



**Webcast Transcript**  
**Making the Most of Your Life with MS in 2016 and Beyond**  
**December 15, 2015**

**Webcast Moderator:** Kate Milliken

**Panelists:**

- **Dr. Gavin Giovannoni**, Professor of Neurology, Blizard Institute, Barts and The London SMD
- **Dr. Rob Motl**, Professor, Dept. of Kinesiology and Community Health, Univ. of Illinois
- **Dr. Nancy L. Sicotte**, Professor and Vice Chair, Department of Neurology, Cedars-Sinai Medical Center
- **Dr. Tim Coetzee**, Chief Advocacy, Services and Research Officer at the National Multiple Sclerosis Society

**Presentation**

**Kate Milliken:** Hello, and thank you for joining the National MS Society's Live Webcast titled, "Making the Most of Your Life with MS in 2016 and Beyond." I'm Kate Milliken, your moderator, and I've been living with MS since 2006.

When living with MS, the pursuit of your best life can involve a wide variety of aspects from emotional, spiritual and social well being to more tangible holistic methodologies. In my experience, the complimentary side of my treatment has been game changing in terms of feeling better.

Today, we're talking to a panel of experts in different fields of MS and we'll be discussing ways people living with MS can achieve their best lives by controlling troubling symptoms by following wellness strategies and by addressing cognitive challenges.

We'll also talk about the promising research and different kinds of MS therapies that are on the horizon. Throughout our live webcast, our panelists will address questions received in advance, as well as those received in real-time during the webcast itself.

Check your webcast screen now for information on how to ask questions during the panel discussion. We'll cover as many questions as we can; however, please note that we cannot answer individual medical questions.

Let's begin by introducing today's panelists. First, we have Dr. Gavin Giovannoni. Gavin is based in London where he is Professor of Neurology at the Blizard Institute of Cell and Molecular Science at Bart's in the London School of Medicine.

Gavin's research focuses on MS and other inflammatory disorders of the central nervous system. He's particularly interested in clinical issues related to optimizing MS disease-modifying therapies. Thank you for being here, Gavin.

Next, we have Dr. Nancy Sicotte. Nancy is director of MS Program, Professor and Vice-Chair in the Department of Neurology at Cedars-Sinai in Los Angeles. Her current research focuses on structural and functional imaging of disease progression in MS, and cognitive impairment and depression in MS

Thank you for being with us.

**Dr. Sicotte:** Happy to be here.

**Kate Milliken:** Thank you. We also have with us Dr. Robert Motl. Rob is a professor at the University of Illinois Urbana-Champaign in the Department of Kinesiology and Community Health.

Rob started out researching high-end exercise physiology, working almost exclusively with the elite athletes, but found a connection between his studies and research in MS. His work focuses on the causes and effects of physical activity in people living with MS, and he hopes to establish scientific evidence that exercise can serve as a physiologically relevant form of rehabilitation for stopping, slowing, or even reversing the effects of MS. Thanks for joining us, Rob.

**Dr. Motl:** Thank you, Kate.

**Kate Milliken:** Last, but not least, we have Dr. Timothy Coetzee. Tim is the Chief Advocacy Services and Research Officer at the National MS Society, and he leads the society's global investment in MS research. He is responsible for a diverse portfolio of research initiatives and recently spearheaded an effort to establish a global collaboration focused on research in progressive MS. It's great to have you back again, Tim. I love it.

**Dr. Coetzee:** Great to be with you, Kate.

**Kate Milliken:** So I'm going to start with kind of a high-level kind of kick-off here. I feel like in the world of MS there's been a real focus in clinical and disease modifying therapies and there's been a growing shift of kind of a more holistic approach.

So I would love for you, Tim, just from your perspective to give kind of an overview of how that shift is happening and how it's going into research.

**Dr. Coetzee:** Sure. No, it's a great question and I think an important topic for us to discuss, because you're right – the way we approach MS today is much different than it was 20 years ago where we only had one disease modifying therapy, and now, you've got 13 disease modifying therapies, several that are there for symptom management. What's happening though, now, is when we think about MS, it's more than just whether or not there's a drug treatment available, but it's how you live, what are the strategies you engage in to manage your life if you're living with the disease?

And so, as we'll hear from Rob about how exercise is giving us new insights as to how we live or what Nancy will share with us about the impact on depression and Gavin's work in the area also of lifestyle and managing other aspects of the disease.

Really, it's the totality of how we live and how we move through life, and I think individuals are starting to see, OK: there are these treatment options, but then what do I do? What are the things that I can do as an individual that allow me...

**Kate Milliken:** And what can you do now...

**Dr. Coetzee:** ...and what can you do now. And I think there are lots of areas where there are things we can do now, there are other areas where we need to just do more research to be able to understand well, what are the best strategies for an individual at a point in time where they are with their disease.

**Kate Milliken:** So before we talk about kind of the immediate things and what people can do on their own, let's kick into one thing that's been a really, really big deal, a really hot topic: stem cell transplants and the research that's going with that. That's something you can't do by yourself.

So give me an overview, Tim, of where we are with that.

**Dr. Coetzee:** Sure. Go for the easy stuff, right? So I think, you know, stem cells are an important topic for our community and it's important to also be clear about what we're talking about with different types of stem cells.

And so, oftentimes people hear about hematopoietic stem cell transplantation - that's where cells are taken out of the bone marrow and really reintroduced back in so that an individual's immune system can be reset.

Then there's also what we call mesenchymal stem cells, which are stem cells found in various parts of the body like fat and other places where they're, again, taken out, manipulated and put back in. There's a lot of interest in the research community about well, which are the right stem cells to use and which place for -- which person. There is, I think, a growing sense that hematopoietic stem cell transplant, or HSCT, is an area that we've got to really -- has great potential in that clinical trials are needed in that area.

We have more work to do around treatments like mesenchymal stem cells, as well as embryonic stem cells or, you know, induced pluripotent stem cells, iPSC, which people might hear about, and not so much that they're not -- there isn't a possibility within them. In fact, there's a clinical trial being done here in New York City. There's one that was done at the Cleveland Clinic looking at mesenchymal stem cells as a treatment for MS, but what we need to figure out is which stem cell is right for which person, and when? Are we doing it for immune modification versus nerve repair and other areas?

So I think, when we think about this, I'd say there's a lot of research questions that we still need to have answers for, and individuals need to really think about that before perhaps embarking on a stem cell therapy strategy. I think this is part of where I know our doctors can provide perspective on that.

**Kate Milliken:** Yes, and I'm curious, some of the clinicians are at the table, how much stem cells come up with your patients? Nancy, want to start with that?

**Dr. Sicotte:** Well, I'd say it's usually a question I get in every office visit when people ask about research that's happening. There's a lot of interest in stem cells and I think

there's a lot of promise in that area, but I think we also need to be careful that we don't get ahead of where the science is.

And there's potential risks associated with especially embryonic stem cell transplants, which sometimes people are getting quite frankly in places where it's not regulated and, you know, there are safety concerns.

I think the best way for people to be involved in these kinds of projects is through funded research, where we have the data that's being collected that can be used to better understand these. So, I do think there's potential, but we need to proceed in the usual careful manner and I'm sure Gavin has some other...

**Kate Milliken:** Yes, Gavin, want to add to that?

**Dr. Giovannoni:** Yes, I think people must be very careful before going forward with any stem cell therapy. We try and encourage our patients to go to trials. Better trials that are being run by an ethics committee or steering committee.

We know that there is serious oversight in the peer review and, you know, typically you don't have to pay for those types of trials. You know, the costs of paying into them are paid for by who is doing the study rather than going to some health tourism thing overseas or abroad where you're paying large sums of money, you're not sure of the quality in what you're getting.

And so that's why I warn people against health tourism.

**Kate Milliken:** Well, I think it's hard because as a patient, you hear these incredible stories of great results, and there are some -- there are results that are true, that are positive, but conversely it's important to keep it safe.

**Dr. Coetzee:** And I'll add to that, Kate. I think that, you know, if individuals are thinking about taking a trip, we have resources on our website - at the National MS Society website, as well as, on the website of the MS International Federation and others, where there are questions that you should ask because there are important considerations an individual needs to think about when embarking on this.

And so we'd encourage an individual to have a conversation with your family, your doctor, visit resources, understand and be clear about the choices that one is making. Because even though there's great promise, there are unanswered questions and it's really important to take that into account as one is thinking about this topic.

**Kate Milliken:** Because it can be very dangerous.

**Dr. Coetzee:** It can be.

**Kate Milliken:** So in the spirit of the new paradigm, let's talk about your work, Gavin, in the world of disease modifying therapies.

**Dr. Giovannoni:** I think gone are the days where you started some of the new treatments and you left them on a treatment and hope that they did well in the long-term. Now that we have so many different drugs and some of them are very effective, we now can actually almost shut down the disease activity completely.

So the paradigm shift essentially -- our treatment paradigm now is we're now treating to a target and we've adopted this from the rheumatology of it, rheumatologists treating with their arthritis. We try and treat people more aggressively, more effectively, to try to switch off all inflammation, and the whole idea there is to try and protect the brain, maximize brain health.

And what protects us from aging is the size of our brain, and we know that the brain is shrinking much more quickly in MS, and the most effective treatment strategies now are slowing their process, almost normalizing it.

So the question is can we normalize or optimize brain health to allow people with multiple sclerosis to age healthily. And that also not only brings in the disease modifying therapy, it also brings in all the other issues that go around optimizing brain health. Because outside of the MS space, particularly in the Alzheimer's field and the general population we now know about a lot of things about certain comorbidities of the diseases, smoking, high blood pressure, high cholesterol, bad diet, poor sleep. All these aspects have to be optimized.

So it's not really just about disease modifying therapy. It's likely a holistic approach, and whose responsibility is it to look after the MS brain? Is it the neurologist? Is it the individual with the disease? Is it the family doctor? And in my personal opinion, it has to be the individual, the person with the disease has to take control and empower themselves to do that, and that may mean shopping around because this particular holistic approach is not practiced very widely.

**Kate Milliken:** Shopping around in the case of, let's say, finding a neurologist, who will actually continue to measure you instead of just saying, here's a therapy, good luck, hope it works out?

**Dr. Giovannoni:** Yes. So the old paradigm would be start slowly and then observe and wait and maybe escalate later on. Nowadays, if you put somebody on a treatment, you've got to monitor them, and if they're not responding within a short period of time you've got to escalate them to more effective therapies. Or, if somebody's got a very bad prognostic profile, if they look like they're not going to do very well, you may want to flip the program and offer them the most effective therapies for a [while].

So it's really a personalized health approach, but it's much more active. Gone are the days of being passive about this. You have to be active. And I like to remind people that “time is brain,” and the more you wait – and the more you wait, and the more you wait – the more you're losing brain and that's the concept in this common quest. You have to be proactive. There has to be a very aggressive management strategy and it has to falter across all aspects of brain health, not just disease modifying treatments.

**Kate Milliken:** So patients now have -- or should have -- the belief that they can find a doctor who will not only follow them over time, but will also think in terms of their overall wellness and life happiness.

So Nancy, how would you define wellness?

**Dr. Sicotte:** So -- well, that's a great question, and I think why we're here today, and I think a lot of people have different views perhaps. But what I think of wellness is activities and behaviors that really help to enhance quality of life.

And I think that we've found, and there's evidence as Gavin was suggesting from Alzheimer's disease, for example, that all of these approaches are actually benefitting brain health. And I think we can take those insights and use them as we're talking to our patients about these strategies that are not only enhancing their life, but actually improving their outcomes related to their MS.

So things like eating a good diet, stopping smoking, getting sufficient sleep – there's a lot of evidence that that's very important – stress reduction. With all of these things there's data to suggest that it's actually decreasing disease activity and improving disease outcomes.

**Kate Milliken:** It's tied. There's a correlation between the two of them.

**Dr. Sicotte:** Right. So it's not just that you want to overall feel good, but it also is helping your long-term outcomes as well. So it's a win-win, I think.

**Kate Milliken:** One of the symptoms that you've done a deep dive on is MS and depression, and I would love -- you know, you have a biological perspective on it, so can you tell everyone more about that?

**Dr. Sicotte:** Yes. So what we know is that depression is really common in people who have multiple sclerosis. It's much more common than in other disabling neurologic conditions. There's something we think about MS in particular that predisposes people to have depression, and we've been looking at brain changes that we think may be part of that answer.

But I think it's really important for patients to recognize that this is a symptom of the disease. I think for a long time there's been a stigma about mental illness and the -- and the thought that well, I have neurologic problems and that's what my MS is. But we think of depression now, and we really want patients to recognize that this is a symptom of the disease, and it's a treatable symptom and it can impact their quality of life, their cognitive function, their overall well-being.

And so it's something to bring up with your neurologist, to recognize and to get treatment for.

**Kate Milliken:** You told me a story when we were together before this broadcast of a woman that you had been treating for years, who you had no idea for over 10 years that she had been dealing with depression, and how did that change?

**Dr. Sicotte:** So I think this is what happens if you're not asking your patients about their mood, they won't necessarily reveal that to you because they think of it as a separate compartment. They think that this is a different part of their disease and that there's some personal failing or something, that's why they're having these mood changes.

So bringing that out into the open not only helps the patients feel better about themselves, but also get the needed treatment that they have.

**Kate Milliken:** Awareness is the first step to recovery, right?

**Dr. Sicotte:** Exactly.

**Kate Milliken:** Rob, let's talk about your contribution to this table: exercise. So how does physical activity and exercise impact MS from what you've learned?



**Dr. Motl:** Yes. So that's a great question. I think more and more we're understanding that exercise can affect everything from cellular level processes to societal level variables. And so what I mean by that is that exercise has been shown to change around the way the immune system is functioning. It's been shown to change how nerve growth factors are regulated. It's been shown to improve brain health.

So one of the things that Gavin was talking about, there's a large body of evidence that suggests that exercise can improve the structure and function of the brain. In people with MS, we know that exercise can improve depression, it can improve fatigue, but it also can improve quality of life in the ability of an individual to participate in everyday life, which is at the end of the day what health and wellness is really all about.

**Kate Milliken:** With some of your work, I know that you're bringing people in and you're asking them to have their own goals, right?

So certainly there are athletes who have goals, like, 'I want to make a sports team, I want to hit the Olympics,' right? And one of the things that I think is interesting about your work that I think's worth people realizing at home is that if there's a life goal that has to do with your life – of trying to attain it and trying to build up to that. So do you want to give a case study example?

**Dr. Motl:** Yes. So it is important that when people come to the lab they have to have something meaningful that they're shooting for from the exercise perspective. And so we had a participant in one of our studies who, when we were first interviewing her we asked her, "What are you here for" and she told us, "Well, my son's getting married in six months and I want to be able to walk down the aisle with him."

And so we got her involved in this exercise program and at the end of the exercise program, not only did she walk him down the aisle or walk down the aisle with him, but she also did the first dance with him. And when she came back and told us this, the entire lab was in tears and that really is an example of a real world consequence. But it's also the reason why we do research - is to be able to have that profound of an impact on people, and that's what the whole health and wellness mission is all about.

**Kate Milliken:** Does anyone want to kind of just do a comment about -- you go for it.

**Dr. Giovannoni:** Well, I want to come back to the wellness because, I mean, most of the comments have been about the individual, but we are a social species so we interact with the wider society. So, at a philosophical level, wellness is not just about the individual. It's how they interact with society.

There's a thing called social capital. It's essentially how many people you know in terms of family and friends, and we know that people with chronic disease, particularly depressed people, their social capital just shrinks.

So part of wellness is actually keeping that social network going. It's keeping those interactions going. And it's also about how we interact with the environment and that's hot news at the moment with global warming and everything.

But I think people that actually seriously consider how they interact with society and the environment have a bit of a different worldview, and they tend to be more well than in people who don't do it.

So I would encourage the viewers to think about how they interact with society and environment when they start thinking about their own wellness and they'll feel a lot better for it.

**Dr. Sicotte:** Well, Gavin, I think that's a really good point that socializing and being involved in social activities is really good for brain health. And there's some of these things that people tend to isolate themselves, for example, when they have MS or they have a disabling disease, and I think that's one of the reasons why the resources of the National MS Society are so important - to allow people to feel that they're not alone, to be engaged, to continue these relationships to build them because ultimately that is associated with better brain health.

**Kate Milliken:** I think with the whole idea of just emotional relatability of people who are going through the same thing is one thing that's hugely helpful, but this seems to be the age of the patient being, like, I am my own patient advocate.

And what's awesome is I feel like doctors in the clinical world are embracing that. So, you guys would know better than me, but I certainly feel like neurologists seemed a lot more official and clinical, and not willing to hear a different perspective in the past compared to now.

**Dr. Coetzee:** Well, I think you've raised an important part of this conversation, which is about how does a person living with MS and their care partner have a conversation with their physician about it. Because one of the challenges we face on some of this – why we have a health and wellness initiative – is that for some of these, the evidence is hard to say. Is there enough evidence, as you would say for a classic clinical trial for a drug treatment, for example.

You know, we are still in the early signs of showing exercise is beneficial, but, do we have all the evidence we want for a doctor to say, 'yes, I'm prescribing you to go get exercise for this.' Or it can sometimes create a barrier between the person living with the disease and their doctor if their doctor says, you know, there's just no evidence that a diet makes any difference, but feel free to try it.

That can really be a challenging thing for a person with MS to hear because, I'm trying this and my doctor's saying, eh, whatever works.

**Kate Milliken:** That's what the doctors say.

**Dr. Coetzee:** Well, not quite that way, but I will say this: there's also a shift in that. And so the community is seeing that our patients are coming with this, so there's a real attention to it. I think it's important just to have open conversation around this and to challenge.

**Dr. Sicotte:** Well, I don't want to be too defensive being a neurologist, but I will say that -- and again, going back to the brain health idea that all these things we're talking about are actually really good for your heart, they're good for your blood vessels, and ultimately those things are going to be good for your brain as well.

**Dr. Coetzee:** Exactly. Exactly.

**Dr. Sicotte:** So being in good shape and getting enough rest, and doing all these things, it's just common sense that you want to take care of your body, and I hope that other neurologists are including that in their appointments.

**Dr. Coetzee:** But it's part of the conversation. I think this is what we encourage -- encourage the people to have the conversation, get started, and everybody needs to be at this table.

And that's what's also remarkable about where we are in MS is that here, the conversation isn't about just this suite of drug treatments, but it's really about all this other stuff that goes with it, and at least the way I describe it, this is a place where people can take a step and they can own and they can take ownership of this aspect.

**Kate Milliken:** Gavin?

**Dr. Giovannoni:** So one of the things -- particularly when we talk about the brain health initiative is a lot of -- the majority of the things apart from the MS specifically, the disease modifying treatments, are things that the general population should be doing.

So the -- have you ever met -- have you ever seen an unhealthy neurologist at all?

**Kate Milliken:** Have I ever seen a health neurologist?

**Dr. Giovannoni:** An unhealthy neurologist?

**Kate Milliken:** No, I have not.

**Dr. Giovannoni:** So generally, the average neurologist is not a very healthy specimen. So, you know, it's very difficult...

**Dr. Sicotte:** (laughter) Present company excluded...

**Dr. Giovannoni:** So it's very difficult for a neurologist to say to your patients, 'stop smoking' if they're smoking, or 'lose weight' if they're obese, or 'exercise' if they don't exercise. So this really -- this probably launched this thing called the brain health challenges for the patients themselves. I don't like using that term. I prefer using the term MS'er.

For the MS'er themselves, to challenge their health care professional to join them because it'll benefit society. So it's about using the knowledge you've acquired as a change agent to say 'why don't you do it as well and why don't you change your behavior?' And we'll all do it together and make it a little bit competitive, and I think we nudge, we change behavior.

If you don't make it competitive, lifestyle interventions are notoriously difficult to maintain. I'm sure most people watching this have tried things and it's lasted a few months and has failed, and so how do you make a lot -- so this is why it needs a much broader society to change.

And I shouldn't say, but there are certain countries in the world that are number one and number two and number three of bad lifestyle. I live in the U.K., and I think we're number two in the world.

**Dr. Sicotte:** And number one?

**Dr. Giovannoni:** Let's not say that.

**All:** (laughter)

**Dr. Coetzee:** There's another important side of this, picking up on what Gavin and Nancy have said, and it's something that we're working on. And that is trying to train the neurologists and the health care providers in what they need to know to help empower the patient. Because we've been doing research with the MS patients and asking them what they need in the context of the health care system to engage in physical activity, to engage in exercise, and they basically come to us and say we need our neurologist to help us out.

**Kate Milliken:** Right.

**Dr. Coetzee:** And the second is the research, is we've been talking to the neurologists and saying, 'Are you prepared?' And they've unequivocally said, 'No, we're not prepared to do this. We don't have the training. We don't have the background. We don't have the resources.'

So we really have to work on building the system from both sides.

**Kate Milliken:** Well, here's an example: as someone living with MS, if you go in for your yearly or your six-month MRI, and a neurologist comes in and they say, 'well, we looked at your MRI and it's stable.' Great. Versus (excitement) 'so we looked at your MRI and it's stable!' Right? Is there a difference in a mindset of somebody believing that the neurologist is forward?

And I recognize there is a fine line. You can't have a neurologist say, 'you're going to take 148 supplements? Do it!' You know? That's not right, right?

**Dr. Coetzee:** Right.

**Kate Milliken:** And there's an understandable why -- that you want to be clinically based and you want to know what's going on. You want to make sure nobody gets hurt. But I think that line is beginning -- everybody's aware of the issue, right?

**Dr. Motl:** Absolutely.

**Kate Milliken:** At least at this table?

**Dr. Coetzee:** And that's some of the work we're doing as our wellness initiative because I think part of the conversation is so let's think about your visit insight and the work that Nancy and Gavin have to do is that you're seeing a patient and you have only a certain amount of time and there's, like, 50 things you've got to get through. And where does the wellness conversation fit in that?

And being able to give resources to everybody so that they can actually have that conversation quickly and effectively, and then say, 'OK, here's someplace you should go.' It's all part of the change, but I'm so glad we're having the conversation. Gavin?

**Dr. Giovannoni:** So that's why we're going to change -- what you just said: you've only got this length of time and you've got to squeeze it in. That's what the problem is, is that our current health care system in the way it's configured is wrong. It's a bygone era, it's Victorian. This idea of having a 15-minute slot as the follow-up and getting everything in is ridiculous.

So what we're trying to do is trialing this thing called group clinics, which have been in the psychiatry field for 50 years. Instead of seeing one patient, you see six or seven at a time, and you spend three hours with six or seven. And that's so much more valuable for those six or seven because they're interacting with each other. And they're on exercise therapy - that's kind of the ideal environment rather than a one-to-one, you know, one-to-many.

Maybe you can even bring an exercise physiologist, you know, or a physio and you can deal with -- so I think we need to rethink the way we deliver health care, and the current paradigm is wrong.

**Kate Milliken:** Tim, what are some of the ways that the Society is kicking out a wellness initiative?

**Dr. Coetzee:** Sure. So part of it is with research. So Rob and Nancy and others who have been part of our efforts to bring the research community together to say, 'who are the people working in this and how do we network them?' A lot of times they work in isolation from each other and now, we're saying, let's get it all -- let's get them all together.

We're also engaged in creating programs, so we're partnering with Can Do MS as well as other groups to try to create a -- you know, a wellness platform where individuals participate in programs. There's a program we call, Everyday Matters, which is a sort of positive psychology program that, you know, individuals have an either telephone or in-person multi-week engagement and we've done this in the past and we know it works.

And so those are some of the programs we're doing now, and then we'll also be putting a lot of information online through our digital platforms so that people can see the resources, what are the things they can engage in. And part of what we want to see is --

as we fund research – can some of the research we invest in help us build new programs that say, OK, exercise plus positive psychology works.

Well, what does that look like and how do we engage more than just the person with MS, but the family or the care partner and people around them, because, as Gavin said, sticking with a program, if you're doing it on your own can really be challenging, but, you know, who do we need around you in order to be successful?

So those are some of the things we'll be rolling out in the coming year.

**Kate Milliken:** So we have actually already received a bunch of questions and we're going to just dive right into them. So actually, Rob, this first one is for you. What are the best exercises to gain back strength and balance in your legs?

**Dr. Motl:** Well, that's a good question. I think the first thing to think about is figuring out where the weakness is in your legs. Is it isolated to activation of the entire musculature in the legs or is it specific musculature, and then trying to make sure you engage in resistance training as a way of strengthening those muscles.

If your weakness is more along the lines of, you get tired very easily when you go walk, then engaging in and slowly increasing the amount of time you spend walking would be a good approach.

I don't think that there's any one general recommendation. I think it's something that you need to see a physical therapist – in the United States, the equivalent of a physiotherapist – and make sure that you get a good evaluation and then engage in the appropriate exercise to improve it. But resistance exercise, walking exercise; that would be a great place to start.

**Kate Milliken:** One other thing that we spoke about, again, earlier, but I thought it was important, there are probably people with progressive MS who are listening to, you know, the exercises right here thinking, 'I can't get out of my chair.'

**Dr. Motl:** Yes.

**Kate Milliken:** So just tell me how that can be better because there is something that they can do?

**Dr. Motl:** Yes. I think there's a lot that they can do actually. I think we just have to change the way we look at behavior modification. That is, they don't necessarily need to go engage in a structured exercise program. Just standing for a prolonged period of

time, getting out of that seated posture that they spend a large part of their day in, standing, i.e., reducing sedentary behavior is a great way to start gaining improvements.

But there are other things that people can do. We have lots of objects around the house that we can utilize for resistance training: grabbing cans and doing arm exercises with them, things along those lines. There are a lot of opportunities for people with Progressive MS, and there's a lot of research looking at ways of kind of bypassing personal activation, that is, using external stimulation with exercise.

So, for example, using electrical stimulation of the muscles during cycling exercise to try to get people back to a level that they can be the agent to exercise themselves.

**Kate Milliken:** And who could facilitate that for somebody?

**Dr. Motl:** So those right now are research studies. So there are ongoing research studies. We have one going on at Illinois on functional electrical stimulation. There are other studies on body weight-supported treadmill training, where you have a therapist activating the legs while someone's walking. And those studies, at least the preliminary data, are quite positive showing that you can improve people's ambulatory capacity, as well as, things like quality of life and fatigue and a whole range of variables. But it's still a very preliminary research.

**Kate Milliken:** Gavin, I want to go to you and your work and what you know about the central nervous system and repairing myelin.

**Dr. Giovannoni:** Repairing myelin?

**Kate Milliken:** Yes.

**Dr. Giovannoni:** Is that a question?

**Kate Milliken:** Yes. Yes, it is. In a minute or less, tell me what you know.

**Dr. Giovannoni:** Well -- so we know that -- well, it's a very interesting that if you suppress all the inflammation in the brain early on, the brain remyelinate itself. So it looks like MS is not a disease of lack of myelin. The endogenous -- the cells that live there -- are capable of repair.

So this idea we have to stick cells in to repair I think is wrong. What we need to do is manage MS effectively early on. Now, one of the things that happens with age, the ability to repair drops off.



So maybe there is a window where the myelin repair will be necessary and there's a clinical trial going on right now in people with early progressive disease using a strategy that tries to promote remyelination; and we'll have to wait for the trial results.

But I personally don't think MS is a disease of a failure of remyelination. The biology has shown, the research has shown, that the brain can repair itself. What we need to do is switch off the inflammation. And if we do that early and effectively enough, people will repair.

But I wanted to come back to the hand thing. People with MS who are in progressive disease and are maybe in a wheelchair, have lost function, they've still got their arms, they've still got their head and neck. They can still chew and swallow.

We've got to think about strategies to keep those things healthy. So we never give up, you know? So that maybe the goals are different, but the goals are still the same. It's how do we optimize the function of that individual and improve that individual's brain health, that individual's health? So we shouldn't give up.

**Dr. Motl:** And I want to go back to something that Gavin mentioned. This is a quid pro quo, you know, we know in the aging literature that older adults who exercise can repair myelination. They can repair white matter tracks within the brain, and so -- you mention MS being kind of an accelerated model of aging.

So I think that we need to spend a little bit more of our time looking at exercise as a rehabilitation strategy for improving myelination, as well as, other neuronal processes. What do you think about that?

**Dr. Giovannoni:** No, I completely agree. The...

**Kate Milliken:** You guys are going out for beers later definitely. I can tell. (laughter)

**Dr. Giovannoni:** No, so, this whole thing about MS being premature aging is not just MS specific. I think any inflammatory disease, be it of the heart or the muscles or the joints pretty much ages that particular part of the body.

So as a general principle, inflammation is aging, and we know that the MS brain is very inflamed. And the best predictor actually of a progressive disease is age. So we have to actually look at progressive disease as maybe it's -- or a component of it is premature aging, and believe it or not, the best way to counteract aging is probably exercise.

I mean, the best evidence available is exercise, you know, for that.

**Kate Milliken:** That's true. Now, do 10 pushups right now. Yes.

**Dr. Sicotte:** Well, I saw Rob this morning. We met at -- in the gym.

**Kate Milliken:** He was in the gym. Of course he was.

**Dr. Sicotte:** We met up in the gym this morning.

**Kate Milliken:** A neurologist wouldn't dare not be in shape, especially one that focuses on exercise or studies it. So this is very optimistic, and taking kind of a -- taking action and doing something empowering for yourself no matter where you are. I feel like in the realm of progressive MS, that has been one area that has seemed -- had a vague semblance of hopelessness and things are changing drastically. Tell me what's going on with the International Progressive MS Alliance?

**Dr. Coetzee:** Sure. So, you're right. There's a lot of movement in the area of Progressive MS. So, the Progressive MS Alliance, for those who might not be aware of it, is a global effort by MS societies from 12 countries. There's 14 MS societies all part of this effort.

And, you know, what we're trying to do is organize the world, particularly the research world. So we funded last year's, what we call Challenge Awards. These are 22 projects to get new ideas moving forward, sort of innovative, sort of groundbreaking concepts.

So we moved that forward. Now, we're in the phase of saying, 'OK, we've got attention, now, let's create a global research network.' And so we're in the second phase; we've now basically put a call out for scientists to come together to form these large research networks where they have to have scientists from at least three countries involved to get -- working together and realize it's much more than that.

In our initial set of applications, we had over 500 scientists represented and, you know, the idea here isn't just to organize scientists, but to actually create and drive collaboration.

Gavin's a good example and in the work he does in myelin repair. We, a few years ago, funded him through the Promise 2010 Initiative and he had an international research team that really opened up new research in the area of myelin repair and neuroprotection. And our vision is to do the same in Progressive MS, that by organizing scientists and saying, 'Work together, share together,' that we will make more progress.

It's a hard problem to -- we're not going to solve it overnight, but when you think about the fact that just two months ago now in October, we heard the first results in a Phase-3 clinical trial of a treatment that showed potential. That was the drug called Ocrelizumab, which showed that in primary progressive MS it had an effect, you know, a modest effect, but nonetheless, it was -- it had impact.

And so, I think that is a sign that we are able to move forward in this, and I think the global community is really dialed in to try to figure out what are the questions we need to answer, how do we answer them, and then also how do we do the clinical trials so that we can get the answers quickly?

One of the, I think, exciting things about where we are in relapsing-remitting MS is that just this seems like a number of treatments coming along really fast, and how we can have similar aggressive outcomes and results in progressive MS is what everybody wants.

**Kate Milliken:** Yes, right. OK. Another question from one of our viewers: What do we know about the research in reducing susceptibility and MS, and an example would be stopping smoking?

**Dr. Giovannoni:** You know, smoking is -- I mean, there are three main environmental risk factors, apart from the genetics (which we can't do anything about). They are smoking, Vitamin D and sunlight exposure, and the virus that causes mononucleosis (also called glandular febrile infection), the Epstein-Barr virus.

So just getting the population to stop smoking would probably reduce the incidence of MS by 20 percent and your family members, by 40 percent. So if you've got MS and you've got any children or siblings, you must get them to stop smoking, as simple as that. You know, why would you smoke?

Unfortunately, the Vitamin D question is a big one -- how do you do the trials, and it's choosing the dose and the trial design. We had a task force meeting about four years ago and we never actually delivered on a trial design, but we're coming back to it.

**Kate Milliken:** OK.

**Dr. Giovannoni:** With Epstein-Barr virus, well, there's a big new NIH initiative mainly around the fact that the virus causes other diseases. And hopefully we're going to get a vaccine, and hopefully the vaccine trials that, if they can prevent that infection, will show that it reduces or prevents MS.

**Kate Milliken:** For everyone, pre-MS maybe?

**Dr. Giovannoni:** Yes, so maybe. I mean, I've got a little bit of concerns about that; that's another discussion. But I think there are things happening in the prevention space, but if I could coach Tim, I think it really needs a lot more investment because the kind of trials that are required to do prevention studies are beyond any country or probably beyond any two countries. It probably requires an international effort, and it may require hundreds and hundreds of millions, or maybe even billions of dollars to do those trials properly.

And unless we get Class I evidence, in other words, rock-solid evidence that this strategy works, then nobody will accept the strategy and it won't be widely adopted and there will be another generation of people with MS.

So these studies have to be done well.

**Dr. Sicotte:** Yes, and I would also comment there are some studies going on looking at people with genetic risk, trying to gather people. So, if there are patients who have MS and they're -- you know, a lot of times people are worried about their family members.

They are looking at this in terms of genetics and some of these other risk factors. So I think with more research, pulling these people together and looking at -- you know, there may be a day that we're going to be able to actually prevent MS, which I think would be pretty amazing. But as Gavin's saying, this is going to be a very complicated process.

But the tools are there, I think, to at least start answering some of those questions. So it's exciting.

**Kate Milliken:** Rob or Tim?

**Dr. Coetzee:** Yes, and I think part of what we have to do is, we have to be ambitious enough to say we're going to give this a try -- even if it's imperfect. I mean, Gavin and I spent some time yesterday on big huge ideas and I think the thing is, where we are in MS, if you look at the progress we've had in MS to this day, you have to say, well, why can't we?

The idea that in a 20-year period you can go to 13 disease modifying therapies, two more on the rise -- there hasn't been another neurological disease where you've seen this. So if we can make that kind of progress for relapsing-remitting, why not? And I think that's the question. We have to be ambitious enough.

Is it easy? No. Is it, will we have to perhaps take on a big, outrageous challenge? Yes, but I think we should...

**Kate Milliken:** Because what's happened now is an outrageous challenge, right?

**Dr. Motl:** Challenge, yes. Absolutely.

**Kate Milliken:** And what you're trying to figure out now is outrageously challenging.

**Dr. Giovannoni:** I mean, what is outrageous is that wherever it's been tracked, the incidence of MS is going up. And in parts of the world that are so-called low incidence regions – like the Middle East, in Asia – they're seeing an incredibly rapid rise in incidence, and the number of people with this disease is actually increasing.

So, that's the elephant in the room, you know? It's fine targeting people who have got the disease and disease modifying treatments and how we repair the nervous system, but if we can prevent this disease, that will be the key application.

So we really need to step back and think about – we know a lot about causation now and how these factors interact with each other, and I think we're ready for trials. There's just no doubt. We just couldn't design them and do them and get them resourced. We really are ready for the trials.

But I think the proof will come in the trial.

**Kate Milliken:** (to Tim) He's speaking to you, I think...

**Dr. Coetzee:** The gauntlet has been thrown down... (laughter)

**Kate Milliken:** Another question. So several people have asked about herbs and other supplements, including cannabis and Vitamin D. Are they safe?

**Dr. Sicotte:** So I'll take that one, being in Los Angeles. I get a lot of questions about this. In general, we have data suggesting that cannabis extracts can be beneficial for symptomatic treatment in MS

I think one of the issues regarding safety, you know, we know that smoking – smoking tobacco is detrimental, so I think one of the issues is going to be the delivery method if you're going to be talking about THC or other cannabinoids. And I think that the idea that there could be oral forms I think is very promising, and at least in the States, Sativex

has not been approved – they have it available in the U.K. – and there's definitely data suggesting that this is beneficial.

In terms of other supplements, this can be a very challenging issue especially when you're sitting with a patient in your 15 minutes – we get 30 minutes to see a follow-up patient – but there's a lot of things to go through, and some of these are very unregulated. You don't know exactly now what the compounds are that people are actually taking.

So in general, my approach is, let's look at what we know is safe and that would be Vitamin D is going to be a beneficial supplement to take, but some of these other things, there just isn't enough information about it.

And then I think going forward that we need to do a lot more about granting access for some of these cannabinoid-based treatments that do have benefit and just are very complicated to prescribe at least in the States right now.

**Kate Milliken:** Anyone else?

**Dr. Coetzee:** So I think... raising the cannabis issue is interesting because – and actually I will ask Gavin to talk about it – is that part of the work, some of the research we funded around this area led to some science that became incorporated with a company called Canbex, which sort of comes from the cannabis side of the equation. But now they're in the process of doing a clinical trial of this treatment and spasticity and pain. And I wonder, Gavin, if you want to talk a little bit about what Canbex is doing because it's an indicator of how pursuing some science in one direction opened up an opportunity that we really weren't expecting and now, is on the cusp of potentially becoming a treatment for people with MS

**Dr. Giovannoni:** Well, I mean, you need to understand a bit about the biology. So the receptor that this particular cannabis works on is called a CB1- cannabinoid 1 receptor, and it's expressed in the brain and peripheral nerves.

And not only has it reduced spasticity and pain, but it also goes into the brain and causes a dysphoria/euphoria you get with cannabis. So my colleague, David Baker, he's also called 'the mouse doctor,' had this idea that if we can exclude this drug from getting into the brain, it will work in spasticity, and using a very clear strategy we showed that cannabis can be excluded from the brain and work to reduce spasticity.

So then you went the route of designing a drug – can we get a small molecule; and we designed this drug and for all intents and purposes it worked extremely well as an anti-

spasticity drug, and didn't cause any of the dysphoria and sedation that goes with cannabis. It's now, I think, gone through toxicology and it's in clinical trials, and we're recruiting right now for a Phase-2 study.

And so it turns out though that it doesn't actually work on the cannabinoid CB1 receptor. It works on a related receptor, but regardless, it's effective.

**Kate Milliken:** It's working?

**Dr. Giovannoni:** So this is what happens in life. You design a drug to work on target "X," it's effective, but then you discover it's working on target "Y," but it doesn't really matter because it works.

**Kate Milliken:** Right. That's great.

**Dr. Giovannoni:** And so we've got to hopefully get a new anti-spastic drug that doesn't cause sedation, doesn't put people to sleep. That's the problem with cannabinoids, cannabis by the way. In normal people, it seems to be quite safe, but it may take the edge off concentration, attention and cognition with people with MS.

So I'm always worried about just recommending to people to get street cannabis or smoke cannabis because of that particular, potential side effect.

**Kate Milliken:** Right. Right. What about diet? One of the biggest things to see on social media today in the world of MS? Ready? Go.

**Dr. Coetzee:** Well, it is -- so I'll start and maybe I'll let Rob and Nancy chime in, I think we know in terms of when talking with people with MS, that's the number one topic when you looked at social media discussions. We see it.

People want to know what diet, what's the strategy I should be using, what works for me? There's, you know, all different types out there and the dilemma we faced in that conversation that we'll have is well, which one is right for an individual? Where is the information and the clinical trial evidence that says one or the other this works?

And then the other piece is can people stick with it and afford it? Because that's the other thing, you know, sometimes it can be very challenging for someone to stay on it if the people on them aren't sticking to it or if it's expensive.

And so these are some of the questions we're trying to tackle with our health and wellness research network and strategy because we want to have practical solutions that people can use in their daily life that work.

So I think the short answer, generally, is find something that's a heart-healthy diet, stick to it, and it'll be beneficial. How it impacts the immune system and some of these other pieces, the jury's still out on that.

**Dr. Motl:** Right. And I think that the Society has heard the message from people with MS, and we had our health and wellness research meeting in October and one of the biggest things that we discussed was trying to figure out how to design these trials for diet and supplementation to determine whether or not there is a disease modifying effect, maybe at the level of inflammation.

But also, how to design these trials to look at other outcomes like cognition or depression or quality of life. And so, I think we made a lot of headway. We had a lot of very good experts in the room who provided a lot of good insight, and I think in the next five years we'll know a lot from very sound, very well-designed research on the role of diet and nutrition in MS, but it's going to take a little bit of time.

And so I think people have to be patient in maybe following that.

**Kate Milliken:** I got to speak to an expert about it who brought up the fact that doing a clinical trial on diet -- how hard it is and that even if you're studying the best chocolate in the world, the fact that somebody has to eat the same amount of chocolate every day for 180 days is not that easy, right?

**Dr. Sicotte:** So I think of diet actually as a quality of life issue because if you think about it, this is one of the pleasures of living is eating, and so you have to pick a diet that you can, first of all, stick with, but also that you can enjoy and this idea that you're going to put yourself on something that's so regimental that you have -- that it's very unpleasant...

**Kate Milliken:** Yes.

**Dr. Sicotte:** ... even if it was chocolate, which is something I love...

**Kate Milliken:** Over time --

**Dr. Sicotte:** ... you know, over time too much chocolate.



**Kate Milliken:** Yes.

**Dr. Sicotte:** But I think that, you know, what Tim was talking about, this idea about heart-healthy diet, I think it goes back to this overall wellness issue that you want to be on something that's going to promote overall health, and that's going to be a benefit.

And the science is going to get there, but it's going to take some time. So in the meantime, I think, you know, moderation.

**Kate Milliken:** Before we wrap up, I want to go kind of down the line and ask each of you regarding your area of research, what we can look forward to in the next three to five years. Or what you're hoping to accomplish in the future. Gavin?

**Dr. Giovannoni:** So I think we really need is safer, highly effective therapies so we can use them first line. What's stopping people using these more effective therapies are the risks. So let's get safer first line therapies to treat the MS-specific problem, and then the adoption of a holistic approach. And in people with progressive disease, we've got to re-think how we do our trials and I'm almost certain we're going to have much more effective treatment strategies in the next five years.

And that will be an anti-inflammatory therapy combined with drugs to slow down the degenerative components of this disease, or what I call combination therapy. And I think we can tell people with progressive MS the Ocrelizumab study is just the beginning. Just remember, we had interferons in relapsing disease that took 20 more years to get to where we are now.

This is the beginning, and in 20 years' time, we'll look back and progressive disease will be a tractable problem.

**Kate Milliken:** Nancy?

**Dr. Sicotte:** Right. Well -- so Gavin's going to put us all out of business, which is excellent, but in the next couple of years, we've been looking at depression and we're really excited to start using something that we hadn't really talked about too much, which is the role of technology. And I know that Rob has been doing some really cool stuff in the exercise world where people – everyone – has a wearable device so we can get information based on that, but also using the Internet and using that as a way to deliver treatment, for example, and wellness approaches and self-modification.

So we're looking at ways that we can deliver cognitive behavioral therapy for people with depression, for example, so they can get access to that when they're at home -- they can utilize that.

And then looking at changes that occur when people have depression that's treated effectively – what changes happen in the brain and are some of these changes we see reversible, and is it related to some of these other factors like inflammation; is that what's driving depression?

And so we're going to have some longitudinal data to start looking at that and novel ways to deliver treatment for patients that hopefully will improve outcomes. So we're excited about that.

**Kate Milliken:** Awesome. Rob?

**Dr. Motl:** So yes, I think there are three things that we're really focusing on and the first is whether or not exercise is more than a symptom-managing therapy, and what that means is can exercise actually help to manage the disease process itself, reduce inflammation, restore neural tissue?

The second thing we're focusing on a lot is how to help people become more physically active and to engage in exercise with MS. It's the whole science of behavior change -- teaching people the skills, empowering them with resources, helping them to be the agent of change and know what to do and how to do it for a lifelong behavioral habit.

**Kate Milliken:** And believe they can do it.

**Dr. Motl:** And believe they can do it, and we focus a lot on empowering people. And the third is really kind of taking a lifespan approach to physical activity and exercise. We're doing a lot more looking at exercise and physical activity in pediatric onset MS that might provide us some unique insight into exercise and the disease process, but also looking at the other end of the spectrum.

We know more and more that the largest group of individuals living with MS are individuals who are in their 50s and 60s. We have a general aging of the MS society in the United States and worldwide, and it's paralleling what's happening among adults in general.

And we need to know what are the benefits of exercise and the context of the disease and aging with this disease -- simultaneously. And so we're going to have a lot of fun over the next 5, 10 years, I hope.

**Kate Milliken:** There are a lot of jumping jacks in your future. I can feel it already. Or burpees. Even worse.

**Dr. Motl:** Burpees?

**Kate Milliken:** The worst! Tim?

**Dr. Coetzee:** Wow. Burpees. Just what I'm looking forward to.

**Kate Milliken:** The worst, but the best!

**Dr. Coetzee:** Give me 10 burpees. So what excites me is the conversation we're having, that we're looking at new, even more powerful treatments for relapsing-remitting MS, the first signs of treatments for progressive MS, and a community that's really dialed in to finding the tools, the targets and the therapeutic strategies to really make a difference and to change that aspect of the disease so that it's no longer seen that there're no options.

The fact that we're thinking -- that we're looking at what about how people live, how do we handle things like depression, lifestyle comorbidities as we call them, and incorporating exercise into this that depict the totality of the picture of what it is for a person to move through life with MS, and how we're changing that.

So, I'm excited about also things like, what we call, quote - precision medicine - that you could actually decide -- and a person can have a conversation with their physician about, based on this genetic profile and what we see in terms of your makeup, this is the treatment for you.

Are we there yet? No, but the fact that we are looking at the technology, have the genetics to understand it, and also understanding of the importance of lifestyle, we can have that conversation so that when Gavin and Nancy are having a conversation with a person who they've just diagnosed with MS who's, say, 25 years old you could say, well, this is -- these are the choices you can make. And we have a toolbox now that we've never had before.

But also beyond that, for people who live with the disease now or may have lived with it for a number of years, there are also options there in terms of things people can do today.

So I am optimistic. I think we have to be realistic, but also think very optimistic about what we see on the horizon.

**Kate Milliken:** Awesome. And I agree. I really -- I really agree. So I want to thank our panelists, Drs. Giovannoni, Sicotte, Motl, and Coetzee for being here today and for sharing these experiences and their expertise with us.

I also want to thank you, our viewers, for joining us. If your question wasn't answered today, please speak directly to your health care provider, or visit the Society website at [NationalMSSociety.org](http://NationalMSSociety.org).

You can also contact the Society's information resource center and speak with one of our MS navigators at 1-800-344-4867. Please note that today's webcast will be archived and available for viewing at [NationalMSSociety.org](http://NationalMSSociety.org).

Thank you all and goodbye from New York.