When Calcium Kills: What You Must Know About Heart Calcium And CT Scoring Transcript

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Introduction and expert background

Well, everybody buckle up, don't move. We really, really, really have what already has praised. Dr Matthew booed off as a big kahuna Dr booed off is probably the best known expert in the world on imaging the heart.

Early heart disease protect a detection. You can't really reverse heart disease if you don't know you have it. So we're gonna talk about early heart disease detection of which he is an esteemed professor and endowed professor at the David Geffen School of Medicine and U. C. L. A Harbor in Los Angeles.

He's a native new yorker but spent most of his life on the west coast has published more than 1000 research articles. It's just an amazing academic output and I read that and I actually learned from them and many book chapters in many books.

Uh, and really this is an exciting, exciting enterprise. You might not see much on instagram. He's probably writing the next guidelines for a society is when you know every award out there. But so thank you so much for joining us.

Doc booed off. Really, really appreciate, you know, it's a pleasure to be here. Thanks for having me on. So, these are really layup softball questions that you and I know you more than I, but I think they're so important. I mean, give, let me just tell you some personal note. Um, the first Scanner in the state of Michigan where I've been most of my career except for cardiology training and such was in flint michigan and my brother bought it for the hospital.

So, animatronic CT scanner in 1995 brought calcium scoring early detection of silent heart disease to the state of Michigan. I was not at that institution.

I was an hour away, but I saw what was happening, started to refer to a very expensive test back then. Uh and then as you and I know the technology became widely available.

Then more uh prolific CT scanners and emit Tron as a company. And as a expensive option went away largely. There's a few around. I know there are still providing studies. So I've been deep in this and referring people And you are the world expert. Why do you think a 50 year old man or woman with some risk factor shows up at a good internist, a good family doc, an executive physical gets what they got. But nobody brings up.

You got the colonoscopy, you got the mammogram, you got the digital rectal, you got the uh pelvic exam for the early detection of cervical cancer. But where's the heart? And then let's go from that right into what calcium scoring cT imaging might do. But why do you think there's been from 1995 to now? Such a slow adoption by the medical community?

What is now a very widely available? Very inexpensive test? Yeah, no, you know, it's remarkable to me.

Why heart disease screening is underused

I mean we screen for everything else except for heart disease even though heart disease is the number one cause of death for both men and women in the United States. So you know, we're screening for lung cancer and colon cancer and breast cancer and all the way down the list yet.

We we just do not do not look at the heart. And I think it's partly because there was some early pushback. Unfortunately the entrepreneurs early on um advertised this directly to the public kind of went awry.

The medical societies and the medical societies didn't like that and push back a little bit. But they are firmly on

board now. There is not a medical society that does not advocate for coronary artery calcium score now since 2018.

So everybody's on board and I think now we just have to keep rolling out the education, we have to keep educating the primary care doctors that this is an important thing to screen for And there as you see, they're widely available and they're not expensive.

Right? So let's even go back the observation by radiologist that if you do an X ray of leg or a chest before we had cT scanners that you can identify calcium and blood vessels. Just talk for a minute about that background that you know that we know that calcium and atherosclerosis are a very common partnership.

Yeah. So you know the word atherosclerosis, This means hardening of the vessel are Thoreau's vessels sclerosis is hardening and that is calcification. So literally the word atherosclerosis means basically calcification of the arteries, The arteries get stiff, they get full of plaque and they get blocked off and and and patients have a heart attack or a stroke or they get a blockage in their leg and they need their leg amputated.

So this goes back to middle ages and beyond when we first started categorizing why people drop dead. So it's not a new concept. It's just one that we haven't been screening for as systematically as we should be.

So you know calcium isn't always bad. We needed for our bones. We needed for our teeth but it never normally is in arteries. That's at least in a way detectable by X ray imaging.

It's never normal to have calcium. Is that a fair statement? Very fair. Yeah. That's absolutely correct When you take and I don't want people to be afraid of calcium supplements.

Right? Because if you take a calcium supplement, 99.9% of that goes into the bones. The bones take up all the dietary calcium. This is scar tissue, this is calcification.

It's not it's not from dietary calcium. I don't want people to avoid eating you know foods or taking their normal supplements for osteoporosis and it's free of developing these problems in the heart. But then those very very first generation C.

T scanners probably in the eighties for head imaging and lung imaging. I mean the heart was basically a blur because the heart was moving. So what was the breakthrough that you know you were part of and that the great documentary the Widowmaker movie lays out that I would encourage people to watch online.

But you know what was that breakthrough? We mentioned the company in a tron and ultimately multi slice ct but we can see the heart. Tell us about what a revelation revolution that was simple cT imaging of the heart.

Yes. So you know as you said a CT scanners used to take about a minute to take a picture and in a minute our heart beats about 60 to 80 times. So the heart's beating away. Everything is blurry in the heart because we need to freeze that image. So we needed a fast camera to take a picture of a moving object. So in the late eighties scientists at U.

C. San Francisco and Doug Boyd was one of the phds that were involved developed a machine that could take a very very fast picture in 1/10 of a second. So instead of taking a picture in minutes, it took a picture in 1/10 of a second and now we could freeze the heart, see the arteries clearly and quantify those calcified plaques that are sitting in the arteries causing blockages.

The public listening.

How coronary calcium scoring works

I had my last calcium score about a year and a half ago, probably still a zero. I'd like to keep it that way for a long time. But what what does a person go through now? Uh you know the actual experience of getting a modern state

of the art calcium scoring ct scan. Yeah so you know it is so simple and it's become so inexpensive relative to where it started.

So patients basically go in. They can be dressed like they are they down on the table after about one minute, maybe two minutes they're done. It's literally they align the patient on the table.

They take a couple pictures of the heart and they get them off the table. There's no needles, there's no injections, there's no contrast. The the radiation dose is about the same as a mammogram.

So if women are afraid to get mammography for breast cancer then they probably don't want to do this. But I would say that's probably uh pretty safe test and we do that every year. And I would advocate we only need a heart scan maybe once every 3 to 5 years. So it's nowhere near that level of of risk that a mammogram for its patients. And it's very very low.

So compared to the effort of going through a colonoscopy or the discomfort of going through a mammogram which I can't relate to personally. But according to my wife is not the most joyful thing this is a nothing burger test and what's the cost in your community at your institution.

Yes. So we run anywhere between about the common cost, about 99 $249 a test. So I always tell patients you know, for the, for the price of a good meal, you can live longer and and have more good meals.

So it's not it's not out of out of range. For most of us, we have a series of hospitals that are $75 in Detroit. And I know the university hospital in Cleveland for free.

So, if you're ever near there, you might just walk in and ask if you can get a corn artery calcium ct scan, they do that as a public service. It's a wonderful thing. Um, I noticed that your most recent publication, number 1031 I think it was was an editorial why insurance payers should cover the cost, although it's not very high. And people do pay out of pocket in most States of the United States, but why insurers should pay for intermediate risk patients.

Tell us a little bit about what that means. Who's very low risk? Maybe can skip the scan? Who's very high risk and maybe already knows that their disease doesn't need the scan. And who's that sweet spot that you just wrote about? Yeah. So, um, so very low risk people have no cardiac risk factors. So, you know, the cardinal risk factors that we talk about high blood pressure, high cholesterol, family history of heart disease, diabetes smoking. And then age, men or women age becomes the sixth risk factor. So, if you're younger and don't have high blood pressure, high cholesterol diabetes, your low risk.

So we don't want people coming in in their twenties and thirties trying to get a heart scan because dad or mom had a heart attack when they were 60 or 70 years old.

We want them to come in when they're a little bit older. So the very young, what we call the worried, well we don't want to scan. Those are low risk people. The yield is almost zero and it's really not worth the time cost or minimal radiation to to undergo the test at that point, very high risk or the opposite. They have all those risk factors or most of them they they have diabetes and the cholesterol is high and their blood pressure is high. We know they have heart disease already or at least plaque in their arteries already and we need to be aggressive and we don't need to scan them to prove that. But it's everybody in the middle, maybe a little bit of blood pressure, maybe just a family history and you're 40 years old.

As a male or 45 50 years old as a female and someone in your family had a problem. Those are the age that's the age of atherosclerosis and no doctor, I don't care how good or how astute they are. Can say can look at you and say, you know what, you don't have anything going on in your arteries or not unless they have X ray vision, literally, they can't tell and we don't know.

So we need to take a look and then decide how to treat. And there is that term real reassessment and uh risk reassessment that that 45 year old man with a cholesterol of 245 or that 51 year old woman cholesterol 260 that goes through this inexpensive scan and comes back a perfect zero no calcium score. Yeah. What does that do to

the decision?

Here's your lifelong prescription versus lifestyle approaches and a more gentle non pharmacologic approach. I mean, what does the science say? And what did the society say about that now? Absolutely.

And and I'm trying to, when I'm, when I'm answering, I'm trying to answer on behalf of what a lot of the society say. Not just my personal opinions, but you know, there are a lot of societal papers on this, but they all say basically if your score is zero.

So it's like golf, right?

What a calcium scan involves and who should get one

Low score wins and zero happens to be no plaque detect at all, which is wonderful. You don't have a lifetime immunity to developing heart disease, just like a negative HIV test or a negative covid test doesn't mean you can never get those illnesses. It just means you don't have anything now.

So we say wait five years and get retested. But in the interim, live healthy, right? You don't want to build up plaque, you don't want to start going down that road of heart attack stroke step bypass surgery or death. So live healthy.

So we reinforce good behaviors. Even when you have a square zero, we said, look, you got a zero right now. Let's keep it that way and we'll test you again in five years. And that's usually about the protocol.

I used to about five, sometimes seven years. Um, let's talk for a minute about the invisible plaque and what a calcium score can't do. So it, you know, it can't see a kind of plaque we call non calcified soft black and it can't see the degree of narrowing in an artery. We have to go to more advanced technology.

I mean, how common have you seen in your practice at calcium score zero and actually a patient end up in the emergency room or actually have a heart attack or a stent because there just happened to be a burden of soft plaque.

I've got one in my practice that I reassured. And then eight months later he assured me I'd given him better advice. Well, it is very rare. It's less than 1% chance of something like that happening over the next five years.

So it's not 100% guarantee. It's a 99% guarantee. But that is excellent because if you were not to do the scan The best you can do with risk factors. And being a good doctor is probably give them a 90% guarantee. So this raises that 90% guaranteed or 99% guarantee. So we have every now and then we'll all have anecdotes of a person who slipped through who had a score of zero and and and had a heart heart problem. Um Some of that is non calcified what we call soft plaque that might be sitting in the artery that we can't see with this simple X ray and we need to go beyond that. Um but most of the time it might be just uh something that that floats into the artery and blocks it off that that we might not have detected by any test and just some bad luck happened causing a heart attack.

It could still happen in rare cases. Common scenario. Somebody walks in your preventive clinic wants to talk to you about careful assessment and what the plan ought to be is an ex smoker and mentions that they're in a low dose chest cT program scanning screening for lung cancer.

I mean, how interested are you on getting your hands on either that chest cT report or the actual disk images as opposed to ordering a new calcium score because maybe three months ago they did have a cT that included their heart images.

Some radiologists comments. Some don't comment on the heart anatomy. Have you found that helpful. Do you encourage people to before they plunk down $150.01 more millie secret radiation to use a recent chest ct for information.

Absolutely. I think that, you know, if you had a ct of the chest even of the abdomen, you know, if we see in the

aorta the pipe that runs down the body, if there's a lot of atherosclerosis there, we kind of have our answer as well.

So if you've had a ct scan and for another reason chest or abdomen or pelvis, we can often take a look at that and look at the arteries, the coronary arteries or the aorta and say, you know what?

There's something there. We need to get on top of this. Sometimes I still like to get a calcium score if there's a modest amount of plaque or if it's moving a lot if there's motion artifact. But most of the time that suffices to give me the answer to whether I should intensify treatment.

Get them on a cholesterol pill or get them on a better day diet and exercise regimen or whatever we're gonna do versus pat them on the back and say, you know what looks good, let's just keep an eye on things and and be healthy for the next few years and the patient brings you the report of their chest ct, their lung ct and the radiologist was sharp and mentioned moderate coronary calcification, Is there any way to take that image and retrospectively do a calcium score.

You just can comment, mild, moderate, extensive calcification. No, you can actually get a number. There's actually a company that's that's coming out. It's called a heart lung um Where they're gonna look at these existing scans and actually quantify the calcium if you want.

And then you can get an actual number and it's pretty good. There's cases where there's a lot of motion where it might not be ideal. But most of the time you can get a pretty accurate score and then use that as kind of a baseline to see what happens over time. Okay that's that's really important information.

And how about joe or jane walking your clinic? They've had a heart attack. They've had a stent they've had a bypass and the primary care doc ordered a calcium score.

Interpreting zero, high risk, and repeat scans

Or they ask about a calcium score. What would your advice be to that person? I mean that's the ultimate high risk person. That's not really a matter of risk it's a already a known diagnosis. But why does that fairly large group not need a coronary calcium scan? Yeah so people have established heart disease whether they've had a heart attack or stent or bypass.

We already know there's plaque in the arteries and getting a calcium score shouldn't change anything because they should already be being treated aggressively.

What we do in those cases especially if they have some symptom is we do the next test up which is called a ct angiogram. That that's similar to a calcium score.

Except we do have to start an I. V. And we do have to get um die into the into the heart. So it's a little bit more complicated. A little bit more expensive. But it's largely almost 100% covered by insurance. There are a few HMOs that don't do it but but every major player in the US covers a ct angiogram.

Like a noninvasive angiogram. And then we can look into the stent or look into the bypass grafts and see if they're working or not if they're open. And we'll be talking with James men a colleague of yours about ct angiography and advances in detail. We fight in michigan to get a insurance approval for a coronary ct angiogram. And somebody with known coronary artery disease.

It's crazy. It's on their algorithm. But that's a different story. The problems you go through. We usually win it's a fairly heated phone call I have to make.

But unfortunately how about bob or Brenda that have seen you? You've got them on their lifestyle plan because their calcium score was 300 or 400. Um They're asymptomatic and they're doing great with all that.

Do you expect the calcium score to go down and you reorder one expecting it to go 300 to 200 or uh forget about it

as they say in the sopranos. So you know I would say any test any test in the world if it's not gonna change what you're doing. you don't need to do the test.

So if they're already on green therapy, they're already doing great and you're not going to change anything. Getting another look is not gonna help because if it comes out the same, it's not going to go down.

But if it comes out the same number, let's say there were 300 score and now they're about 300 score. That's great. We can pat them on the back and feel good. But if it comes back and it goes up a little bit now it's 400. Um what do we do?

Right, we're already doing all the things we can do. So it doesn't, it doesn't often add a lot. Now I have a lot of patients though that have a score, they want to start slow. They want to start with just a few lifestyle changes. They don't really want to do major things.

They don't want to go plant based. They don't want to they don't want to start medication and then I do repeat the score in a couple of years. And if it's going up by more than 20% per year. So I look at the score and if it's gone up by more than 20% per year, I say, you know what, we are failing, you are laying down more plaque. We've got to double down now.

We got to do something else. I want to emphasize, that's your published data that in your database uh the calcium score went up by average about 20% per year. I'm sure there was a lot of variability.

And you might shock the listeners if you tell what your observation was about the rate of rise of the calcium score. If you're on a statin medication, what happened to that? Yeah. So you know, the statins do something really good which is take the soft and and early black and turn it into later stable plaque.

But part of that is more calcification. So it actually raises the calcium score now, usually by about 10% maybe 15% per year. So even if they're on a statin and they're going up by calculate their rate of change and it's 32% a year, that's more than the statin, then I think, okay, they're on a statin, but we're still seeing plaque. What do I do next?

Do I increase the dose? We have about six medicines that have proven to add on to statins to lower risk further. Maybe I'll add one of those therapies.

So Eva they're on a statin. I sometimes repeat the scan if I'm going to up the ante and put them on uh cosa pentathol, fish oil or if I'm going to put them on a new cholesterol medicine or one of the injectables to get their LDL even lower.

Real aggressive approach. I actually had just yesterday, a chiropractic physician, I only get to see once a year who came in really upset and he had stopped all his medicine all his lifestyle approaches because his original calcium score was 400. And his primary care doc ordered a second one.

I didn't know about this and it went 400 to 500 a little bit more than 20% a year. And he figured this is a failure because it hadn't been explained that one it does go up and number two it will go up a little faster on a statin and really slow him and calm him down and say you know when he is scheduled for a coronary ct angiogram he had some SD depression on a treadmill stress test. So there's more than enough reason to do that.

We'll get the real data. But you know I think people do expect that if we ever repeated it might go 400 to 100 or zero. And how about I follow closely the calculation literature that tact one trial of ivy calculation and then we await the attack to trial. I'm not sure how far out that is but I've not seen any convincing data that a calcium score goes down with intravenous E.

D. T. A. Therapy over and over. Are you aware of any, no you know it's really unfortunate I worked with the group contact one and um for tack to we actually built in in the protocol serial calcium scans to answer that question. And they had some budget cuts that those at the end at the National Institute of Health and they cut out the calcium scores.

So I don't think we'll ever see a good date. Unfortunately we tried, we tried to re add it and get a grant going and it was just logistically it didn't happen.

We worked pretty hard on that and unfortunately we won't have that answer.

Chest CT opportunistic screening and known heart disease

But I don't believe, I think calcium, once it's embedded in the arteries of the heart is scar tissue and it's not going to go anywhere. So you don't want more scar tissue.

So I don't want it To perpetually go up by a lot. But once it's there it's not going from 400 down to 100. I don't believe that can happen and I don't see it either.

I've actually had a couple of people come to me, I've just done 30 weeks of ivy calculation which cost a fortune in a lot of time and why my calcium score go up.

And sometimes they brought me these studies that has gone up. I don't understand because there actually are data points as you know that population may have some clinical benefit in peripheral vascular disease and coronary disease, but we have no idea what it does specifically to corner anatomy.

So if we're not bullish about regulation in the last few minutes. If you carry a lot of titles, you gotta carry the title of the king of chaotic garlic and just share since this is a summit about reversing heart disease naturally.

There's not too much more natural than aged, odorless garlic tablets. How did you get interested and what have you contributed multiple times to literature that I'm fascinated by. All my patients are on kayla garlic.

In fact this exact brand. But how did you get down that road? Yeah. You know it was a very interesting one of the hematologist, one of the the blood doctors came up to me and he said, you know, I've been working with this company. We're doing some safety studies to make sure you can take it with blood thinners and that people don't get bleeding problems.

But it really has a lot of cardiac benefits that have been shown in japan. But nobody's really done any studies in the US. So so I started, I approached the company and they supported a small trial and I was very agnostic.

I had no idea if it would work or not. But I said I'll do the study. I did the study and it worked. So it was a small study and it lowered plaque, the soft plaque and it's slowed the calcium ct angiogram and calcium score. We did both and the calcium score slowed compared to placebo. So it slowed the progress.

Placket didn't reverse it. But we saw a little bit of reversal in the coronaries on the ct angiogram and said, you know what, that's interesting. But it's a very small pilot study.

Let's do a little bit of a larger trial now and really proved the point. And we did another study and it worked and then they wanted to keep doing trials.

So then we did a trial and firefighters and it worked it even lower anxiety levels which was very interesting stress and anxiety levels in the firefighter group.

We measured that because there's also some data out of this drug in japan that colic is considered a prescription drug practically. So it has to go through the registration process of a much more advanced protocols than what we do with other dietary supplements in the US where there's really if you just put something out on the shelf basically today.

So it's very well validated that I think there's over 1000 publications now on that product. So if you want a garlic supplement that has data behind it is the one and over six trials now we've seen market slowing of the calcium score so it definitely helps with calcium calcification progression.

It's not going to cause regression but it's going to slow the plaque. Um And we've seen reversal on some of those ct angiograms that you'll talk to dr min about where we can actually see less of the soft black the non calcified plaque starts to go away with very interesting data.

Garlic research and cardiovascular benefits

And I mean patients do well I've had two out of probably 2000 patients. They claim they smell a little garlic li garlicky taking two a day and they dropped to one a day and they do fine. But everybody else plus there is random, there are randomized studies of dropping blood pressure with the same product, mildly dropping LDL cluster with the same product.

And I can't even imagine that there's any risk in any situation because what was the conclusion with the hematologist? Any patient on Xarelto adding in a chaotic garlic? I wouldn't be concerned.

But no, there's no problem with Warfarin or with with 0 to 1 of the newer anticoagulants. He tested both. So, so no, no safety issues. Although the surgeons will probably ask you to stop the garlic a couple of days before the operation, which is fine. I think that's that's prudent.

It does have a tiny bit of blood thinning property which is probably good for us for health and preventing heart. But but when you're getting operated on you don't want your blood to thinned out.

So it has a very mild effect there. And the last thing which I think is very interesting and I wish we did a study on it. But it has a remarkable garlic has remarkable benefits on on infection. Both bacteria and viral infections and we didn't study covid per se. But it is been historically and I'm talking about now. Thousands of years of research going back consider an anti infective therapy. So I think there there I have as you do, I have a vast majority of my patients are on it. I'm a huge advocate of it because the science backs it up, not because of anything that I've done personally, but the 1000 papers really make it worthwhile and and it's so easy to take and it's well tolerated, it is odorless, so I can't think of anybody who has complained of the garlic smell, but really you don't smell like a clove of like in most cases maybe maybe there's a couple of people who who tease that out. Yeah, man, I agree.

I think it's a powerful, powerful natural agent. Last question, you know, we started with the inquiry why has the primary care world so slowly adopted this amazing test. I think we've got a lot of people excited if they've never had it to ask for it, it usually does require a prescription from a health care practitioner, a few places you can just walk in and get it.

But um and you know, a skeptic might say show me the randomized study. That outcome is different if you apply calcium scoring to a large population. So as this airs the dan cavers trial and I think I got that acronym right was presented in Barcelona and published, I think in the new England Journal Medicine, 45,000 danish men age 65 to 75 randomized to getting screening, including a calcium scoring asymptomatic men or no screening and fortunately the women did not get included, maybe the risk wasn't high enough. And it seemed like in the 65 to 7 year olds they proved a benefit to screening asymptomatic people just comment on that a bit.

Would you have chosen that age range? I think there's a reason they did. And how does that how is that going to impact adoption? Yeah. So so you know, they chose that data based on aneurysms and that they had showed a previous benefit for aortic aneurysms and that's an older disease and and that It's probably too late. And what they saw basically was below age 70.

There was an 11% reduction in death, literally the original proposed title to the New England Journal of Medicine was that that screening reduces mortality all cause mortality by 11% in patients under the age of 70.

And New England journal is a very conservative journal and didn't run with that title. But um but it did work the 70 and older no benefit because it's probably too little too late. Once you're in your seventies, the other problem that they had, which was really to me still I don't understand.

Screening trial results and future adoption

Um and I've spoken to them, they included people who had known heart disease, the people who we talked about before who already had a heart attack or or already had stents and bypass and obviously there was no value in that group.

So if you get rid of those patients, it's probably about a 14% reduction in death in the clean Population you get another 5% benefit um by by eliminating people already have known heart disease because they didn't derive any benefit either. So if you really get to the screening population there's a pretty robust benefit for screening. Okay.

And I think you know, we need to inform our primary care population and the and the public that we now have a randomized study that proves the concept that you introduced and others introduced shape society still in existence. You know morton form the shapes of society is a cardiologist at a Houston and he actually is doing that heart lung that I mentioned earlier.

He's he's trying to bring the ability of taking these millions of lung scans that are done ct scans of the lung that are done for all different reasons.

Lung cancer screening, chest pain in the emergency department and getting deriving a calcium score using ai and being able to provide with the number that they can then use to inform their health. Kind of getting a free scan off of off of existing data. Right?

So so very clever and and he's still working and and shape is still going and just just to talk about one success shape was able to convince texas the state of texas legislature to mandate heart scan and calcium scoring coverage.

So if you live in the state of texas it is state law that they have to pay for calcium score if you're intermediate risk. So we're making some progress but it's gonna be one state at a time. I think for the foreseeable future we're going back 15 18 years for the shape society. We're finally getting there.

It's an exciting time and again. I gave a shout out to this documentary online. The widowmaker movie that tells the story of the texas legislature and how they finally approved it. So everybody go look that up.

Well doc booed off tremendous gratitude. I honestly believe you probably have saved some lives with the comments you made because I think people will now have the the ammunition to ask their primary care of their health care practitioners to get this scan and change their lifestyle. I mean change anyways but some people need a kick in the rear as we all know a little scare factor that they're walking around with plaque.

And if you're lucky enough to be a zero don't go down the cheeseburger path. You know as you said, stay a zero there double zero club. I've now got three zeros every 10 years. So I'm not sure I'm gonna do it the fourth time.

That includes a clearly C. T. Angiogram recently just for the fun of it. Seven millimeters of plaque. Pretty low. Great. But anyways I wish you a great day. Thank you for your time Professor, thank you so much for having me. It's been an honor.