A Special Interview with Dr. John Cannell

DM: Dr. Joseph Mercola, DO
DC: Dr. John Cannell

DM: Welcome everyone. Today, we’re here with Dr. Cannell who is the founder of the Vitamin D Council and one of the most prolific writers about vitamin D.

We’re talking today because yesterday, which was November 30th, the Institute of Medicine released a shocking report that the amount of vitamin D is not as high as we’ve been recommending and actually, it shouldn’t be more than about 800 units for an adult. Really, the only evidence for the benefit of vitamin D that they could document was the improvement of bone health which is just beyond belief. Because there is literally hundreds if not thousands of studies showing that it benefits just about dozens if not hundreds of clinical conditions.

Dr. Cannell has really committed a good portion of his life to pursuing this and reviewing the literature and publishing this and helping us understand the benefits of vitamin D. I felt it would be really appropriate to have him help us understand how this flawed recommendation could ever come to be.

Thank you for joining us and helping us get a grip on this recommendation.

DC: You’re welcome. It’s my pleasure to be here with you Joe. I know you’ve been a long time advocate of vitamin D. Yesterday was a disappointing day. We were pleased with one aspect of it and that’s called the upper limit that went from 2000 to 4000. Although not high enough, it should be enough to allow some more meaningful research to take place.

The other changes though for…

DM: By upper limit you are meaning their recommendation of the upper limit of normal oral doses of vitamin D?

DC: No. Upper limit means the amount that you can safely take with no one having any side effects. They get it by doing some division and subtraction. They get no observed adverse effects level and then they divide that by -- this time they divided that by 2.2 I think or something to come up with 4000. Because they couldn’t find any studies that showed the ill effects of taking 10,000 units a day. So then they get the 4000.

It’s so important that people remember a couple of things about these reports. These reports are, number one, about bone like you mentioned. They’re not about heart or liver or lung or respiratory infections.

DM: Or cancer.
DC: Or cancer or brain disease. They're simply about bone. What the literature says is an adequate amount of vitamin D to take for bone health. Not even do they say that it’s a recommended daily amounts for bone. They are pretty clear that this is only one of many things as you know that people need to have healthy bones.

But what this is not talking about, it’s like you mentioned, its not talking about how much you need to take to reduce your risk of getting influenza A this winter. It doesn’t address that. It doesn’t address how much you need to take to significantly reduce your chances of getting Parkinsonism, if in fact it turns out vitamin D does help prevent people from getting Parkinsonism.

It doesn’t say a word about how much vitamin D infants need so that they don’t develop schizophrenia 20 years later in life. As more and more studies are pointing to that distinct possibility. So it’s only talking about bones.

DM: Those are important points. I’m curious as to what your thoughts are with respect to why this recommendation even came out. Since the last recommendation which I believe Dr. Heaney was a part of, who is, from your perspective and many others, widely believed to be probably the most prominent and well respected researcher on vitamin D, was a member of the last panel.

He actually had some interesting comments from Carole Baggerly who contacted him for his -- I would just read that now -- he said, there is an impressive body of scientific evidence supporting levels higher than the Institute of Medicine panel is currently recommending. For reasons that are not entirely clear, the panel has discounted that evidence. The public needs to know that evidence exist so that they can make up their own minds. It is helpful in making those decisions to know that intakes higher than the recommendations are safe. For me that decision is easy even if the evidence for higher intake were uncertain. And I don’t believe it is. Intakes two to fives times their recommendations would carry a good chance for benefit at essentially no cost and no risk.

This is coming from a man who served on the last committee. For reasons unclear to me, why was he not on this committee. I’m wondering if you have any thoughts as to why they came to this conclusion?

DC: For one thing, they have a rule, if you served on one committee, you can’t serve on the next one. So he was disqualified by that.

First, you have to look at the members. There were a couple of people there who have written fairly sensibly about vitamin D but the chairman was a vitamin A expert. Why they would pick her and why they would pick non-vitamin D experts, I’m not quite sure. I don’t know if they do that with all their panels. Do they choose vitamin D experts when they look at vitamin A? I'm not sure.
When one gets into having to build a group consensus, all one person has to do is say, “Well, maybe that’s too much.” The way that humans work for some reason is that everybody starts saying, “Well, maybe this.” So reaching a group consensus is very difficult.

You can look at this another way. You can look at it that the dose for infants and pregnant women and young people has been increased from 200 units to 600 units. It’s been tripled. The dose for older people has been increased by about 33% and that the upper limit has been doubled So you can look at it in different ways.

Unlike 200 units, 600 units in a prenatal vitamin D I don’t think will be entirely meaningless. I mean, I think it will prevent some of these long latency diseases that are afflicting our children. I think it will prevent some of it but not much of it because it’s not enough. It’s not high enough a dose.

**DM:** What’s shocking to me is that the levels they are recommending will not even approximate -- well, I guess maybe it’s not so shocking when I think about it but it won’t approximate what one would expect if they were exposed to healthy levels of sunshine. I guess the basic premise is that sunshine is evil and harmful and that you should stay out of the sun because it causes cancer. That seems to be the prevailing thought. If that’s their belief system then they certainly wouldn’t recommend anything that would approximate exposing your skin to healthy amounts of sunshine.

**DC:** That’s right. To think of them coming from an academic situation where they all know that sunlight is evil so that’s not a choice and to their mind, they are testing a new drug. To them, like all drugs, you need to have absolute proof that a dosage is safe and does something good before you approve it. They’re treating vitamin D like it was discovered just a couple of days ago and they have been testing it on humans.

The other way and I think the proper way to look at it is what vitamin D levels did humans have when they were evolving for two million years in Easter Africa. Those are the levels we want to have. That’s the levels the genome is used to. And then all the studies you want maybe it would better if it was higher than what the genome evolved. It may be lower but to me that’s where my family, my patients, my friends and myself are going to start. We’re going to start at natural vitamin D levels which is 40, 50, 60, around there.

**DM:** It would certainly seem to be a more rational and logical approach but I guess we can’t accuse the conventional paradigm of adapting a philosophy anytime soon.

**DC:** One thing that did concern me is they have 15 vitamin D experts to review their report before they released it. They refused to let anybody look at the vitamin D expert’s opinions about their reports. Yesterday, we instructed our attorney to try to obtain them under the Freedom of Information Act.
The Institute of Medicine is a quasi government agency that does a lot of government business. We’ll see whether the Freedom of Information Act applies to that. I believe this was being paid for by the National Institutes of Health. I think the fact that this is being paid for by the government means that the Freedom of Information Act applies to that. I’m just not sure.

**DM:** I guess there are some good points as you mentioned. The other good news is that even though traditional medicine is unsurprisingly lagging behind with what the science shows. It clearly shows that there is not, at this point, a law that restricts us from applying this.

So ideally, we take this information. We’re adults with our own freedom and ability to make our decisions. We can either seek out the appropriate amounts of sunshine on appropriate amounts of skin or use a safe tanning bed. If those options aren’t available to us, as in the case for many in the winter, then we can choose to take an oral supplement and vitamin D3.

**DC:** Right. The other thing that people forget about this report is these are recommendations for people who want to proceed on their own without a doctor’s advice. If you’re under the care of a physician, this report is almost meaningless.

It’s like, for example, looking at the report on calcium. They recommended yesterday that most people don’t need any supplemental calcium. So you could say, the report says Americans don’t need any calcium. But if you have a patient that comes in to your office who is hypocalcemic, he sure does need calcium. The calcium report they issued yesterday with the vitamin D report is of no relevance to the doctor treating low calcium.

So it’s important to remember what the Institute of Medicine released yesterday as advice about what people can do on their own without being under the care of a doctor. It doesn’t in any way preclude a physician from prescribing the usual dosages that they do, the 50,000 units once or twice a week. It’s not designed to prevent that or to address that or to in any way remark upon that.

**DM:** So if you’re convinced with what Dr. Cannell has been writing in the Vitamin D Council or what I’ve been posting on my site and it seems to make sense to you then you can choose to freely ignore this new recommendation from the Institute of Medicine. I think it sounds like the sound message.

**DC:** Yeah, that is a sound message. It’s important for people to realize that of the several hundred studies that have come out in the last couple of years not all one hundred of them are positive for reasons that I believe has to do with vitamin A.

There is a U-shaped curve in some of the studies especially the ones that come from Scandinavian countries. When I say that U-shaped curve, a very low level secure area much increased risk but high levels showing increased risk as well. I believe that those U-shaped studies are due to the intake of cod liver oil.
Most of the cohorts that were studied in these papers had their dietary information taken in the 80s and 90s and their blood drawn at that time. The intake of cod liver oil especially in the Scandinavian countries in that time was substantial.

When one takes cod liver oil, you’ll get your vitamin D level up but with it you’ll get toxic amounts of vitamin A. There are a number of studies that shows that vitamin A is not a good thing to have in excess of.

But people have to realize that there is nothing in science that’s a hundred percent. You can look at the randomized control trials that have been done. The randomized control trials have not shown any damage or any danger of anything. In most of the ones -- now that the dosages are starting to go up are showing significant treatment effects.

DM: You were a progressive reviewer of the vitamin D literature, I’m wondering what recent studies you found that are interesting that might shed some light on some of the new benefits or tweaks of the information you already have on vitamin D?

DC: I can tell you another paper is coming out about macular degeneration which is something that is just thought to be inevitable with aging in some people where part of your retina just sort of deteriorates. It turns out that the higher your vitamin D level the less likely it is for that to happen.

There is even a paper that implies that the opacity of the lens, cataracts, which is one of the reasons we’ve always been told to stay out of the sun is you’ll get cataracts. There was even a paper that indicated that the lower your vitamin D level the more likely you are to get cataracts. And that vitamin D prevents against these sorts of opacity. That’s one organ with two studies that are pretty impressive. Again, they are cross-sectional studies. They’re not randomized control trials.

People are getting tired of the epidemiological studies in vitamin D. They want randomized control trials. That’s what’s going to have to be done. That’s what people are looking for especially the study coming out of Harvard, the VITAL study. Basically it’s going to be comparing 3000 units a day with 1000 units a day in the placebo group and seeing if there is a difference. Those are the types of studies that people are waiting.

There is also an interesting new paper about Parkinsonism that implies that low vitamin D levels exacerbates the disease. I’ve had a couple of patients that told me, an elderly parent with Parkinsonism, it’s improved somewhat. So if you know of anyone with Parkinsonism make sure their vitamin D levels are in the high range than normal; 50, 60, 70, 80 something like that.

DM: Would that also hold true for other chronic neurological disease like Alzheimer’s?
DC: Absolutely. That’s a really important point. People are asking me, what’s the right vitamin D level? If you’re otherwise perfectly healthy, then a level of around 50 is just fine. If you’re not suffering any chronic disease that’s been associated with vitamin D. But many people, in fact, they have heart disease or they have Parkinsonism or Alzheimer’s or emphysema…

DM: Or cancer.

DC: Or cancer. They’re just using sort of logic and also some studies.

It’s my opinion that people should get their levels up into the high range of normal. The rationale for that is that there are a number of studies with cancer now that showed that the blood level of vitamin D you have at the time you’re diagnosed with cancer predicts how long you’re going to live. That is high vitamin D levels at the time of diagnosis prolongs life. Another way of saying is that having a high vitamin D level at the time of diagnosis has a treatment effect on the cancer.

Some people are hopeful that ultra high doses of vitamin D are going to cure cancer. I do not think that’s going to happen except perhaps for a few cancers. It’s a possibility. But for most of the cancers, the machinery that activates vitamin D is turned off fairly early in the process in aggressive tumors so there is just no way for the vitamin D to get activated.

DM: Interesting. Is that in the cellular level because the form of vitamin D that works, for our listeners, obviously, you know this is the 125-dihydroxy. When we were in medical school it was believed that the only tissue that did it was the kidneys but Holec and others have shown that pretty much all cells in the body possess that ability. You’re suggesting that as cancer progresses this additional hydroxylation to the active form is impaired?

DC: Yes, that’s correct. That impaired. The 125- dihydroxy which you just spoke about is impaired. The vitamin D receptor is impaired and the machinery just doesn’t work. Whether that would be true very early in the case of cancer formation, no one seems to know.

Most of us remember the Lappe Study which was the pretty remarkable reduction in cancer with a modest dose of vitamin D in the women in I think was in Nebraska. That basically showed a preventive effect of vitamin D.

There are studies, for example, there is a breast cancer study showing 10,000 units a day decreased the pain that breast cancer patients had in their bones. There are animal studies that showed it decreases the side effects of chemotherapy.

If you have cancer -- people ask, if I have cancer, should I take vitamin D? I just say, if you have cancer should you be vitamin D deficient? That’s the real question. The answer to that is no, you shouldn’t be vitamin D deficient if you have cancer. And, you
shouldn’t be vitamin D deficient if you don’t have cancer. You shouldn’t have any…but if you’re perfectly healthy, a level of 50 is fine but if you’re sick, you want to keep your levels at 80 and 90.

**DM:** Well, that’s a good fine tuning. Thank you for that observation. Actually, also relatively-disappointing information but we’re interested in the truth and not some fantasy or fairytale that pushing higher levels with an advanced cancer may not be as useful as we previously thought.

**DC:** Right, and not all cancers, I mean, they haven’t tested it yet on leukemia for example. So you just don’t know. But there is certainly no reason to have a level of 20 while you’re fighting your cancer.

There is one interesting thing. You know of my interest in autism. One very interesting thing is that children with autism who have not ever taken high doses of vitamin A or have taken retinol acetate or retinol palmitate, they seem to have a treatment effect when their levels get up to about 50 or 60.

The children who have been given mega doses of vitamin A or have been on fairly large doses of cod liver oil for a long time, they all seem to get a treatment effect with their autism until their levels are at 90 or 100. Again, not that vitamin D cures autism or not that there is any kind of randomized control trials showing vitamin D has a treatment effect on autism.

I had experienced now with dozens of parents writing to me and then doing what I told them to do and then they’re writing back saying there was an improvement. It appears that how much vitamin D you need also depends upon how much your vitamin A intake is. That sort of makes sense because the two work together. And if you’re overdosing on the vitamin A, you’re going to have to take much more vitamin D to get an effect at the cellular level.

**DM:** Interesting. For our listeners, your observation was that vitamin D for the management of autism is ideally instituted during the pregnancy when the child is a fetus, prior to birth. Certainly, you can treat it afterwards but the best benefit is in the prenatal stage.

**DC:** Yeah, absolutely. A guy at Harvard, a professor there, just published a paper basically accepting my theory -- the vitamin D theory of autism. But he’s saying that some of it is even in the man’s vitamin D level before the impregnation occurs. That there is some genetic damage he thinks that partially contributes to the explanation of why there is four times as many boys with autism as girls.

I think the safe thing to do is if you’re thinking of having a child both the parents should take the steps necessary to be vitamin D sufficient. Once a woman is pregnant, she’s going to need probably 7000-8000 units a day while she’s pregnant and lactating. And
then when the infant is off the breast milk, the infant needs an independent source of vitamin D.

Yesterday, the Food and Nutrition Board said 400 was adequate. Four hundred is pretty good but a thousand is better. The prevention, in my opinion, is the key to autism.

Something else has come to light that’s really interesting. Glutathione metabolism is not functional in children with autism. Glutathione is how the body manages to get rid of heavy metals. Glutathione sort of acts like EDTA and chelates and removes it. Without adequate vitamin D, the glutathione cycle cannot occur.

It made perfect sense to me that these vitamin D deficient toddlers would get shots that contain mercury. That would sort of tip them over the edge if they’re vitamin D deficient. If their vitamin D is sufficient, it shouldn’t be a worry at all but that’s never been tested.

**DM:** Well, it's just further confirmation that the best way to treat disease is not to treat it at all but to prevent it. It becomes so much more of a challenge once you actually have the disease process. You know, words of wisdom.

**DC:** I agree. In fact there is even a possibility that the flu vaccine is not going to work very well in people with high vitamin D levels. The Russians have observed that when they gave the flu vaccine in the summer, that they got much less of a reaction, you know, mild fever or body aches or anything. When they gave it in the winter, there was 10 or 15 times higher rate of having the symptoms.

The kind of reaction that the body makes when you get a flu vaccine decides how many antibodies it makes. In the absence of any side effects at all, you can assume your body is not making as many antibodies as the person next to you who had a slight fever and some muscle soreness after the flu shot.

And looking at the literature, it doesn’t appear that the vaccine industry has ever even considered that possibility. They seem to have known for a long time that you can’t take the flu shot too soon in the season or it doesn’t work. They’ve never considered the possibility that it’s only going to work if your vitamin D is deficient.

**DM:** More encouragement to again make sure that our vitamin D levels are appropriate. You can choose to ignore the recommendations of the Institute of Medicine. It’s just a small step but eventually, it sounds like they’re going to need another 5 or 10 years to update their recommendations to be consistent with the clinical observations of what the new research clearly shows.

**DC:** It’s a nice thing about -- I know everyone won’t go into the sun beds but I’m looking right now at your D-Lite. It’s up in my wall. It’s such a nice way for my family to get vitamin D. They just stand there for a few minutes, three or four days a week. You don’t have to worry whether your blood level is adequate. You don’t have to go to the doctor to have it tested. You don’t have to take pills. It’s just there. It makes it really nice. The
high intensity red light in it makes it even nicer. I like to stand up in it so you can’t fall asleep underneath of it. But now I hear you have one out that has a timer on it.

DM: They all have to get a timer. That’s required by Federal law. I actually have the bed. The nice thing about the bed is that it’s more time efficient. Basically, you can cut by 50% the amount of time you’re on it because they are essentially two of the standup beds together.

DC: That was a very smart thing, Dr. Mercola, when you said why not get a bed that just makes vitamin D? To my knowledge, nobody has done that before. You deserve a lot of credit for that because it’s very effective. The women in particular were concerned of their skin being damaged. You’re being protected from the vitamin A, from the UVA, which does most of the skin damage. So with one of these D-Lites you’re being protected.

DM: For those who aren’t familiar, it’s not that our beds don’t make UVA, they do. They just make it significantly less. Sunshine is 95% UVA and our beds have 90% and double the amount of UVB so 50% more UVB which actually causes your body to produce the vitamin D.

DC: Right, which allows you then to stand or lay on it for such a short period of time that you don’t get anywhere, there is not much radiation burden to your skin.

DM: And then we use safe electronic ballast rather than magnetic ones which is really, from my perspective, a key issue and perhaps one of the primary reasons why some of the tanning beds have been so violently opposed by traditional medicine. I do believe magnetic ballasts are something that should be avoided and you really don’t want to be that close to them. That’s what makes them safer, the electronic ones.

DC: Have you had much luck with children? Some of the autistic children, the mothers, would like to use these. The children just won’t stay close to them for some reason. I don’t know if you’ve used these.

DM: I haven’t had any feedback from individuals seeking to use it for that possibility but it would make sense. There probably have to be some revision or modification of the strategy because they would tend to avoid the bright lights and specifically wearing those goggles. I mean, most children with autism, on the spectrum, are really not going to like any tight fitting clothes and certainly not goggle if they can’t see on it.

DC: Right exactly. Getting back to the studies, there are more studies than just the eye. I just reviewed an interesting paper. I can’t tell you the name of the professional team. One of the professional team -- everybody is familiar with the name, everybody would recognize, they started wholesale treatment of the vitamin D deficiency of their athletes and now are leading in their division. As you probably know, I reported last year that the Chicago Blackhawks have been on a training program for more than two and a half
years that included adequate treatment of vitamin D. I just got a call the other day from the sports nutritionist there. We’re going to work together on a paper.

**DM:** For those who aren’t following hockey very closely, I typically don’t but I’m from Chicago so I would know about this. The Blackhawks did win the Stanley Cup last year, the first time in many years. There is obviously many variables that go into winning any professional championship but the vitamin D optimized levels certainly didn’t hurt.

**DC:** Right. This is a very good nutritionist. She does other things besides vitamin D. Three years ago they were in the cellar. They’re very unpromising then they started on the vitamin D and they seem to improve. The theory is not that vitamin D can make a bad athlete into a good one. It won’t do that but it does affect muscle strength, it affects timing, quickness, choice reaction time and a number of things.

**DM:** It will optimize your performance. My strategy in seeking to obtain optimal health is really to carefully examine the strategies that many elite athletes are using because there is usually some very powerful profound physiological truths that typically have widespread application. I certainly use that for my exercise fitness protocols.

**DC:** One thing that Germans recognized early in the course of their experimenting with vitamin D and with ultraviolet light in their elite athletes is that when one of their elite athletes had an injury that meant that he couldn’t exercise for eight or ten weeks but they continued to take the vitamin D or they continued to go into the light beds.

That there was an artificial training effect that that athlete tended to stay in shape. I mean, not at peak performance but when the injury was healed and they’re back, they don’t have to start from zero again. That vitamin D itself provides an artificial training effect like it keeps you in shape without you exercising.

I know people are going to get angry about this. They’re going to say, “That can’t be, exercise is good. Dr. Cannell is saying we can sit there and drink beer and then take vitamin D and we don’t have to worry about staying in shape.” In my opinion, some of that is actually true.

There is another question people need to ask themselves. When is the last time you saw a rabbit going to the gym? Rabbits need to literally run for their lives periodically and yet you never see a rabbit going to the gym or doing anything like that in the field. They’ll hop around, hop around, day after day, week after week and then one day, one minute, they’re running for their life. They seem to be able to stay in shape without regular exercise.

If you think of the mountain gorilla, you know, its strength is in its enormous pectoralis muscles, never has to exercise them but stays in shape anyway. It may well be that vitamin D, the reason that these wild animals can stay in shape much better than we can is because we live an indoor existence and they don’t.
DM: Part of that may be related to the definition of exercise. You kind of alluded to it with the rabbit. What I have learned after essentially following Dr. Ken Cooper’s aerobics program and doing long distance cardiovascular type of aerobic training for 40 years. I realized that that may not have been the best approach. That these higher intensity, very high intensity sprint type of exercises done over short periods of time but done regularly can provide superior benefits to what's traditionally viewed as an exercise workout.

So a 20-minute high intensity anaerobic interval training program we call Peak 8 is far more effective than almost any traditional cardiovascular program and especially done in conjunction with optimizing your vitamin D levels. When I was running outside, what I had done for a long time is -- I think you’re a proponent of this too -- is there is probably some additional benefit to exercising with as much skin exposed to the sun as possible because when you’re performing that activity and you’re exposed to UVB there is some additional synergistic benefit. I believe you alluded to that in the past or maybe I am mistaken but I thought that was…

DC: Right. There is a synergy. Of course the other thing is that the vitamin D by itself is not going to give you the calm peaceful feelings that the endorphins do after you exercise.

DM: No.

DC: I’m not saying not to exercise. But I’m saying that if you get injured, if you’re an athlete and you’re injured, make sure you’re taking your vitamin D because you’ll probably heal your injury quicker. And when you get back to training, you won’t be as far behind as you are afraid you were.

DM: It’s a profoundly beneficial thing. It’s actually one of the best things that I have learned this year is really a specific protocol and way to integrate this high intensity training that we’ve adopted as Peak 8. We have videos on the site that review it. It’s really for 20 minutes of exercise just a few times a week. You can really optimize the health of most people who are able to implement it and you really achieve the health of the rabbits. You don’t see rabbits running marathons that’s for sure. They don’t do that.

Unless you have any other insights, I want to thank you for the time in really helping us understand some of the implications of this Institute of Medicine report which I’m sure have confused many because it almost directly contradicts much of what we’ve been saying. But I think when it’s put in proper frame and perspective, we can understand why they would come to these conclusions.

DC: The take away point for me was that they have increased the upper limits from 2000 to 4000. Basically to me the main core of the report was that vitamin D is safer than we thought.

DM: Yeah, and we still have a long way to go.
**DC:** To their defense, you know, I've just started going through this report. It's like a lot of pages. They're talking here about bones and they're upfront about it.

**DM:** That's particularly frustrating for me to ignore the wealth of scientific studies that have conclusively, essentially and irrefutably documented the benefits of vitamin D. Bone is just really the tip of the iceberg. I really believe is somewhat tragic that they didn't include these in their recommendations but that's their process.

**DC:** Joe, can you imagine, you know, we talked about the healthcare crisis and the financing going broke and health insurance. Just imagine for a minute every American in the country was vitamin D sufficient. What would happen with our healthcare dollars? What would happen with the increase and rise of cost of Medicare? What would happen with the health insurance industry? It would be a remarkable thing.

**DM:** It would and one may even speculate that there may have been some outside influence that limited that recommendation from happening because it would be a serious challenge to the financial benefits of many industries that is served by people not being healthy or sort of well by that. The cost for implement optimizing vitamin D levels is really -- it wouldn't increase the Federal budget that's for sure. We're talking like a minute of the defense budget. That's about it.

**DC:** Yeah I know. I know it's easy to fall into a conspiracy mode and maybe there is. I ask people that when they criticize medical companies, I ask them, it was your company, and you'd worked your life off and you have 500 employees. You're making flu vaccines and you believe in them. You think it's a good thing. If you find out about vitamin D, the first thing you're going to do is say, it doesn't work. Then if there is evidence that it does work, what are you going to do? Just close down and lay off all your employees just say you're right? Human beings are human beings. They do things for different reasons.

**DM:** Sure. They definitely have their motivations but my experience is that when you do things for the right motivations and you stay at integrity and you honor that truth that although there may be short term financial and economic consequences of that decision usually you're rewarded in the long run.

**DC:** It's sort of a variation of, if you do what you love, you'll eventually make a living out of it and you will.

**DM:** Yeah, absolutely, if you're passionate about it. I think sometimes you have to take a step backwards. But it is definitely a very powerful human motivation component. It's something that I'm sure is a factor for some of the reasons that contribute to these behaviors and recommendations that we see.

**DC:** Nice talking to your Joe.
DM: Thanks again.