

Dr. Barret cardiologist and Ivor Cummins talk about CT scans and your CAC score – and best nutritional prevention strategies: Find out more @ihda.ie and TheFatEmperor.com

- Ivor: [00:00:10](#) Welcome to the Fat Emperor Podcast. I'm your host, Ivor Cummins. We're supported by the Irish Heart Disease Awareness charity (www.IHDA.ie), which advocates a simple CT Scan to reveal your CAC score. So Know Your Score, and take action to prevent that premature heart attack. Everything you need to know will be right here.
- Ivor: [00:00:32](#) Dr. Paddy Barrett, Cardiologist, great to have you here.
- Dr. Barrett: [00:00:36](#) Really great to be here. Thanks for taking the time.
- Ivor: [00:00:38](#) Not at all - delighted and it's great to have you in studio as well. I do a lot of remote podcasts, but this is the real deal.
- Dr. Barrett: [00:00:45](#) Yeah. As someone who records stuff, the in-person stuff really makes a difference.
- Ivor: [00:00:49](#) Yeah, for sure. So you know, what I was going to start with, which I often do, is just a little bit of your background. So you went from medicine into cardiology. I know you have extensive experience in the USA, probably seen as the center of excellence for this field. So maybe just give a little bit of your background and how you got to where you are today yet.
- Dr. Barrett: [00:01:08](#) So I did my medical school training in UCD, then went on to spend a year in Australia in cardiothoracic surgery, looking to make a difference from that point of view, quickly realizing that I wanted to work in cardiology as opposed to cardiothoracics. Then transitioned, spent about five years in the United States, predominantly at the Scripps Translational Science Institute, which is really this institute that is looking to pull together a whole lot of different technologies and work with different industry leaders to really translate basic science into clinical science, but also spent a year in New York at the Columbia University Medical Center doing interventional cardiology. So opening arteries with stents and everything that goes with that. And that was I think an unbelievable experience for me, but also an eye-opener in so far as looking at where you're addressing a disease state, on that continuum. And what people do in interventional cardiology is absolutely phenomenal. But for me, it was I think a little bit too late, and in terms of where we are meeting people on the Cath Lab table, we've missed people by about 20 years. So I decided to move my focus and attention to a slightly earlier time-point in the disease state.

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- Ivor: [00:02:26](#) Right. So you essentially went towards preventative. Excellent. And then you came back to Blackrock Clinic in Dublin, which I believe is one of the foremost centers for scanning and cardiology in the country.
- Ivor: [00:02:40](#) Yeah, I think there's, you know, the opportunity to actually deliver a very large volume cardiac CT program there. We're kind of one of the only centers in Ireland or the only center in Ireland that actually has a dedicated cardiac CT scanner, cardiac MRI scanner. So we have the latitude to actually do that. And it's a wonderful, wonderful opportunity for me to be part of that program and to deliver that service.
- Ivor: [00:03:04](#) Yeah. And you mentioned to me before, and maybe just briefly go through it for the nerds here, you have the only machine of its type in Ireland and I believe it's a super-fast scanner, very high slice?
- Dr. Barrett: [00:03:15](#) Yeah. It's a dual source 512 -slice scanner. But I mean, it makes our lives a lot easier from a CT coronary angiography point of view. But I think what's often mistaken is the understanding that cardiac CT is just one thing, but it broadly falls into two categories. There's calcium scoring, which doesn't necessarily require that degree of "tech". It can be done on a much lower kind of technology capable scanners, but for CT coronary angiography, for the evaluation of luminal obstruction of the coronary arteries, particularly around kind of non-calcified or calcified plaques, that's where the advanced scanning technology really makes a difference in terms of being able to differentiate different degrees of luminal obstruction or the actual burden of non-calcified plaque. But that's typically within the realm of, for the detection of symptomatic patients with obstructive coronary disease, rather than actually identifying the presence or absence of any calcified atherosclerosis.
- Ivor: [00:04:21](#) Right. And actually that's something that comes up quite a lot and I get asked it a lot of times where people out there on the Internet, you know, should they get a coronary calcium scan to find out their level of risk or level of disease or should they get a CT angiogram? And often it appears that many hospitals do push towards the CT angiogram, but these are people who are middle risk maybe, reasonable blood markers, middle-aged, wanting to get an idea of their risk. So I think the CAC would be much more appropriate.

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- Dr. Barrett: [00:04:54](#) Well, I mean, that's where all the evidence base and the literature has been born out of. Thus we have decades worth of comparative data to actually assess to workout future risks of mortality, myocardial events, et cetera. So, you know, that's where we base all our evidence based from. The CT coronary angiography obviously is not for risk stratification. It is not indicated for risk stratification. But we know that when you actually look at the information that you get, and something that I personally do, is show it to the patients themselves, go through the scan images, look at the actual build-up of atherosclerosis. And what that I think does above and beyond the role of the calcium score numeric is, it really helps that person visualize their disease. And we know that doing that actually affects greater changes in behavioral outcomes. Although that's not actually what it's indicated for, there is some utility in seeing that disease state, but it is solely for, well largely solely for the detection of obstructive coronary disease, not in sole risk stratification.
- Ivor: [00:06:02](#) Right. So a kind of a follow-up. If there's symptomatic or issues, you can delve deeper, motivate the patient more, find more subtle things that are going on inside – the second step maybe.
- Dr. Barrett: [00:06:14](#) Yeah. It's a very valuable tool to actually use, but everything we do, no matter what the test is, has to be matched with the appropriate Bayesian model. And it's, we run into difficulties when we apply the wrong tests to the wrong question and that's when we kind of get ourselves into rather tricky situations.
- Ivor: [00:06:37](#) I can imagine, indeed. And one other thing, your experience with people who have all manner of heart disease levels, but there's also the point that how do people recognize if they are having an issue and separate that from some other things like a gastro issue that could be going on. Your insights maybe on people, how they would recognize when they might have a coronary issue and get help?
- Dr. Barrett: [00:07:03](#) The main risk factor or the main kind of identifiable symptoms are no symptoms. And that's probably the most concerning feature of this. The differentiation between gastrointestinal or cardiovascular symptoms can be incredibly challenging for us to parse on the basis of symptom analysis alone. But the reality is in terms of risk, in terms of thinking about whether cardiovascular disease is an issue for me; if you are an adult in the developed world, you are at risk, and it is very hard to I

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think understand that this is something that is applying to just an exponentially growing percentage of the population. You'll be familiar with the statistics around kind of metabolic health, and it will range anywhere between having ideal metabolic health and certainly in the US population is sometimes as low as 12%. So we know that if you're an adult in a developed country, you are somewhere on that risk continuum. The real difficulty here is about identifying where you are on that risk continuum and how that changes over time. And largely this is not down to symptoms.

So that's often the struggle that we have is that you have patients who don't necessarily have any symptoms. And the bigger challenge is is that if someone has the traditional risk factors of say, being overweight or smoking for example, they're very obvious risk factors and the person knows that this is a difficulty for them, but it's the person who doesn't have those traditional risk factors yet who are still at significant cardio metabolic risk. It's about identifying those people and that's where tests like calcium scoring is incredibly robust at differentiating those degrees of risk. And the ability to be able to risk stratify into a higher clinical risk or a lower clinical risk is something that calcium scoring in particular is very, very powerful at doing.

- Dr. Barrett: [00:09:04](#) So that's where I tend to look at it, the majority of patients that I see are asymptomatic. And when someone is symptomatic, the disease state has been likely at play for a long time.
- Ivor: [00:09:16](#) Yeah. For sure. The "silent killer" is a phrase often used and of course people... I think up to 35 or 40% of first heart attacks can be fatal. So it's a really nasty thing.
- Dr. Barrett: [00:09:30](#) Yeah. It's very hard to actually, I think state this properly, but often the very, very common first presenting symptom is death. So as you know, anytime a physician asks you a series of questions, it's akin to saying, "So when did you first notice the death?" This is unfortunately the truth for many people, people will present as their first symptom having had no prior symptoms with death. And that's a pretty irreversible outcome.
- Ivor: [00:09:59](#) Yeah, yeah. Depending on your belief systems and...
- Dr. Barrett: [00:10:05](#) Well, there's often scenarios here where you actually... you know, people do die for a period of time and they can be brought back. But that's not an ideal outcome.

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- Ivor: [00:10:17](#) Absolutely. And often there can be heart damage following that. Even if you are lucky enough to come back, you can have heart muscle damage and long-term effects. So, yeah.
- Dr. Barrett: [00:10:25](#) Yeah. I work in the heart failure unit as well. It's just devastating to see people who have had that insult of a cardiovascular injury or myocardial infarction and the degree of impact it has on their lives for decades potentially after.
- Ivor: [00:10:44](#) And I remember hearing once or reading somewhere that, you know, the act of having a heart attack, maybe clot release and the treatment can affect you neurologically afterwards? Maybe beyond the kind of psychological effect that you realize your own mortality now and all those other things.
- Dr. Barrett: [00:11:02](#) Yeah. I mean, in terms of the foundational risk factors that are driving cardiovascular disease often have significant overlap with other neurocognitive syndromes. So it's sometimes hard to differentiate those, but it is incredibly disappointing for people who present with their first myocardial infarction and come face to face with their own mortality and realize that so many of the changes that they could have made were very much within grasp for a period of time. And that's terrifying for people because they are really faced with their own mortality. And maybe decisions that they could have chosen differently.
- [00:11:45](#) I think one of the questions this for me tends to bring up is that there is a challenge in terms of addressing activities and this idea of apportioning blame that people should make the right choices or that people need to pursue better health related activities. And historically, I think my own opinion was that this was exclusively up to the patient that they needed to engage as an individual and take responsibility and be a participant in their healthcare. And when they failed, it was largely their fault. And I think I've done, you know, a full turnaround on that. In so far as that, I think so many of the features that are driving cardiometabolic risk in developed nations are from factors that are often largely outside of people's control, that they have little understanding that are impacting on them and you know, for reasons that are not necessarily their own fault. That doesn't mean that you take away agency or volition in their next steps to do something about it, but I think we need to be very careful about apportioning exclusive blame to individuals because no one wants to end up in that scenario.

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Ivor: [00:13:00](#) Yeah, I'm actually, I love that you brought that up because I have very strong feelings about that general topic too. And I had an analogy, if you will, it was the financial crash in 2008 and the experts, they were all saying there won't be a crash, and the experts were all the people, the money people, the banking people, everyone in the business who was a professional in money matters was saying it was fine. But interestingly, when the crash happened, suddenly it was the ordinary person who was to blame – because they got greedy. So I think in this thing, you know, if people all knew and were really informed on the top Pareto Stack of things that drive heart disease and they really understood it fully, then if they chose to go ahead and break all the rules, it kind of would be their fault. But I think there's a big problem where people don't really know what is bad and good necessarily in nutrition and in other areas. So maybe if you ran through, what are the worst things for promoting the likelihood of atherosclerosis and heart disease in the next 20 years – in a nutritional sense – in your mind?

Dr. Barrett: [00:14:09](#) The answer that is obviously incredibly polarized by many different people. But I think the way to think about this is that there's often huge friction between different groups. But if you look at the commonalities that exist between those, most of them are pretty much the same. And I think everybody is trying to achieve the same goal. I think everyone, no matter which dietary kind of perspective that you have, if you eliminated any processed foods and the things that as I like to say, "If you would leave it in your bed for two weeks and come back and it's fine, you probably shouldn't eat that." And I think there's very few people in any dietary kind of group would disagree with that. So I think that is a first step in terms of preparing actually your own food.

[00:14:57](#) In terms of, you know, refined sugars, eating food groups that I think have required a significant amount of man-made processing to reach that actual substrate, I think we need to be very careful around that. So these are kind of the lead dominoes that we're actually talking about. And then when we get to the point around specific macro-nutrients, it gets harder and harder because when we largely look at the idea of say refined carbohydrates, the impact on a person is going to depend largely on their degree of sensitivity to insulin resistance and their actual insulin resistance. Because we just know that there are certain people who have a tendency towards becoming insulin resistant at a much earlier time point, for far less triggers. So their exposure to that particular macro-nutrients is

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obviously going to have to be dialed back – where others have a little bit more latitude on that.

Dr. Barrett: [00:15:55](#) And I think we need to, I think have a sophisticated way of actually approaching that. And for me, what I try and do for my patients is I try and look at them to achieve obviously as little or no processed foods, proper fiber intake as part of kind of no-processed foods and then as limited a glycemic variability. And as part of a learning exercise is often using say a continuous glucose monitor and then having them say, "Listen, you eat would you think is healthy based on these particular guidelines." And you will then use your own bio-metric information to assess whether you think this is healthy or not. I think that is a hugely important learning exercise for people who will say, "I eat healthy." And for example, I will say, "What does that mean?" They will get up in the morning and they'll say "Well, you know, I'll have some porridge and I'll put some honey on that. And then at lunchtime I'd have some tea and maybe just one sugar and a sandwich with x, y or z." Their perception is that that is a healthy meal. But if you are someone who is at risk of insulin resistance or actually genuinely is insulin resistant, that meal may be something that is posing you very significant glycemic variability. And we know that when you give that information back to the person, it helps them then frame it. They go "Well that actually isn't what's right for me." Then you then you have some kind of latitude to work with them in terms of "Well maybe why don't you substitute in these particular fat products for example." And then they are much more comfortable at saying, "Okay, well we'll just try that."

Dr. Barrett: [00:17:28](#) And so when you set up those parameters around a narrower scope of glycemic variability, then you can work towards a more kind of individualized approach. And we know that our variance to glycemic control is actually quite a unique and there are certain genomic and microbiome factors that actually drive a lot of these particular features. So it's about working out "What is my target?" My target is a very kind of narrowed glycemic control, and when then you can build your diet around that. It's something that is tailored to you. But largely that means no processed foods, typically kind of a very limited amount of any, or exclusion of refined carbohydrates, and then understanding where carbohydrates are coming in in your diet and then tailoring that to be kind of the biometric data. So that's what I try and tend to do. But again, it's an imperfect science.

Ivor: [00:18:21](#) But it is the emerging now that the CGM's or continuous glucose monitors or even just using a little major and checking

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occasionally an hour after a meal, that's a fantastic way. The phrase I've heard is "Eat to your meter" and it gives people instant feedback. Anyone can do it; the technology is cheap and they can check what these foods are doing to them. There is, I think the most recent figures and I sometimes quote them - 64% approximately from the Center for Disease Control figures from the USA - 64% of adults over 45 are now prediabetic or diabetic. So they're obviously completely in the insulin resistance spectrum, maybe 75% if you measured more carefully. So your point's well taken. In Ireland – just while I'm saying that – in Ireland, where do you think we are relative to the US?

- Dr. Barrett: [00:19:11](#) At a guess, I think that the evidence of this is, is not as refined as in the US populations. I think we're probably a little bit better but not that much better. I think one of the things that actually, just as an observational point of view as someone who has moved back from the United States is that the quality of basic food groups in terms of be it either say the milks or breads, etc. they tend to be actually better quality in terms of basic food groups. But in terms of what I see on a day to day basis, the degree of atherosclerotic disease burden at an earlier and earlier age and the increasing likelihood of Metabolic Syndromes and insulin Resistance is just going through the roof. And this was something even from the beginning of my training, that the idea of someone having a cardiovascular event in their 40's or 50's or maybe even 30's was just unheard of. But now people having myocardial infarctions in their 30's is still not common – but not exceptionally rare. And I think that speaks to the earlier likelihood of disease states presenting, and that kind of really acceleration of atherosclerotic disease burden in all developed populations.
- Ivor: [00:20:26](#) In Medscape recently there was a headline that the 2030 projections will now be met in 2015 I think they were saying, and it's going up at a rate that is difficult to see how we really manage it over time.
- Dr. Barrett: [00:20:40](#) And which you would like to think is that in any complex biological system that there are feedback loops, but hopefully there are, you know, appropriate feedback loops where we can, we can self-correct. No system I would like to think - unless it is a very abnormal system - will continue to its absolute detriment, but we shall see.

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- Ivor: [00:21:00](#) Indeed. Yeah. Well, human nature though – we're trying to get people to understand this and actually take action. You mentioned fats there and that's a kind of a controversial topic, has been for decades. But the healthy fats are the ones like avocado and good grass fed meats or fish fats. They're all kind of healthy. What about vegetable oils? What's your thoughts on those things?
- Dr. Barrett: [00:21:24](#) I think, again if you put this through the lens of a processed food, I would say, listen, okay. If you just understand that most processed foods are particularly going to be generated in a way which are not ideal - is just to simply go and look at how these products are made. It's easily accessible on YouTube for example, and you can identify this is a process that you would not be particularly comfortable eating the actual, the output from that. So purely from a visual point of view, I think that's often enough of an acid test. But I think we're seeing increasing evidence that vegetable oils in particular are something that we need to be very mindful of our reduction of. But I think the challenge there is that people simply look at it as a container that sits there and you know, "I don't add that much or when I do, I only cook occasionally with that." The reality is that again, if you're eating a processed food group, the likelihood of that being a constituent of that food to a high degree, is just exceptionally high. So it's very obvious when you have it sitting in a container. But the reality is, is that we're consuming very large amount of it in foods that we would traditionally not associate with those compounds. And that is again, this invisible consumption of food groups that we know to be harmful, but we don't think that we are consuming. And the literacy of most people around the actual macronutrient ratios, the contents of food is just exceptionally poor.
- Dr. Barrett: [00:23:04](#) I think this is one of the big challenges that we face is that people would like to make the right decisions, but when they're not given the right information or they actually do not have the appropriate health literacy to navigate that space, it's incredibly hard for people. So, you know, I agree. I think when we look at actual vegetable oil as a driver of so many of the chronic disease conditions that ail us, I think they are a key component in all of this.
- Ivor: [00:23:37](#) Right. Okay. But I won't agree necessarily with many of the authority's guidelines on replacing healthy fats with healthy Polyunsaturates, I think is the term?

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- Dr. Barrett: [00:23:48](#) One of the things that I think is, is really kind of crucial to know is that in medicine, we really do like to have guidelines structures. But if you have ever seen how guidelines are produced, you come away with... one of the, the key phrases that I've taken from an expert that I worked with is that, "Guidelines are like sausages, insofar as everybody likes them, but no one wants to know what goes into them." And I think you need to be very sophisticated about how you interpret guidelines. About how you say that this is going to be shaped by a lot of cognitive bias, by a lot of absence of evidence in literature, a lot of preexisting motivations to put research agendas forward that have been supported by different groups. So I think we need to be very careful and we need to understand that the science of medicine is not a cookie-cutter approach. And we need to understand that our biases as human beings, as scientists are baked into these particular guidelines.
- Dr. Barrett: [00:24:54](#) The search for truth here will always be a back and forth in terms of how we move towards doing this. But you know, I think there are many things that have existed in terms of medical recommendations in the past, that are now held to be false. And I think it doesn't mean that everything is false, but I think we need to constantly reevaluate the legitimacy of the claims that we are making. Not to sound like Donald Trump, but you know, facts have half-lives, but as long as they are moving us towards the truth, that's actually, I think what matters more. And it's about being open-minded to the possibility that you're wrong.
- Ivor: [00:25:36](#) Yeah, really important and being objective and there is so much subjectivity out there as well, but at least the guidelines, I think to your last point, the vector is good – they are moving away from the classic pyramid 30 years ago and they're beginning to make more sense. Well, to my "biased view."
- Dr. Barrett: [00:25:55](#) Yeah. And I think... you know, I'm going to misquote this to Einstein as everything is misquoted to him, but, the definition of intelligence is to be able to hold two competing ideas in your mind at the one time. And I think that's what we need to, I think entertain more. And I think from the guideline prospective, the threshold for evidence often is sometimes more challenging because the fear of causing harm, but that works both ways insofar as if your recommendation is causing harm, that's also a big problem. We've seen this with approval of drugs. For example, with the FDA, there was a significant pause between introducing certain drug therapies for the treatment of heart failure. And yes, that delay probably did prevent a handful of

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patients dying from an adverse event, but it probably lost the opportunity to save thousands of lives.

- Dr. Barrett: [00:26:49](#) So just because safety is your priority, we need to understand that every decision comes at an opportunity cost.
- Ivor: [00:26:56](#) Yup. For sure. And if we circle back to your patients now, what are some examples of people who've done extremely well on what they did, how they did it, the psychology or just they were able to follow advice, or maybe some anecdotes about patients.
- Dr. Barrett: [00:27:12](#) So I think, this is something that I think we're incredibly fortunate to see in terms of experience, patients journeys, and it's often hard to predict who is going to be that person who changes. But I think our understanding needs to become more refined about what are the triggers for that particular patient? What are the motivators for that particular patient? Because they're not all uniform. And to say that if you're going to continue in this particular way that you're going to die at an early age, that means very little to most people.
- Dr. Barrett: [00:27:44](#) It's about understanding where their kind of particular motivators are. I had a very brief encounter with a young man who presented with... it was a chest pain evaluation. He didn't actually have obstructive coronary disease, but he had several risk factors; was overweight, was probably insulin resistant. But my interaction with him was incredibly brief when I was on service in one of the hospitals and he came to see me approximately six months later and had adopted a ketogenic diet because I had explained to him that, "I think, you know, based on your insulin resistance phenotype, you were actually consuming what you should; reduce your refined carbohydrates." He had read this and then said, "Well, you know, I can do low carbohydrate or else I can actually just go the whole way and do ketogenic." And had come to me six months later, a totally different human being; had lost a huge amount of weight, had reversed all the parameters of his cardio metabolic risk and felt a million times better and said to me for the first time, which I think has been echoed in the community, something that I found incredibly strange saying that he would always get sunburnt, but now he's able to actually have a tan and he barely wears any sunscreen.

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- Dr. Barrett: [00:28:56](#) This was totally novel to me. I'd never heard this before. But looking into any of the stories from the, particularly from Virta Health for example, you see that these changes are things that we're seeing. So, patients are making the difference but I think the challenge is about finding the right levers of change from their behavioral motivation point of view and about understanding how they are motivated for change and understanding that the environment that they're in. Because often if you're working in a hospital system and you see someone from say a very disadvantaged background, you can give them all the information that is necessary, but the likelihood of them being in a position to make those changes from a purely volitional point of view is just incredibly challenging.
- Dr. Barrett: [00:29:46](#) And you often end up in a situation where the people who come to see me are often the section of society are the least likely to benefit from seeing me. And that's the dichotomy that we actually face. And that's why I think there needs to be more of a focus on the primordial prevention of creating environments to actually promote healthier behavior. But we do see these changes. We do see patients who make a transformative movement in their health status. And it's incredibly rewarding for us to see that. And it's incredibly, I think impactful and meaning for us as physicians, when patients come to us that engaged and that enthusiastic about being an active participant in their healthcare. That's incredibly rewarding for us.
- Ivor: [00:30:36](#) I can imagine, Paddy, that must be huge because, I mean having patients that generally you're giving them advice that doesn't really help, you're just giving the medications, you know, they tend to just slowly get worse over time, maybe less faster than they might have done without the meds and without the intervention. But to have people who have transformed themselves, that puts your kind of professional pride, I'd say, your whole mood right up.
- Dr. Barrett: [00:31:04](#) I think this is one of the key points here, but it's actually the inverse of that. And I think there's often a feeling of criticism amongst say physicians or a particularly people in cardiology, that they just dismiss the actual patient in their ability to change. But it's often their frustration insofar as that they say, "I make these recommendations and nobody changes. Nobody does anything. They don't take responsibility. They don't take ownership." But I think it is because of that lack of positive

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feedback from making those recommendations and not actually having the reward.

- Dr. Barrett: [00:31:39](#) There comes a point where people just say, “Well listen, the likelihood of me succeeding here is just so low. So why don't I just give this person a whole boat load of medications and just do what I can do?” And you can see how you just quickly find yourself there. But I think we're not recognizing the environment that these people are going back out into the community in. I think we have to also acknowledge that may be the recommendations that we had been giving them for years that haven't worked, maybe it didn't work for a reason. And I think there's probably not a doctor out there who has said to somebody in terms of counseling them with regards to weight loss that they need to eat less and exercise more. But we know based on the objective literature here that the likelihood of that working is less than 5% a two years.
- Dr. Barrett: [00:32:25](#) So maybe if that's the efficacy of your recommendation, maybe you need to think the actual recommendation and that would be considered a growth failure of therapy. We can't just keep banging that drum if it has been repeatedly demonstrated to fail.
- Ivor: [00:32:29](#) Yeah. It's a long history of failure body and it's quite shocking to look out in a way. But the proportion of doctors who even would answer as you did a while ago, lower glycemic , continuous glucose monitor, removing processed food, watching for vegetable oil contained in processed foods, all of that advice which you summarize to quite simple advice. How many doctors now would actually give that pithy, clear, direct advice to patients?
- Dr. Barrett: [00:33:12](#) I'd like to think, this is again based on my own kind of biased sample set that that number is growing, but again, I think that number in total is probably far smaller than we would like. And that's partly to do with the overwhelming workload that dealing with the burden of atherosclerotic disease has actually left us with, in terms of, if you are working in any major center that is doing a take for cardiovascular patients, the idea of working on prevention seems so remote when you're dealing with patients presenting acutely in cardiogenic shock. And it just seems like that's really nice and all, but I have an entire CCU full of incredibly sick patients. You try and fix the problem that is most pressing to you in the most immediate sense. And you just have this tsunami of disease that you have to deal with. So, although

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it seems appealing to talk about preventative cardiology, it just seems so remote and it just seems so outside of your wheelhouse in terms of your ability to be able to intervene in that domain.

- Dr. Barrett: [00:34:21](#) But I would like to think that there is a growing population of cardiologists, of physicians in general who are beginning to see this problem through a slightly different lens and intervene in the ways that we were talking about. Only this morning, I was speaking with a hepatology or liver, a colleague of mine whose main focus is nonalcoholic fatty liver disease. And the reality is is that I think if you were to eliminate the cardio metabolic health problems of insulin resistance and say prediabetes, the hepatologists in terms of fatty liver disease, will probably be out of a business. The cardiologists will be out of business. The endocrinologists in terms of diabetes would be out of business. Several of the stroke physicians would be out of business. The nephrologists in terms of kidney disease would be out of business. The neurologists in terms of stroke and your degenerative diseases would be largely out of business. And if you look at this as a core marker of what predicts so much of that chronic disease, this is not a story that needs to be told by cardiologists or by primary care physicians, this is something that likely touches every single physician across every single specialty. Unless you're dealing with probably the rarest of the rare pediatric, you know, cancers, the likelihood that this doesn't touch your specialty is almost zero.
- Ivor: [00:35:48](#) Yeah. I used to say, Paddy, you summarized that excellently there, but I used to say Google insulin resistance or hyperinsulinemia and the name of the disease of your choice, and you're going to get a pilot hit on a lot of papers to read. And that's it, it's so central. Particularly, what do you think versus cholesterol and higher cholesterol are indeed higher cholesterol being sometimes part of this problem of hyperinsulinemia, etc.
- Dr. Barrett: [00:36:10](#) So again, it's often hard to separate one from the other in terms of one actually driving the other. And I think one of the big challenges in terms of, going back to it, that the dietary recommendation is the implications it begins to have around the cholesterol hypothesis as a driver of heart disease. And I think the approach that we need to take is, is again, is a more sophisticated approach. The biology of atherosclerosis and any chronic disease condition is likely infinitely more complex than we have any appreciable understanding of. And that it comes down to one single factor as a causal factor is just incredibly unlikely. And I think, you know, we see this in all the papers that

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we talk about, as something as an independent driver of cardiovascular disease, of atherosclerotic cardiovascular disease.

Dr. Barrett: [00:37:06](#)

The likelihood of there just being one independent driver is almost kind of, you know, insane. And so it's about understanding about how these relate to one another. And I think you quickly get into the idea of whether, you know, it's the cholesterol story or whether it's LDL or even if you're a little bit more refined and this may seem slightly unusual to you, but at the idea of talking about ApoB or LDL-P, that is a dialogue that most cardiologists are not actually having. But then to understand that these are interdependent variables and once you begin to look at it that way and then you see that they are truly interdependent variables, that just because you have higher degrees of cholesterol particular LDL-C, LDL-P, ApoB, it doesn't absolutely give you a deterministic outcome that you're going to develop cardiovascular disease, that it's likely going to be the result of a complex interplay of all these different factors.

Dr. Barrett: [00:38:06](#)

And I think that's where we need to get a little bit smarter. But as you often speak about it, it's about then understanding that that rank order of importance of how you should address these. And again, it's about actually looking at a good root causes. And when you begin to address those root causes, the other factors become less of a concern to deal with. And the challenge then becomes... well you're looking at risk and benefit and if you have someone who's high cardiovascular risk in terms of defined, say like a calcium score greater than say 200 or 400 or wherever, where you want to actually put your cutoff, looking at say the big question and the controversy will exist around starting therapy and reduction of events. Maybe it won't actually reduce events, but it's again going to be on a probabilistic curve. And it's about where you sit on your comfort with that degree of risk. And when you actually explain it to somebody and they say, "Well, you know what, I actually don't think that for me, and as long as you have conveyed that correctly, that the degree of risk that that confers and the degree of risk that it's likely to reduce, I'm not okay with that." And as long as people understand that we're just dealing on continuums of probabilistic risk, then we can have an appropriate dialogue. But I think the historical conversation has been a much more binary outcome, is that if then you have these parameters, you have to have this and I think we just need to have a much more sophisticated conversation around that.

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- Ivor: [00:39:43](#) Yeah. And the reason to ACC/AHA guidelines have come out with very clear kind of directionality towards CAC being used in some of these ambiguous scenarios with middle risk people and that they be part of the decision. You had an interest, I remember you mentioned a paper from, I can't remember the name, I think Joshua was the author, and it showed that people with a low-ish CAC score did not appear to have a benefit from Statins, whereas people with a higher score appeared to have a very substantial benefit. So maybe have a chat on that.
- Dr. Barrett: [00:40:19](#) I think that that fits to, again, our continuum of risk in terms of... obviously if you have a non-zero calcium score, and it's a true non zero calcium score, it speaks to a degree of risk. But the likelihood of benefit that you are going to confer should you make changes, is likely going to be to be less. So there's going to be a dose response here on the degree of risk.
- Dr. Barrett: [00:40:44](#) But one of the temptations has been, and I think this applies across all of medicine, is that, "Well, what we should do is we should focus on the highest risk groups. We should intervene on the highest risk group because we have the most to actually offer in terms of a reduction." Where if you actually look at this broadly across the population, and this is called the prevention paradox, is that if you want to make the greatest impact, you need to focus more on the middle risk groups, not on the actual high risk groups. Because they're going to be a smaller number, so the end reduction will actually be smaller. Whereas the greatest number events will happen in the smaller and middle risk of groups.
- Dr. Barrett: [00:41:21](#) So when it's a clear screaming indication as to someone needing very advanced therapeutic interventions, it's easy. There's very little debate about the benefit, but the real debate and the real difficulty we face are in the lower and middle risk people and how to stop them progressing into a higher risk category. And I think that's the challenge and that's where we then start to wander into kind of much less clear evidence basis in terms of the therapies that we have from a pharmacological point of view.
- Dr. Barrett: [00:41:57](#) Aspirin for example, has been the standard, put it in the drinking water for the prevention of cardiovascular disease, to the point where it wasn't even prescribed. Often we wouldn't have it on medication lists. It was like, "Oh, and you take your baby Aspirin every day or every second day." And I think we have just been blown away by the challenge of Dogma that for a

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huge percentage of a primary prevention, of cardiovascular disease, that although aspirin at 75 or 81 milligrams in the United States does offer a very small benefit, the tradeoff is with very significant bleeding. So the net benefit is incredibly low. And to look at this in terms of comparison when I started my training and two now, that there would be a huge question mark over the use of aspirin therapy and the primary prevention of cardiovascular disease would just have been mind-blowing. And I think that speaks, I think volumes to our ability to continuously reevaluate where we are from a scientific literature base and use that information to move forward. The struggle is, is that pace of moving forward always just seems glacially slow.

Ivor: [00:43:08](#) Well, you know on BBC the other day, just speaking of statin, there was an article. Quite a few people ping me about it and it was essentially that anyone in their 60s and 70s, pretty much everyone should be on a statin. So, how does that logic strike you?

Dr. Barrett: [00:43:23](#) Well, see, I think you probably have to look at it on the basis of true, true and unrelated is that we will sit here and talk about issues or on cardiovascular risk profiles and cardio metabolic profiles.

Dr. Barrett: [00:43:36](#) But grossly the number one risk factor for heart disease is age. So, if you just select out your highest risk group, which is largely going to be a age, there's clearly going to be a population of those who will have additional cardio metabolic risk factors that will potentially have them accrue a benefit from being on a therapy. But we know that when you actually broadly apply statin therapy to an older population, it doesn't work. But I think with any degree of evaluation, that was never going to work. This is why we need to be much more refined about how we deliver these therapies and about selecting the appropriate few who will truly benefit from these therapies and understanding the other drivers that require probably much more of our attention. You know, when you have a hammer, everything looks like a nail. And so this is the challenge that we face.

Ivor: [00:44:39](#) The "Cholesterol Nail" I think as many of us think about when we think of that phrase, yeah. It was a story I have recently, quite dramatic, the data and it just speaks to what we're talking about here, and they analysed the calcification categories by age group. So 45 to 55, 55 to 65 all the way up to 75 to 85. And

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no matter what age you were, the zero calcium was the same - really low risk - of around one and a half, 2% even in the 75, 80 year olds. It's an incredible graph to look out. And, the high calcium scores are just as high risk, in the 40, 50 year olds, just they are in 70 or 80 year olds. So you can see at a glance here, the calcium decides regardless of your age. BUT - when you superimpose the Framingham risk, for the lower age category, it's around 4 ½% average, then it's 10, then it's 15 then it's 20 for the older guys. So, exactly as you say, the risk goes up as you're older. But fascinatingly, if you get a calcium scan test result, it bypasses all the age and just tells you the risk.

- Dr. Barrett: [00:45:47](#) I think largely because the calcium score is a collection basket for so many different risk parameters around chronic disease states. And this is why there's obviously a relationship between all-cause mortality and not just cardiovascular mortality. And I think it's really important to identify that so that if you have calcification in terms of disease in your coronary arteries, be there luminal obstruction or not, it speaks to a collection of factors that are certainly in place and likely have been in place for a period of time. And if you have it in your 40's, that just means that it has been an accelerated process for you.
- Dr. Barrett: [00:46:33](#) So I think beyond just the prediction of cardiovascular events, I think it speaks as this overall collection of risk factors that touches everything else in old medicine.
- Ivor: [00:46:33](#) Yeah, I agree actually. And that's the way I'd look at it too. It's the ultimate conclusion of how you've lived your life, your genetics, all of the different factors that can drive disease, the calcification, shoals; where you ended up today, just today, at this point, you don't know the future because you can change something. You can stop that calcification growing. You can change your life, you can avoid a heart attack, but only, as we said earlier, if people are willing to grasp and understand it.
- So what about people who really surprised you where you got relatively good bloods but then when you went in to investigate further, and actually look for disease - you found a surprisingly high amount - or vice versa indeed i.e. if they had bad blood markers but then surprisingly had very little disease.
- Dr. Barrett: [00:47:42](#) I'm going to say I'm going to tribute this incorrectly, but if something surprises you and says, that doesn't make sense, it doesn't mean that it doesn't make sense; it just means that your model is wrong. And the reality from that point of view, it

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means that you're just not seeing the risk. You're not seeing where it's coming from in terms of the patient who presents with “normal cardiometabolic risk profile” and they have a cardiovascular event or have a very substantial burden of disease. You're just not seeing where that's coming from. And I think if we look at the standard panel of testing that we actually do, very few people extend it beyond a traditional lipid panel and maybe a fasting glucose.

Dr. Barrett: [00:48:26](#)

Some people will add on an HbA1c. But, as useful as that is, you are still left with a huge blind spot in terms of other things that actually are driving your cardiometabolic risk. Very few people are testing for insulin. Very few people are testing, LFTs for example, as a marker of... as an expression of cardiometabolic risk. Even within HbA1c, looking at, that you can have a relatively normal HbA1c, if the variability is very large, even though... so it's directionally if it's quite sensitive, but we need to understand the mechanics of how your red cells are expressed and that the variability factor that is baked into that. I think cardiologists have to become more comfortable with managing these diabetic precursors as drivers of cardiovascular disease.

Dr. Barrett: [00:49:30](#)

And the thing is for me is that when you actually look at the concordance and the discordance between these parameters, once you develop a metabolic syndrome, the likelihood of them speaking directionally to where you're interested in, obviously your LDL-C, with kind of APLB, or LDL-P, the discordance that exist there is substantial. So even if we'll just say that the LDL particles are a primary driver here, doing your traditional lipid panel gives you very little information. But even if that's the case, even if you know that it is good, bad or indifferent, if you're not understanding the underlying insulin resistant phenotype, these patients will present with “torm totally normal laboratory testing features” but will have been in this insulin resistance prediabetics stage for maybe 10 years prior and no one is testing this. I test for it, along with only a handful of other people.

Ivor: [00:50:26](#)

And that speaks to the number of doctors maybe who know about the nutritional fixes perhaps, similarly the tests. The classic panel for cholesterol, you would use the ratios obviously. You'd be looking at the triglycerides to HDL ratio and you can kind of infer somewhat as to what the particle number might be or particle size from that, but it's not perfect.

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- [00:50:50](#) You mentioned LFT and just for people listening, Liver Function Test, but, I agree totally at the GGT, the ALT, all these liver tests speaks so powerfully to insulin resistance. They are really good ones too.
- Dr. Barrett: [00:51:04](#) Yeah. And it's an expression obviously of hepatic insulin resistance as kind of one of the main reservoirs. And I think even the term insulin resistance, you know, obviously, that term has been around for quite some time. It's beginning to resurface obviously in a much more refined way now. We're having a much more intelligent conversation, but we're also learning that we know less and less about it in terms of what it actually means in terms of peripheral tissues, in terms of what's happening actually in the liver, etc. And I think that's a wonderfully exciting area to be able to explore more in terms of how we kind of navigate around that area. But, most of my learning on this largely happens at the very tail end of my training or in in my own kind of learning behalf. And that's frustrating. And that's something that we actually, I think need to correct within the cardiology community in terms of a greater emphasis on understanding those biomarkers. And I think one of the difficulties that people in specifically cardiology training have is that they feel, not able to make a difference at the primary prevention level.
- Dr. Barrett: [00:52:15](#) So they feel that it cannot operate at the top of their license. So they feel that the likelihood of them making the difference is much less because your reward is the absence of something happening. And you have to have an appropriate, I think, psychological model to understand that that is your reward. So, there's just so many different factors at play here.
- Ivor: [00:52:34](#) And that apply in engineering too that the person who prevents major issues does not really get so much credit even though they're the most valuable person because they can save multimillion dollar losses and make sure they don't happen, but they have nothing to show or they lack of those issues. But the root cause person who goes in and solves a massive issue when it's happened, you know, can be the hero.
- Dr. Barrett: [00:52:55](#) Clearly. I mean, this is the same as when you're doing your interventional cardiology training. You write in your white horse when there's an abrupt problem and it feels amazing to make that difference at a time. The feedback loop of there is a problem, I have fixed it and now everyone is better seemingly. It's just incredibly rewarding. But it also speaks to, even when

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you look at it from an insurance and a payer point of view. When you have people who are part of insurance groups that may only last with them for say three to five years, there really is a little motivation to implement a preventative strategy as covered by their insurance policy because the likelihood of that insurance policy garnering the financial benefit in terms of reduction of risk is almost zero because the person will have changed to a different insurance model. And you see this in terms of the calcium scoring for example, is that a lot of the big health insurers will say, “Yeah, you don't need to convince me about the data.” “You don't need to convince me in terms of its predictive capacity.”

Dr. Barrett: [00:54:00](#) But the reality is is that when you actually look at the outcomes, they're likely to occur outside of the period whereby this person is covered by our insurance. So why should we pay for that?

Ivor: [00:54:11](#) And that is a concern. I think it came up in The Widomaker Movie, that very point. (Google: “Widomaker CAC” for free viewing of short version). And also the pharmaceutical companies were not so interested in this technology. They agreed it was incredible for predicting who'd have a problem and who'd not, but they figured that they'd be more people taken off medication because they did not have major disease then would go on it because it was discovered. So there's a lot of the shenanigans going on that air. The recent guidelines, again I just mentioned them once more the 2018 AAJ, they actually... you could say by recommending CAC for people who are middle risk, who are not sure they want medication, you could say that a lot of people who have low scores with the CAC would save long term medication costs.

Ivor: [00:54:56](#) So there's possibly a cost benefit. There are where the CAC could help, insurance companies who are paying for meds. Might that be the case?

Dr. Barrett: [00:55:03](#) That's true. As long as the insurance company is paying for the medications. And that's where the rub is a lot of the time. Often you look at, say in terms of med tech, someone will come to you – we did this a lot at um at Scripps in terms of digital health technologies – and someone would say, “Listen, I have this amazing invention that is if we put it in place, it will save x amount of money.” And a helpful thing to do is always to say, “Okay, if it's going to save x amount of money,” rephrase it another way. “It's going to take x amount of money away from who and what will let resistance B.” And then I think you can

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understand your business case a lot clearer in terms of saving money is not a saving money. Saving money means somebody doesn't get a portion of money. And I think once you see it through that lens, you can have a better appreciation of those motivations.

Dr. Barrett:

[00:55:51](#)

But I will say about the Pharma companies, the Pharma companies have clearly had a dominant position in this particular field in terms of generating billions and billions of dollars of revenue. But I think we're beginning to see a movement within the Pharma sector that they need to broaden their horizon beyond the exclusive sales of our pharmacotherapeutics and that they need to move into much more adjunct therapies that exist around the actual disease states.

And so I think if a business model can be generated from that and so far is that the, the analogy would be when Boeing went from selling jet engines to selling power by the hour and start in terms of you know, you want actually to get from A to B with x amount of power; you don't need just a jet engine, you need all the kind of the maintenance and the certification, etc. It was like, "We will sell you power as a package." And if we can change the idea of, "We need to reduce your LDL from A to B," from, "We need to reduce cardiovascular events and that we can provide you a package that actually sits there that will reduce those events." And maybe for a section of those patients that will be a particular set of pharmacotherapies. But that is part of what they offer. My hope is that we can navigate a way to actually motivate everyone across the different groups from the patients, the physicians, the Pharma companies, governments, insurance companies and payers, to all align across this.

It's a huge ask, but I think... you know, we're certainly seeing a move by the Pharma companies slightly looking to move beyond just the sale cardiovascular, or therapeutics in general.

Ivor:

[00:57:36](#)

Yeah. So diversification, new business models and new ways to be more effective and keep her profits rising. Of course, all the revenue has to keep rising. Yeah. Farm also have gotten more and more into kind of niche, ultra expensive drugs. So that's another kind of thing that's happened. We've seen it with many different drugs for cancer or for rare conditions. But those huge prices of course are an enormous burden as well in the system.

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- Dr. Barrett: [00:58:03](#) The reason that this has happened is because if you look at the cost of development of a drug for a chronic disease, we'll just say hypertension or diabetes. Again, average figures, but it will take up to a billion dollars over five to seven years and the screening of 5,000 compounds to get one compound from start to finish and actually into a market selling to patients. And when the Pharma companies had looked at this and evaluated the cost efficacy of doing that, it just seemed like a poor bargain.
- Dr. Barrett: [00:58:33](#) But if you look at different sections predominantly within the FDA approval process, the rare orphan drug act, you get accelerated access to the FDA approval process. You get brought through quite quickly. You can actually have extensions on patent protection, and so that you can get your compounds approved much quicker at less cost and you can charge a higher price point per unit. And this has been an incredible achievement for really underserved and unrecognized disease states, one of them being cystic fibrosis for example, or a lot of the metabolic disease states. But if you look at a, say Ivacaftor for example, as a therapy for cystic fibrosis, the average therapy was \$254,000 per patient per year. So clearly huge in terms of an expenditure.
- [00:59:24](#) If you look at the most expensive for certain metabolic diseases, it was almost \$1 million per patient per year. And clearly that is not a sustainable mechanism to deploy in any way, shape or form, particularly in a cost constrained healthcare system like we have in Ireland or the NHS in the UK or something like Australia and New Zealand.
- Ivor: [00:59:46](#) You find as well that the loudest voice then can win. So you have patient lobbying groups for rare diseases and politicians are very, very exposed to not being seen to be the cruel person. So you do see that a lot of these are approved and very high prices are paid.
- Dr. Barrett: [01:00:02](#) Yeah. And it's an incredibly difficult for people to be in when there's a therapy that is available that confers benefit. But when you have a limited amount of money, it means that that allocation of funds has to come from somewhere else. And maybe that's an extension to a waiting list for a hip replacement, for example. But there's a finite amount of money and we have to choose how to spend it appropriately.

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- Ivor: [01:00:25](#) Yup. So the squeakiest wheel is going to get noticed most and get what they need. So any other cardiological thoughts you have or insights in the last couple of years particularly?
- Dr. Barrett: [01:00:38](#) I think one of the areas of my own kind of personal interest has been around kind of digital health technologies. And I think the faults that we had met earlier in that whole journey was the idea that just simply presenting people with information or data was going to be enough for them to be the appropriate behavioral changes. Because I think largely in cardiovascular disease, you need to say atherosclerotic coronary disease, much of what we do is behavior change. So we need to actually develop the tools to act in adjunct with the raw information to help people make those decisions. And I think the consequence of that has been a huge explosion, in people becoming part of that quantified self. But understanding kind of the behavioral mechanisms we need to put in place.
- Dr. Barrett: [01:01:29](#) The continuous glucose monitors I think are probably one of the best examples, but we're seeing tools and technologies that you can use on your phone. The fact that you can use your watch to actually do an ECG in terms of how you will do this for particular patients. And I think it's about coupling that responsibility with the tools that we have with the environment that actually promote an appropriate behavioral change for people to make the right decisions and to make that decision an easier decision to make.
- [01:02:00](#) So for me, I think the kind of unmet need here is matching what we know in terms of what works with the behavioral change mechanisms to try and affect that change. And I think individual behavioral change is incredibly difficult, but I think it's probably easier to change the mind of a large group of people than it is just one person.
- Dr. Barrett: [01:02:22](#) So that's where I think I would like to see an increased emphasis placed on in terms of how we can put in place mechanisms to make the right choice, the easier choice.
- Ivor: [01:02:36](#) Yeah. And that's where we really need. No doubt about it. I got to check back on one thing we said earlier though, the Metabolic Syndrome and you've mentioned insulin resistance syndrome or hyperinsulinemia, these are huge in the disease world and if people understood about them, they would be much more enabled to do as you say, to take action and to move forward and get the CGM's, all that stove. But even a few

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years ago, I had several doctors in Ireland, really good guys in fairness who were vaguely familiar with metabolic syndrome and not really familiar at all with the insulin dynamics and how important it is. They thought of it more as a medication for diabetics really to be quite honest in the conversation.

So in the medical schools now I wonder or would you have any insight, is it beginning to be the case that the education is showing, well this is a really big issue causing a lot of modern chronic disease and these things are maybe lesser or do you think that change is going to take a lot longer?

Dr. Barrett: [01:03:43](#) It's going to take a lot longer. Change within medical education is, is typically very, very, very slow.

Ivor: [01:03:53](#) Glacial.

Dr. Barrett: [01:03:54](#) Yeah, absolutely. And it's frustratingly. So, as the line goes in terms of when you finish medical school, 50% of what they told you was wrong and the other 50% is likely to change the other. The only issue is that you don't know which 50%, or somebody I know who retired after 50 or so years, when someone asked him, you know, had he had trained to be a physician or gone to medical school and he said no, because everything he'd learned originally was now false.

Dr. Barrett: [01:04:19](#) His qualification was actually retracted. So I think there's obviously a growing emphasis in terms of prevention, but it's how you execute that and how you make that a deliverable when you have this tsunami of chronic diseases that are giving you an acute urgent need. And that's the difficulty, is that when you finish your training and you start working in a hospital system, for example, what you're dealing with on a day to day basis is just this tsunami of chronic disease. And to be able to glance away for a short period of time and look at that continuum of how those patients got there and how we can intervene is always the desired approach. But how we actually manifest that and make that a real possibility, and also maintain the attention that is required to actually address those acute needs.

Dr. Barrett: [01:05:18](#) And this is the endless problem that we face. It would be wonderful if we could just take all the resources and deploy them to a preventative approach. But we are still left with this huge problem that is landing on our doorstep every single day in every hospital, all around the world. It's how we actually shift

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that focus, hopefully over time. But it's going to take a long time.

- Ivor: [01:05:42](#) And it's going to take a lot of leadership as well. It occurs to me that when you talk with your fellow physicians or fellow specialists, consultants, do you find yourself being a huge advocate of getting out this information about insulin resistance and all that? Or are they very receptive towards, or are they just so busy as you described that, "Well, yeah, I'm sure it does all that out there, but I don't need to know it right now."
- Dr. Barrett: [01:06:06](#) I think there's a motivation to want to learn about this, but it all goes back to often the frustration that most physicians feel insofar as they say, "Well, isn't the recommendation going to be the same anyway?" Whereas the answer to that is, well, the answer to everything obviously is, it depends and it's complicated, but it, there's often a sentiment that the recommendation would be the same anyway. So why should I actually parse down, parse out these different risk factors because I'm going to make the same recommendations. And even when they do make the recommendations and nobody follows them. And that's, that's the frustration.
- [01:06:44](#) So, you find yourself in a position where, you know, "I'm going to make the same recommendation anyway. Even when I do make the recommendation, no one follows it." "So listen, there's an archery here that I can open with a stent, this is somewhere I can make a difference."
- Dr. Barrett: [01:06:59](#) And you can see how very quickly you find yourself there because this is something that requires a lot of technical capacity and just is unbelievable from a technology advancement point of view. But it's born out of our inability to... I think it connect with patients and give them the right tools and information to make the changes that the physicians want to see/made as well. But it's a huge obstacle.
- Ivor: [01:07:27](#) Yeah. Well, big challenge. But with people like herself, Paddy, you pretty much know at all far from it. Joking. You know, I'm sure, I'm sure we get there, and it will be an interesting decade ahead I think, as the knowledge around all these metabolic diseases and what's really causing them in the nutritional world becomes more widespread, more people internalize it, more physicians internalize it, more physicians begin to have faith in giving advice to people that they when actually see those people get healthier and then they'll get that psychological

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boost and that Joie de vivre from doing a great job and basically we'll just have to wait and see what happens the next 10 years.

- Dr. Barrett: [01:08:10](#) I think so. And I think one of the things that I always try and do and remind myself is read medical history. Because I think it constantly reminds me of how little we knew such a short time ago and how much we are likely to know and how much our opinions are likely to be different in five and 10 years. I think that is incredibly exciting to think that it is almost certain that the conversation that we are having now, we'll be seen as quaint in five to 10 years. And I really hope that that's the case.
- Ivor: [01:08:47](#) Well, I hope so too. But I really hope in five to 10 years that that many people who are involved in the health world are having conversations even like this that we're having today in some ways. It's great to have you here Paddy, and I know you've got to get back to your job and I'm delighted. Any other last thoughts you have you want to try out?
- Dr. Barrett: [01:09:06](#) No. I think it's wonderful to be part of these conversations and I think, it is also in recognition of the work that you've been doing in terms of being an advocate for awareness in this particular area. It requires a constant slow push and this is all just part of that movement.
- Ivor: [01:09:26](#) Well, yeah, we're just trying to get out there to the people translate the science into understandable directions you can take for improved health. So thanks a lot Paddy for that.
- Dr. Barrett: [01:09:35](#) Thanks so much.
- Ivor: [01:09:37](#) Thanks for tuning in guys. If you're watching on YouTube, you can see my subscribe button in the middle of the screen or free viewing of the Widowmaker movie on the far right, and myself and Dr. Garber's book, "Eat Rich, Live Long" on the left. Otherwise, please do subscribe to the audio podcast. Thanks!