:04 Absolutely! There's no downside to achieving regression. Absolutely zero downside.

Ivor	01:03:10	Excellent. So is there anything else you'd like to add? I've gone from memory here, and I have a little list, but is there anything else you'd like to add in at the end? I think we've got some incredible value from having you here today, William. Really appreciate it.
William	01:03:25	Well, you know, I step back for a moment, and I think what Ivor Cummins is doing today was unimaginable, even 20 or 30 years ago. This smart engineer looked at the medical system and the conclusions they draw and say, “This is a bunch of crap. I can't believe these people have fallen for this nonsense logic, because it's driven by Big Pharma.” I love this. I love when somebody from outside the system disrupts what’s being passed off as prevailing wisdom and says, “This is not right.” And you know, if we had 100 cardiologists here, probably 99 would disagree with everything you and I say. We don't want anybody to underestimate just how important it is what you're doing, disseminating. You're not selling drugs, you're not selling a procedure, you don't cash in for 100,000 bucks every time somebody has a heart scan score. You're telling what you believe, because you analyze the data without bias (objectively) and say, “The stuff you're hearing on drug ads, or from your doctor is complete nonsense. Here's what the real story is.” And I think this is wonderful. It's representative of the kind of power we have now being put in the hands of everyday people. And that's why by the way, I called my book Undoctored because it showed me how people are becoming magnificently healthy, despite the doctor, despite the doctor.
Ivor	01:04:56	Thanks, William. Yeah, I certainly enjoy this because I've always for decades, love going in and sorting out the data and finding clarity where there was confusion. But also, of course, David Bobbett has enabled me with a sponsorship over the last few years to actually do this whole mission. So that's really the only way it's possible. And maybe a quick word to people, IDHA, Irish Heart Disease Awareness (ihda.ie) has all of the resources in a few minutes on the homepage and all the test centers around the world. It has a video of you as well, actually the second down from the top, I believe, which you were kind enough to do for David and a huge amount of information in those short videos. So people can proliferate that, that would really help us.
	01:05:43	So, Dr. Davis, William, delighted to have this conversation. Really enjoyed it. And I think we jumped all over the place, scored a lot of ground and got to do it again soon.
William	01:05:55	Absolutely, Ivor. Anytime.

Ivor	01:05:56	Thanks a lot, William. Bye now.