The Real RDA for Vitamin D:
A Special Interview with Dr. Robert Heaney
By Dr. Joseph Mercola

DM: Dr. Joseph Mercola

RH: Dr. Robert Heaney

DM: Without a doubt, one of the most important nutrients you can get is vitamin D. Hi, this is Dr. Mercola, helping you take control of your health. Today we are joined by Dr. Heaney, who is one of the premier vitamin D researchers in the world. We’re just delighted to have him today. Not only is he a premier vitamin D researcher, but he also is the research director of GrassrootsHealth, an organization headed by Carole Baggerly.

They’ve basically done some research, to compile it from population-based studies like you, the people watching this, and many of you participated in this. That has shown that the recommended dietary allowance (RDA) should actually be 10 to 15 times what the Institute of Medicine (IOM) says it should be. We’re going to expand on that a bit today with Dr. Heaney. I want to thank you so much for joining us today.

RH: It’s my pleasure.

DM: And for also participating in the GrassrootsHealth project. I’m wondering, maybe if we could open up with some of the details of that, because a lot of the people watching this aren’t aware of what some of the benefits have been from their participation in their projects. This could be an update for many and really interesting insights of what can be achieved if they participate in a research project like this.

RH: Well, I think one of the principal benefits of being involved in the GrassrootsHealth effort is that it provides information to people, which allows them to begin to take control of their own status and situation, not being dependent upon what an insurance company might or might not be willing to pay just because you want to find out what your vitamin D status is, for example.

I think moving control out of the hands of an establishment fuel into the hands of the general public carries a long way toward substantial improvement in public health because the official operators move with glacial slowness. The GrassrootsHealth can get you the information quicker and can tell you what is it you need to know in order to make your decisions.

DM: Thank you. I neglected to establish your credentials. You’re a double doctor, not only a research PhD doctor but also a physician, an MD, out at Creighton University. Maybe you can expand a bit about your background.

RH: I am trained as physician, as a clinical endocrinologist. I’ve spent the best part of the last 50 years doing clinical research i.e. research in humans. Most of that, for the past 20 plus years, has been in the field of vitamin D. What I’ve done there is to quantify the vitamin D economy. That is to define how much vitamin D is necessary for how much of an effect, how big the effect may be, how much we make in the skin on exposure to sunlight, and how long that lasts. All the other quantitative questions that you might want to raise had simply basically never been addressed before, and yet they’re critically important.
As I mentioned in an earlier interview, it’s important to have a bank account. It’s important to put some in and to take some out periodically. But what’s really even more important is knowing how much you have in there, how much you have to put in every month, and how much you have to draw down every month. It’s the amount coming in and out and the balance you have that really is important. We have some more concerns with respect to vitamin D, and that’s where I’ve been doing my focus most of these past 27 years.

**DM:** I suspect that many experts would confirm that the Institute of Medicine represents what the conventional medicine believes to be true at this time. I’m wondering if you could perhaps summarize their views as to what their position is on vitamin D currently.

**RH:** There are two issues with respect to the recent recommendations of the Institute of Medicine with respect to the vitamin D requirement:

1) Did they pick the right number as an indication of adequacy? They picked 20 nanograms per milliliter for a serum concentration of 25-hydroxy vitamin D. Many of us think that’s too low. But let’s just for the sake of arguing, assume that it’s okay.

2) The second thing they did is they told us how much you needed to take every day in order to reach and maintain that level of 20 nanograms per milliliter. What they said was that number was 600 international units (IU) per day up to age 70 and 800 international units per day for everyone over age 70.

Now, the second statement – 600 would get you up to 50 nanomoles or up to 20 nanograms per milliliter – that is simple flat wrong. They made a mistake. That was kind of in a general way apparent to many of us at the time the recommendations were published several years ago, about 2010 to 2011. Several of the letters submitted to various scientific journals in reaction to the IOM recommendation pointed out simply that 600 wasn’t enough. I mean, from the cumulative experience of various investigators, it just didn’t get you there.

But we weren’t more precise about it until last fall when two investigators from the University of Alberta, Edmonton published a paper in the journal, *Nutrients*, which not only stated explicitly that the Institute of Medicine had made a calculation error – not just chose the wrong number, but simply calculated the wrong answer. They showed exactly how they did that and that if they had done it right, the recommended dietary allowance would have been at least 10 times greater than what had been publically posted.

Now, I looked at the same question using a different set of data entirely because it’s always good… I mean, once you’ve find something in one group of people, the question is can you find it in another group of people?

The Edmonton investigators had taken the studies that the Institute of Medicine had used, the very own studies that the Institute of Medicine claimed they had used. They found that there is something like 32 or 33 separate studies of people who had received vitamin D in various doses and recorded what kind of a response they got in terms of the level of 25-hydroxy vitamin D that that dose would produce. What they did is they looked at the average dose. I mean, in each study that would have caused them an average. It would have been a standard deviation around that average. But it was the average that the Institute of Medicine looked at.

They gathered together the average responses for the 32 and 33 studies that they were able to find. They parted those, they drew a line through them, and they configured the uncertainty range around that line. Now, what that means is that if you’ve done the study again, the averages would have been a little bit different. There’s no doubt about that. There’s always an uncertainty range whenever you compute an average. They used that uncertainty range to define what the recommended dietary allowance was.
Now, that might sound like it’s a reasonable and a conservative estimate, but let me tell you something. The recommended dietary allowance, which I think most of us know, is the intake that is reckoned to be necessary to meet the nutritional need of 97.5 percent of the population, 97.5 percent of the population. That means two and a half percent of the population would not be getting quite enough. But still, the vast majority, 97 and a half percent, would be getting enough under the circumstances.

How much is enough? Well, the Institute of Medicine said 600 was enough. But what’s very clear is that 600 would not get 97 and a half percent of the population above 20 nanograms per milliliter. That’s what the Edmonton investigator showed. As a matter of fact, probably something like a third, and in some studies, even as many as half of the people getting 600 international units a day wouldn’t even get up to 20 nanograms per milliliter.

If you followed the calculations of the Edmonton investigators, Dr. Paul Veugelers and his colleagues, they calculated a number of 8,895 international units per day. They did say that that was an extrapolation because none of the studies that the Institute of Medicine had used had employed doses anywhere near that level so they had to kind of extrapolate from the region in which they had data.

Now, what I did when I was able to access the GrassrootsHealth data… We had a total sample size of something like 3,700 and some odd individuals in there who had doses in that range, all the way up to 10,000 international units per day. We knew exactly how much of an increase in 25-hydroxy D they got and whatever dose they were taking.

What we calculated was, forgetting for a moment the baseline dose… I mean, they obviously are getting something from the sun and from food, which they would have even if they had not been in the GrassrootsHealth study. But setting it aside for a moment, our calculation showed that about 3,800 international units per day, in addition to everything they were getting, would have been necessary to get that population up above 20 nanograms per milliliter.

Now, when you realize that the baseline level in this same GrassrootsHealth cohort indicated an intake of about 3,400 already without any supplementation at all, see, that totals out to about 7,000 international units per day in order to get above 20 nanograms per milliliter. That’s very close to the figure that the Edmonton investigators had used: 8,895.

Now, what the precise number is, it’s going to have to wait for better studies. But what is very clear is that the right number to get most of the population above this level of adequacy, the right number, is at least 10 times higher than the Institute of Medicine had said. If you believe, as I do and many of my colleagues do, that even 20 nanograms per milliliter is not enough; if you want to see instead 30 nanograms per milliliter or preferably 40 nanograms per milliliter, which is the number that the GrassrootsHealth thinks is the right answer and I agree with that; if you want to get up there, then you need even more.

But the point is the Institute of Medicine is dead wrong, not because it chose the wrong number, but because it made a mathematical mistake. They miscalculated, which is really kind of embarrassing if you start to think about it. Somebody didn’t check the work.

DM: That’s really quite an interesting story. A few questions: I’m wondering why there wasn’t a process in place to address those types of errors that would occur, where the community could receive feedback to compensate for the miscalculations.

RH: Well, you’re talking human behavior rather than science. I’m qualified to talk about the science, but I don’t why something isn’t done that should have been done. My strong suspicion is that the calculations were done by the staff people at the Institute of Medicine. My suspicion is that the panel got the report but
didn’t check the calculation, so it ended up getting published in the Institute of Medicine’s volume on the calcium and vitamin D issue. That’s just where it is.

Now, having made that mistake, bureaucrats being bureaucrats, they’re unlikely to want to change. They’re not going to say, “Oops, we made a mistake. Here is the right answer.” They seem to say, “No, we did the right thing. We are not wrong.”

DM: Is there a frequency at which they regularly revisit this issue like every five years or 10 years, and re-analyze a new data and provide an updated recommendation?

RH: Well, these intake recommendations are revisited periodically, but not because there is a budget to do so and there’s an established schedule. What happens is that one of the agencies of the government – the United States Department of Agriculture (USDA), the National Institutes of Health (NIH), or the Food and Drug Administration (FDA) – agencies such as that start to say…

DM: The alphabet soup agencies.

RH: “There are no data on vitamin D and we’d like to see them incorporated in the recommendations. We’ll put into our budget for fiscal year 2016 enough money for the Institute of Medicine to look at this again.” That’s how and why that happens. But if no federal agency asks to have it reviewed, it could be 10 years from now before anybody ever looks at it again.

DM: I’m wondering if you could provide your insights as to the power or the reach of that type of recommendation, because clearly, with the Internet within reach to individuals, they don’t have to abide by that. Obviously, vitamin D is an over-the-counter supplement, at least in the United States at therapeutic recommendations; in different countries, it’s not, of course. But I’m wondering, how massively important is that recommendation to clinical medicine?

RH: The reach is incredibly important. Fortunately, it doesn’t influence what physicians do because vitamin D is not a drug; it’s a nutritional supplement and it’s safe. Physicians are quite free to disregard what the Institute of Medicine says.

However, with respect to various government programs, that number is used as the standard for the construction of military meals. It’s used as the standard for the construction of food for the elderly and the Meals on Wheels program. It’s used as the standard for school lunch programs. It’s used as the standard for the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC). There are profound ramifications to the whole nutritional establishment of the United States.

It’s even worse in a sense in Canada. Canada is in this with us. They jointly funded the effort of the Institute of Medicine. They reported the Institute of Medicine as the basis for the nutritional policy for their own people. Now, where this is a particular problem for them is that in the past several years, the first nation’s people in the Northern Tier territories, who in the years past had lived off of marine products – oily fish, seals, whale blubber, etc. – these people have now reverted to more industrialized nation food sources, food that was shipped up to them from the southern portions of Canada, where there are a lot more people.

Now, those foods are poor in vitamin D. Up in those Northern territories, there is not enough sun to make any vitamin D for yourself. Canada is looking at an epidemic of rickets and osteomalacia in the Northern Tier of its territories. And as it relies on Health Canada, which is the counter part of the FDA and few other agencies in the US, what shall we do about this? What does Health Canada have to say? Well, it says, “Let’s be sure everybody gets 600 international units per day.” It’s got no evidence to go any further because the Institute of Medicine said that’s enough.
We have, in theory, the same problem in the United States except that we have some fallback: we get some sun occasionally. Now, I’m sitting inside a building right now and I’m not getting any sun, but sometime in the day, I may get some direct sun on my skin. But unfortunately, that’s not possible in the first nations of the northern part of Canada. I foresee a very significant health crisis there in terms of increased risk of vitamin D deficiency as rickets and osteomalacia. That’s really tragic because there is no recourse. There is no alternative. They are stuck…

DM: Yeah. It sounds like…

RH: With this dead wrong number.

DM: Yeah. That baseline assumption that the IOM based their recommendations on was that the 3,700 units that people were getting in their diet and through sun exposure, that 3,700 units is probably likely to be a few hundred units in Canada and in those areas you have mentioned because of the lack of sunshine.

I’m wondering, why are they focused on 20 nanograms per milliliter? It’s such an extraordinarily low level. Was it only because they were looking at rickets and osteomalacia, I mean, that they completely ignored the literature with cardiovascular disease and cancer? It seems like that’s what happened.

RH: Without having sat in their discussions, I can only speculate. It’s perfectly clear that 20 nanograms is not even adequate for osteomalacia. They have in front of them evidence to the effect that between 20 and 30 nanograms per milliliter, bone biopsies show an excess osteoid seam or excess osteoid volume, which is abnormal and is one of the signs of vitamin D deficiency; whereas above 32 nanograms per milliliter, not a single biopsy, not a single specimen showed any abnormality with respect to unmineralized osteoid in the bone.

However, there are no clinical symptoms of vitamin D deficiency that were recognized at least in the range between 20 nanograms and 32 nanograms per milliliter. The Institute of Medicine said, “Well, there is a little bit of excess osteoid there but we can tolerate that. We can tolerate that.” Can you imagine they are saying that? I mean, it was not the people around the table who were tolerating it. They were saying, “We, as a people, can tolerate some of our population having excess osteoid in the bone if we were to have subjected them to a biopsy.” I find that just amazing. It’s kind of an arrogance, if you will. I think it’s disreputable.

DM: Yeah. It is relatively shocking because we are talking about, as you mentioned earlier, a very safe, relatively non-toxic (I mean, extraordinarily almost industrial accidents would have to occur before you got some toxicity from vitamin D), and extraordinarily inexpensive. Essentially, if you’re in the right environment, which most of us don’t have access to, it’s free. Just go outside and get some sun on your skin.

RH: Sure.

DM: Obviously, there are no large sums of money to be made here. But is it just as resistance to inertia or to change? Is that more of an issue, or is it they don’t want to admit they were wrong?

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RH: Again, I can only speculate. I think that’s out of place basically.

DM: Okay.

RH: I’m sure they got it wrong, but I can’t tell you precisely why they settled so strongly on just 20.
DM: We see it in many of these recommendations. It’s a common strategy that many large multinational corporations use: to target the members of these boards that make these recommendations with people that they funded with hundreds of thousands of dollars in research funding or personal funding that they’ve sent them. Of course, they’re going to come up with recommendations that are favorable. But there doesn’t seem to be any collusion like that here because there’s nothing to benefit from unless… That typically is a common strategy. I think they call them “key influence leaders” or “key opinion leaders” (KOL).

RH: No, I’m not aware of any opportunity for financial collusion in a situation of this sort. As you say, is cheap, it’s safe, and it can’t be patented. I mean, that’s three strikes on a product basically.

DM: Yeah.

RH: They’re probably not go anywhere with that kind of a background. That’s one of the reasons why GrassrootsHealth is so concerned to take this to the public. The ability to change the establishment is, I think, pretty limited.

DM: Yes, indeed. That’s fortunate.

We have many new sources that people can obtain information from rather than the conventional media, which is controlled really for the most part by these key opinion leaders. I’m wondering, have your findings been published in journals at this point and what you’re seeking to do to change the opinions of some of the thought leaders in this area.

RH: Yes, the studies that I’ve described have been published within the past months in the journal, Nutrients. It’s available online and it’s open access so anyone of your audience can go and get it.

DM: We’ll definitely put a link to that in the article.

RH: The data figure in there shows where all the data points exactly are, and you could count yourself how high you have to get in terms of intake in order to get 97 and a half percent above 20 nanograms per milliliter. It doesn’t take rocket science calculation in order to do this. It’s just a matter of counting. But these are real people.

And then in the past couple of weeks, there’s an interesting paper from the Netherlands, which used, in fact, 800 international units per day in people who were demonstrably vitamin D deficient. They measured the response, and it was something like half of them never got up to 20. I mean, here is a controlled trial basically providing exactly what the Institute of Medicine said for people over age 70, and yet it didn’t work. It didn’t produce the result the Institute of Medicine had said. The reason it didn’t, of course, is it doesn’t. The Institute of Medicine had calculated it wrong. I cannot stress that too strongly. They made a mathematical error.

DM: Now, there are physiological variables that occur in aging that would require one to increase the dose. We know that’s the case for sun exposure. As you age, you have a general tendency to convert less of UVB to vitamin D. But does that occur equally in people who swallow oral vitamin D?

RH: Well, I’d like to think about it, not in terms of the oral dose, but in terms of the achieved level, because that’s what the cells see.

DM: Right.

RH: And the difference between people is huge. I can give the same dose to 50 people, and some of them will get a four- or five-fold increase and others will only get a four or five percent increase. They’ve gotten the same dose because I watched them swallow it. People just respond very differently. What the focus has to be is not on “How much am I taking?” but “How high did my 25-hydroxy D level get?” And
if it didn’t get up to where you want it to be…I want mine to be above 40 nanograms per milliliter. If it didn’t get above that, then I have to take more. It’s just that simple. I’m not going to get intoxicated or poisoned if I don’t get it up to the level that is therapeutic for me.

**DM:** That’s right.

**RH:** I mean, it’s not going to hurt me in anyway at all. I would have to be well above 200 nanograms per milliliter before there’s any risk of toxicity, and the risk even then is low. There is no risk of toxicity below 200 nanograms per milliliter.

**DM:** Wow, that’s a really important point. When did that information become available? I’ve not heard of that before. 200 nanograms is the threshold for toxicity.

**RH:** There’s an interesting paper published in the *American Journal of Clinical Nutrition* in 2007 (that’s eight years ago), describing toxicity for vitamin D using the Institute of Medicine’s approach to the identification of the hazard and the evaluation of the literature with respect to what you had to take in order to succumb to that hazard. The senior author is Dr. John Hathcock in 2007 in the *American Journal of Clinical Nutrition*. I could be a little bit wrong on the date there but I think that’s it. You can find it. It’s vitamin D toxicity.

**DM:** Sure.

**RH:** And there isn’t anything below 200 nanograms per milliliter.

**DM:** Wow.

**RH:** I bet that there’s no reason to get up there.

**DM:** Sure.

**RH:** The problem is, for some people, it’s hard to get even close.

**DM:** So 200 nanograms would be toxic level and 40 nanograms per milliliter on the bottom of the therapeutic level. Do you think there’s any additional benefit to get closer to the 50, 60, or 70 if you have some clinical condition, which might warrant it like a malignancy, or do you think it’s just a threshold of 40 or 50?

**RH:** If you’re using this as a pharmacologic treatment for a medical disorder…

**DM:** Yes, that’s the question more precisely.

**RH:** Not nutritional support of a healthy population.

**DM:** Okay.

**RH:** If you’re using it as a pharmacologic treatment for a medical disorder, that has to be under the control of a physician and the sky is the limit there. So long as he or she knows what he or she is doing, there will be no problem.

The important thing is that the policy that comes out of the Institute of Medicine and that gets reflected in the meals for seniors, military, school lunches, and WIC, those policies are for the general healthy population. There’s no reason to get even close 200 nanograms per milliliter. But there ought to be enough vitamin D in those meals or in however we get it – sun exposure, supplements, or meals – to get above 40 nanograms per milliliter. That should be the target.
DM: Okay. The research that GrassrootsHealth came up with showed that about 8,000 units per day would be enough for the majority of the population to get a therapeutic level. What level would that take the average person to?

RH: The average didn’t go up as fast as you might think. You go up with your intake, you begin to bring that low tail up, but the average D correctly up, let’s say, 40 nanograms per milliliter.

DM: Okay.

RH: It’s only about, say… Gee, I don’t have the graphs in front of me, Joe. But it’s probably only about 140 or 150 nanograms per milliliter up at 8,000 international units per day. It’s not all that high.

DM: Okay.

RH: I can check on that for you.

DM: I’m just curious.

RH: The reason for that is that the liver has to do the 25-hydroxylation to produce 25-hydroxy D from the vitamin D that comes to us through supplements, the skin, or food. The liver’s capacity to make 25-hydroxy D is limited. That is one of the reasons why some people don’t respond very well. It takes a huge dose. You have to really push that reaction. That’s one of the reasons why we have very substantial safety, because most people just can’t make a lot of 25-hydroxy D so they won’t get really high levels.

DM: Sure. Now, I’m wondering, as as we know, two-thirds of our country is overweight, one-third are obese, and a large percentage of the population consumes large amounts of fructose – 75 grams a day or more – which can be responsible for this almost an epidemic of non-alcoholic fatty liver disease. I’m wondering if those types of liver disorders would contribute to the impairment of the liver’s ability to produce 25-hydroxy D.

RH: It’s generally considered that that’s the case. I don’t have the data myself that will allow me to evaluate that. But I can tell you that’s usually considered to be the case. And in well-established situations with fatty liver, there is substantial deterioration in the ability to make 25-hydroxy vitamin D. How much that extends down into people who are asymptomatic who may have some degree of fatty degeneration that couldn’t [inaudible 29:52], I just don’t know.

DM: Okay.

RH: I just don’t know.

DM: But if people have excess fat or visceral fat stores, does that create a storage depot for the oral vitamin D to start to sink into, which actually increases your requirements because you have to reach an equilibrium before it starts to seep out and go into the bloodstream?

[----- 30:00 -----]

RH: No. As a matter of fact, it doesn’t. I’m glad you asked that question because that’s a chance to clear up a common misconception. For the ordinary person in your audience, the vitamin D he or she takes in today gets 25-hydroxylated so rapidly that there’s no vitamin D left over to store in fat.

DM: Wow.

RH: The only time you begin to store vitamin D in fat is when you’ve saturated your liver’s ability to make 25-hydroxy D. And then vitamin D itself backs up in the blood because it can’t be 25-hydroxylated
quantitatively. When it begins to rise in the blood, it diffuses into fat where it’s very comfortable and stays there. But that doesn’t happen at doses of less than, say, 50,000 international units per week, which is not very much fat storage.

**DM:** Okay. That’s interesting to know. Thank you for clearing that misconception. I appreciate it.

**RH:** I mean, it is a fat-soluble vitamin. There’s no doubt about that. Back in the 1930s when we’re using vitamin D in doses of millions of international units per day, yes, indeed, we got a lot of that stuff stored in fat and it stayed there a long time. Sometimes it would take eight, nine, or 10 months to clear the vitamin D toxicity of some of these patients. Thank goodness, it was possible. But there’s no reason to use those kinds of excessive doses, and I surely don’t recommend it. It’s important to understand there’s a wide margin of safety in the range we’re talking about here.

**DM:** Okay, good. The Institute of Medicine’s recommendation came about five years ago or so. I’m wondering, with your research and the research of others, if you’re seeing a significant shift in the perception of practicing physicians in their appreciation of that mistake and actually the need for far more than 600 to 800 units of vitamin D a day.

**RH:** My experience with physicians is once they have two or three patients who respond to a good dose of vitamin D, they are believers. I’m less worried about the individual physician. It doesn’t happen in everybody. I mean, everybody gets improvement, but not all of the improvement is dramatic enough to capture the physician’s attention. But there are enough cases that do where physicians get onboard relatively easily. The problem is the bureaucracy doesn’t change.

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**DM:** Yeah.

**RH:** I’ll give you one example that you probably are familiar with. That is the fortification of cereal grain product with folic acid, which was mandated in 1998, if you may recall correctly. Why did that happen? Because the science was compelling? No. The science has been compelling for a long time. The Food and Drug Administration simply drove its feet and stonewalled the situation. Why did it change? It was because after much negotiations, back and forth, back and forth for months, the president of the March of Dimes considered the question of birth defects, the principal birth defect associated folic acid deficiency: spina bifida and neural tube disorder problems. The president of the March of Dimes called the commissioner of the FDA and said, “I’m going to have a thousand wheelchair patients outside the Parklawn Building on Monday morning with the media, unless you give me ironclad assurance you’re going to act on this recommendation to mandate folate fortification.” It was politics that made the change; it wasn’t science.

**DM:** Interesting.

**RH:** The science was compelling here, but that doesn’t move bureaucrats.

**DM:** Do you think we can learn a lesson from that experience and threaten a similar arrangement of crippled individuals or damaged individuals who lack vitamin D as a result of these government policies?

**RH:** Joe, I’m an optimist, so yes, I think we could learn from our experience. We don’t have a very good track record doing that, but we should. Go ahead. If we put ourselves to it.

**DM:** All right. Well, that certainly is a thought, for those who are creative among us, to catalyze some action and see if we can get some changes possibly. Because you’re right, it’s not so much individuals, it’s not so much the physicians; it’s those who are really disenfranchised who don’t have the opportunity
to really go out and do the analysis, but they’re really incumbent upon government policy to receive their nutrients, which is seriously flawed in this case.

RH: Yup.

DM: Well, it’s a great thing you’ve been doing as a research director for GrassrootsHealth, getting this information out, creating more data points, and really providing some sound science to support these recommendations and really benefitting so many people.

RH: It’s a pleasure to have the opportunity to do it. It’s a unique resource and it’s a unique project.

DM: It’s a crowd-funded research.

RH: Yup.

DM: Which is new. It’s a 21st century innovation.

RH: Right.

DM: It wouldn’t exist without the Internet thankfully.

RH: You’re exactly right. It’s a Web-based effort.

DM: Yes, indeed. Do you have any other comments you’d like to make in words to wrap things up or recommendations?

RH: No, but for those who are listening to this presentation and who may have a better idea of how to change bureaucracy than I do, I would encourage you to get active.

DM: All right. Well, that’s some solid advice. Also, personally, of course, if you’re not already, take some action for yourself because you don’t have to be bound by the IOM’s mistakes, miscalculations, and flawed recommendations. You can take 8,000 units. It’s not only for yourself but for your family members.

You can start to take control of yourself. Start controlling epigenetically the several thousand genes that vitamin D is responsible for influencing and vastly decrease your risk for heart disease, cancer, osteoporosis, osteomalacia, and rickets – you name it. Vitamin D is just a profoundly important nutrient that has massive benefits for you and your family.

RH: Particularly with vitamin D, keeping it in adequate doses in the first year of life. It’s never too late to start, but it’s never too early to start as well. It’s now becoming increasingly clear that there are midlife and late-life consequences of infancy vitamin D deficiency, and it is heartbreaking to see us ignoring this relationship. We need adequate vitamin D status in infants at a time when they are sorting out the immune system and distinguishing between self and non-self. If they don’t get that right, they are subject to the various immune disorders, autoimmune disorders from type 1 diabetes to multiple sclerosis.

DM: And rheumatoid arthritis.

RH: Just now, it’s recently been shown that women in their child-bearing years are more prone to preeclampsia, not with their vitamin D status now but with whether they got vitamin D in the first year of their own lives.

DM: That’s right.
RH: That is mind-shattering to realize that early life behavior as these long tails with consequences later in life that are dreadful and expensive.

DM: I couldn’t agree more. As a reflex now, when I find or know of anyone personally who is pregnant, I encourage her that the most important thing you can do is to make sure you get your vitamin D levels checked and to make sure you’re taking it because your baby needs it before they’re born.

RH: Absolutely.

DM: Yeah. It’s just huge. It’s just one of the most important things they can do. I can remember my sister who had preeclampsia multiple times. That was back 20 years ago or so. We thought it was related to magnesium deficiency. We gave her intravenous magnesium, and that didn’t seem to do the trick. We didn’t know at that time it was related to vitamin D.

RH: All of these are multifactorial disorders, and vitamin D is not the only factor for these. But it’s something we can control. We do understand it so that we have to fix.

DM: Yeah.

RH: That won’t solve all of these vitamins.

DM: No.

RH: It’ll just reduce some of them.

DM: Yeah.

RH: That’s worth doing.

DM: Cheaply, inexpensively, and safely. Thank you so much for all that you’re doing. I really appreciate it and all your fine work.

RH: It’s my pleasure.

[END]