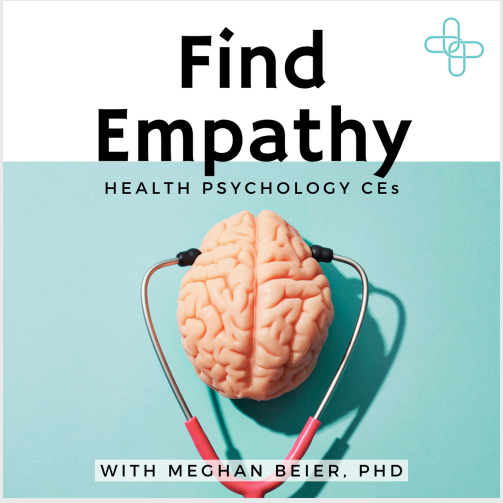
Find Empathy

Multiple Sclerosis: What is it? How is it Diagnosed?



Meghan Beier, PhD

Ashley Pike

Aaron Boster, MD

Kevin Alschuler, PhD

EPISODE I

Course Objectives

Describe the basic pathophysiology of multiple sclerosis and how it leads to the common cognitive, emotional, and physical symptoms.

List at least one theory of for the etiology of multiple sclerosis.

Describe at least two facts about the epidemiology of MS.

Multiple Sclerosis: What is it? How is it Diagnosed? (Ep 1)

[00:00:00] **Meghan Beier, PhD:** Welcome to the Find Empathy Podcast, where we discuss the interaction between health and emotions.

My name is Dr. Meghan Beier, and I'm a clinical psychologist with training in Health Psychology, Rehabilitation Psychology, and Neuropsychology. In this first series, we're going to focus on a population that I work with very closely, individuals and families living with multiple sclerosis.

If you would like continuing education credits for listening to this episode, please head over to findempathy.com/learn.

If you're a mental health provider that specializes in health populations, like multiple sclerosis, please, also head over to findempathy.com and click on, "Get Listed."

We would love to list your practice in our directory and being listed is free. We're trying to help families and people living with chronic or acute medical conditions find the providers that can help them most.

Introduction

[00:01:01] **Meghan Beier, PhD:** In this first episode, we talk about the basic pathophysiology of multiple sclerosis, different theories of etiology, and the basic epidemiology. Having this foundational knowledge about multiple sclerosis is critical for mental health providers who work with this population. Having this understanding can help you identify unhelpful or inaccurate thought patterns such as guilt or self-blame for contracting the disease or worry about passing the disease to offspring. It can also help you identify and address health and wellness behaviors that are, and are not, associated with MS progression or worse outcomes.

We will also take a deeper dive into what is known about the emotional symptoms at the time of diagnosis and for the first year, following an MS diagnosis.

In each of the episodes on the Find Empathy Podcast, you will hear from two to three experts. We will include the perspective of someone living with multiple sclerosis, as well as a clinical or research expert on each topic.

For this very first episode, you're going to hear from Ashley Pike. A doctoral student that lives with and studies multiple sclerosis.

[00:02:12] **Ashley Pike:** I am, I'm a PhD candidate at the University of Arkansas for Medical Sciences. I actually study MS and I'm working, looking at cognition changes through neuroimaging. I am 37 years old. I grew up in Omaha, Nebraska, and, outside of school, I am a huge sports fanatic, volleyball being my favorite. I coached it for like 12 years. I still try to play thinking that I'm young, but it doesn't always work out. Um, and honestly, my goal since I joined grad school is hashtag PhD before I'm 40.

[00:02:48] **Meghan Beier, PhD:** Next you're going to hear from Dr. Aaron Boster a well-known board certified neurologist specializing in MS.

[00:02:57] **Aaron Boster, MD:** I'm a native of sunny Columbus, Ohio. Third generation American grew up in a really tight knit family. My earliest memories involve my Uncle Mark having multiple sclerosis and having trouble walking and so on and so forth. And when I was 12, I made a decision to become an MS doctor.

Uh, I remember actually very vividly. I came to my grandmother's house. My uncle was in the other room, watching TV in his wheelchair. And my mother and my grandmother were sitting at the kitchen table and they were crying and they weren't crying because my uncle had MS. They were crying cause they couldn't get ahold of their doctor and they were scared and alone. Podcasts like this didn't exist. And you know, the, the easily obtainable information on the interwebs didn't exist yet. And I told my mom that I would learn to do it better than that. I would learn to make sure that nobody treated another family. Like our family is treated. So I was the weirdo that went to high school and said,

"I'm going to be an MS doctor." And I sought out an undergrad where I could do a neuroscience, undergrad major. I had a very directed course. It's almost been a mission of mine to help people impacted by MS live their very best life despite having this nasty condition. And, um, you know, I've, I've, uh, I was a professor at a ivory tower for a while, and then I whisked away to a big non-

for-profit where I managed neuro immunology for 13 hospitals and big system, which is really cool.

And then, uh, Two years ago, I opened up my own practice, a standalone MS center called the Boster Center for MS. And, um, two days before the, the governor closed the state I opened my doors.

[00:04:23] **Meghan Beier, PhD:** Finally, we will end with an interview with Dr. Kevin Alschuler. A research and clinical psychologists from University of Washington, who will speak about the emotional symptoms in people, newly diagnosed with MS.

[00:04:37] **Kevin Alschuler, PhD:** I am Kevin Alschuler. I'm an Associate Professor at the University of Washington and a Rehabilitation Psychologist. In my role, I am the Psychology Director and the UW Medicine, Multiple Sclerosis Center, as well as a Co-Director of our MS Rehabilitation and Wellness Research Program. But [00:05:00] also operates out of our MS Center.

Ashley Pike

[00:05:02] **Meghan Beier, PhD:** If we really want to understand a condition like multiple sclerosis, it's absolutely imperative for us to hear from somebody who's living with that condition. So we're going to start off the series of three interviews with Ashley Pike who talks about what it was like for her to get diagnosed with MS.

[00:05:20] **Ashley Pike:** I was diagnosed, February 1st, 2008. Back in 2007, then later fall transitioning into winter, my right leg went completely numb all the way up to my mid torso. So, I could still use it, but it was completely numb. I had seen my chiropractor at the time and they thought that I had a pinched nerve up in my neck. And so I was going to see them about two, three times a week. During this time, uh, the numbness stayed and I started having weird tingling through my hands. My fingers. It was very strange and I was going and it wasn't getting better.

And I remember back late December, I was out at a restaurant watching a volleyball game, of course. And I had happened to look down and when I looked down, I had this really weird sensation down the back of my legs. It kind of freaked me out. So of course I looked down again and it happened again.

And I was like, okay, this isn't normal. Maybe I'm tired. It was kind of late. So I went home, went to bed, didn't think anything of it. And I woke up the next day. It was still there. So I went to my chiropractor, cause I had a scheduled appointment that day and I told them about it and he kind of looked at me and he said, okay, we're going to refer you to a neurologist.

And we want to rule out some tests. I don't think anything is wrong and we'll just see how it goes. I said, okay, no big deal. Before then, you know, you hear that from a doctor and you're just like, oh yeah, no big deal. So I go get my MRIs done. And that was in January because they were booked up.

I went in on the first. That was when they told me that my results were abnormal. Hmm. And they had mentioned when I went there, cause I did meet with the neurologist before that they talked about multiple sclerosis. And before that I had never heard of it before. I didn't look it up. I didn't do anything cause I didn't want to freak myself out.

But when they mentioned it that day that my MRIs were very abnormal. Ironically that what was causing my numbness was I had lesions in my neck where my chiropractor thought I had a pinched nerve. So I guess they were right in some sense, but they did a lumbar puncture that day and when they got those results back that was abnormal as well.

Then that with my clinical history is how they diagnosed it. So going back through my clinical history, I actually have had the symptoms of MS of MS. That go back to about 13 years old. I can trace, severe fatigue. My same right leg actually went numb during volleyball season and they thought it was a pinched nerve in my back. It only lasted a few weeks, but looking at all that back, those definitely were symptoms of MS.

[00:08:20] **Meghan Beier, PhD:** I hear that a lot, that people have experiences of symptoms, you know, years back, but they, they sort of dismiss them or they get missed. And did you ever go to the doctor during that time for any of those symptoMS or was that stuff that you just, it went away so you didn't think about it?

[00:08:38] **Ashley Pike:** So my parents probably had me too tested for mono, like numerous times because of the severe fatigue. As I mentioned, being a sports fanatic, I used to play volleyball. I ran track. I played basketball year

round. Yeah. So I would go play like all day tournaments or I'd go play out in the sun during the summer.

And then I would just sleep really heavily. And, you know, we kind of just thought maybe I just wore myself out. Wasn't a big deal. Because as a child, when I was a baby, I was really good at napping. That was always my thing. So I've always been known to be the sleeper. With the pinched nerve in my back, during high school, I did have an MRI done just to rule out anything in my back, but they didn't do any contrast dye. They never talked about MS or anything else. They were just looking for nerve damage, I suppose, but no, it's never been looking further than what they initially thought .

[00:09:35] **Meghan Beier, PhD:** And were you put on a disease modifying medication right away after your diagnosis?

[00:09:40] **Ashley Pike:** I was, um, back in 2008, there was only like five options. All of them were injections. And I decided to go with Copaxone because, the real interferon beta makes you feel like you, you have the flu. So I decided to do the injection every day versus a few [00:10:00] times a week, just because I didn't want the side effects.

[00:10:03] **Meghan Beier, PhD:** Are you still on Copaxone?

[00:10:05] **Ashley Pike:** I am not on Copaxone. I was on Copaxone for about a year, maybe a little bit more, but I had severe, I call it severe injection site reactions. I have huge welts. Knots. I have some lipoatrophy on my stomach, which isn't a huge deal, but I think I still have some permanent. I don't want to say cellulitis, but I can feel knots where I've given injections, like in my arMS and in my my lower back there. So I was not a fan of it. They did come out with they doubled the dose and you could go from every day to taking it three times a week. So I did that and I, oh, I just. I hated it. I hated injection day. I had people do it for me cause I couldn't do it. I went to autoinject. It was, it was not a good time in my life. I really am so happy that they came out with tablets and oral medications.

[00:11:03] **Meghan Beier, PhD:** And is that what you're on now?

[00:11:04] **Ashley Pike:** Yeah. I have been on AUBAGIO for a little bit over a year now. Very happy on it. Very minimal side effects. I know that there was a time where I was not on a disease modification drug because I didn't want to

keep getting side effects. So there was a good span of about, I want to say five years and like I'm ashamed in retrospect, but I was not on a disease modifier for a long time.

[00:11:32] **Meghan Beier, PhD:** And was it your decision or your provider's decision to get you back on a disease modifying medication?

[00:11:39] **Ashley Pike:** So being in research about MS and having a professor that studies MS. You know, we have little talks. And we talk about things and working with the neurologist on my team, you know, they kind of, "Hey like, hey, you should be on this." You should do this. This is really good for you. And, you know, I used to have the assumption of, you know, I don't have any symptoMS.

I'm fine. But then they started talking about, neuroprotective in that it'll help you later in life. And that kind of hit me and I was like, okay, I need to start taking care of myself, not for today, but for the future as well.

[00:12:16] **Meghan Beier, PhD:** I am asking about that because there's a lot of people that I work with who worry about taking the medications, or the side effects are really difficult and there is injection anxiety and sometimes injection phobia. And there can be a lot of emotions around choosing a medication and using a medication and those kinds of things. Do you have any thoughts about that?

[00:12:40] **Ashley Pike:** Sure. I know now you can go get on social media there's groups for every medication out there. And the one thing that I noticed that is super common is everybody likes to voice their complaints, the negatives, they don't like this. They don't like that. So when you go reading about what people have to say 9 times out of 10, it's going to be negative. Don't do it. I hate this. It's terrible. So although I think that it's important to know what people have to say cause they're taking it and it's good to get opinions. Always expect negative. I also having a pharmacology background, I understand medicines. A little bit, you know, I'm definitely not a pharmacy, a pharmacist by any means, but just looking at the medications they also have reps around town, you know, they're always going to be pro for taking it, of course. And also it's, sometimes it's hard to listen to people who don't have MS.

And don't take it, you know? So your providers, your neurologist, they're like, you know, I, should've just taking this one and it's well, have you, you taken it? I have it. For me, I don't know how I feel about that. I definitely had the injection phobia, you know, you know, if you have MS you get a lot of needles in your life.

When you go for MRIs probably hospitalizations, steroids, the lumbar puncture, which hopefully everybody, if they do it only has to do at once. But you kind of get used to needles. I suppose, um, it wasn't the needle that hurt. It was the liquid. So that's kinda my thought on injections.

But for me, it's kind of, I'm a trial and error kind of girl. I have this thought of I'll try anything once, you know, there, of course there's some limitations to that, but when I'm presented with a few different medications have suggestions, they my. Providers gave me some really good handouts.

There are support groups. I'm sure that in those support groups, people wouldn't mind having a conversation about it. In the support groups I'm on, I try to put in the good, with some bad. There are some negative side effects for taking , AUBAGIO, which is the medication I take now.

It can cause some loose stools and diarrhea and GI upsets. Well, [00:15:00] in my MS. I have constipation and, It's a very common thing. A lot of people don't like to talk about that, but I am so happy having a looser stool every day, then being backed up for three days. Honestly, that side effect is kind of a positive, some days it could be worse.

But most of the time it's pretty manageable and I'm okay with that. The other thing to know is that everybody's different. Everybody responds to things differently. And I think as long as somebody is happy on a medication that that should be all that matters to them, you know? Yeah. Yeah. So there is an abundance of resources out there.

I just, my word of warning is look out for the negatives because that's what people talk about the most.

[00:15:45] **Meghan Beier, PhD:** One of the neurologists that I work with talks really strongly about shared decision-making and sharing their own perspective about why they think you should be on certain medications, but also really listening to the person who has to take the medication every day

and coming to some sort of shared decision, you know, a consensus between the neurologist and the patient, so that you're not, you're not going down the pathway of just sort of pushing a medication on somebody that they may not want or may impact their quality of life.

[00:16:16] **Ashley Pike:** Oh, absolutely. I've seen different neurologists throughout my time and, you know, I had one that was heavily pushing a medication and it got to the point where in an appointment he like broke me down. Like he made me feel bad and, you know, he made me feel guilty and I started crying and he was like do you think we should put you on an antidepressant? And I was like, well, Like, you know, you're the problem.

It's kind of, it's hard to feel bullied, you know, and obviously the same thing about neurologists not one is a size fit, all, you know, everybody's different.

I feel very supported with my current neurologist and his staff and, being not pressured to get on a one medication is wonderful, and to throw in the other thing, you know, when they gave me two choices, I chose AUBAGIO mostly because it was once a day versus twice a day. I'm kind of bad about taking pills twice a day, you know, I guess sometimes I forget. It's just how it goes. And the other thing was that that one medication cause caused some flushing and they say to take aspirin, well, I'm allergic to aspirin. So that kind of ruled that out for me.

[00:17:23] **Meghan Beier, PhD:** So really knowing yourself is important. You mentioned that you study MS. And so I wanted you to talk a little bit more about that. So you're a graduate student. What are you studying?

[00:17:35] **Ashley Pike:** So what I'm studying right now is, I'm looking at neuroimaging and how changes in the brain is affecting cognition in the patient.

We're looking at functional MRI which is the leading technology, one of the leading technologies in in brain function and connectivity and how the brain talks to itself and how those effects can affect someone's thinking and thought process.

And you know, how they manage daily life. And so looking at the functional side with the fMRI, we want to compare it with the structural side of the

regular MRI and seeing which one of those is a better predictor for cognitive decline in MS patients.

[00:18:17] **Meghan Beier, PhD:** Very interesting. What is it like to study MS and have MS?

[00:18:23] **Ashley Pike:** Sure. I'm a non traditional grad student, of course. I was a veterinary technician for 10 years. Maybe a little bit longer, but who's counting? And I was diagnosed then. And so when I w when I got into research, I was first working with cardiovascular disease. And that was at Creighton University.

And I had, an acquaintance there and she was a PI who worked with MS. And she had told me, and this was back in 2015. She was like, you don't want to study MS while you have it. And I was like, oh, okay. Why do you think that she goes, you know, I just don't think that you should be upset by finding all these things that aren't working. So, you know, I kind of took that and put it in, you know, my, my back of my brain and kept it there. So when I came to the University of Arkansas UAMS, I during your first semester, you get to rotate with all these different professors and find a lab that works for you.

And they had a little like a poster session for all of the professors that were taking students. So I go down there and, um, you know, walking around, looking at into people I've researched beforehand. And I came upon Dr. Drew and I knew Dr. Drew studied MS. And so I came and I talked with him, you know, and I let him know that I had MS.

And from the conversation that we had, I just felt that we had this really great connection as mentor and protege or, student in PI and, you know, it sparked a little fire in me, you know, and I did some thinking and I rotated with him for five weeks and I got along with everybody in the lab [00:20:00] and, you know, I had some really like self heart to hearts.

And what I came to was that, I've been dealing with this disease for all my life. It's something I have to think about daily anyway. If I can take what I've been through and what I can learn, and I can turn that into something that can help my MS community, that's something that makes my heart swell.

I, and I only wish, not everybody can, work and study MS that has it. And that's okay. But, I feel like I can be a voice and an advocate for a disease that I deal

with every day, because I'm so lucky that I can do this. And so I feel that, I don't, that it's a calling, you know, I just, I feel like it's a place that I belong.

[00:20:44] **Meghan Beier, PhD:** Absolutely. Absolutely. How much did you know about the pathophysiology of MS before you got into grad school?

[00:20:54] **Ashley Pike:** So the pathophysiology that I knew before I got into grad school, you know, I knew that, I had an auto immune disease where my white cells attacked my brain and my spinal cord.

I knew that, I could be wheelchair bound or that there may be a day. I won't be able to walk unaided without some like a cane or the walking crutches or something like that. You know, I knew that I had some heat sensitivities or that, you know, I may have days where I don't feel well, you know, so I knew a lot about that.

I knew I also could wake up and be blind one day from, optical, neuritis So there was things that I knew about that. I probably didn't say that. Right, but you get what I'm saying. But getting into, pass the initial grad school and getting into what I'm studying now, and also from the Can Do MS, that I was part of, and other groups, you know, that I've learned from all these professionals is, I didn't know that there was more than just physical disability with MS. And that has been completely eyeopening for me, opened up a whole new horizon of research and also living with my disease. You know, you get into the cognition side and, you know, I didn't know that, outside of being physically, physically disabled, that I could be cognitive cognitively disabled, you know, that was something I didn't know at all.

And that has changed the game for me, for so long, you only think of MS being a physical disability disease. And you know, when I got into the research, I learned that. 60%, at least of people that stopped working and are disabled, aren't because of physical it's because they can't mentally do their job anymore.

And that was like a jaw dropper for me, you know? And this is something that, that is affecting a lot of people, that aren't in wheelchairs, aren't using crutches can go run marathons, can go play sports, and That's something that definitely needs that attention. That's that big red flag in my head that Hey, we're, we're missing these group of people.

I can say that. I feel like I fit in that group. I don't have any physical limitations , but are some times where I just, you know, the brain fog is it's real, there's some things that, you don't think about and you look back and you're like, man, those are issues.

And those are specific and we can do something about that. I didn't know. I thought, this is it I'm just done, there's things that can be done. And there are things that we need to look at so that we can do more about it.

[00:23:29] **Meghan Beier, PhD:** So it sounds like learning what you're learning and studying this has also given you some hope for the future, or given you some information about what to do next, either for yourself or maybe even in research for others?

[00:23:44] **Ashley Pike:** Oh, absolutely. You know, as far as like my personal journey with MS, you know, learning that there is mental fatigue versus physical fatigue, you know, I didn't know.

I thought maybe, Hey, like you're just you're losing focus because you know, you have too much to do or, you know, you're just tired cause you didn't get enough sleep. And learning that, Hey, there are some things that are going on in your brain that could be because of MS. You know, and there are medications to help that, you know, I'm very happy to say that I'm on one now, you know, and I, I feel it, I feel normal, who knows what normal is, but I feel more normal that I can focus.

There's medications, well this one actually does both that can, that perked me up during the day, not super wired that, you know, I feel like I'm shaking, but I feel like that I can function as a normal person during the day. When you get into the research side, people that I've met in my support groups and online, you know, I'm learning that there is a group of people like me out there, that we can go, we can exercise, we can, you know, I may not be able to run a marathon, but I've run 5Ks.

I can play sports and we can do all this stuff, but you know, we're struggling too. There's been some visits that I've had with my [00:25:00] neurologist and this is no fault to them. You know, if I'm talking about things, I don't fit a certain category of being enough that they need to pay me more attention, you know, I don't, you know, I don't need a walking aid.

I don't, I don't need this. So we're just gonna be like, okay, just keep going. So I think the more that this awareness comes about, and the more that we're seeing that these changes are actually happening, that we don't know, you know, we can't see them well, we don't know they're happening, someone says, I feel kind of foggy.

The things that these patients say will trigger something in a clinician's mind to be like, okay, let's put this in a tree and look at what it can be from. How to treat that? How can we attack this? What can we do to make all of the people with MS have some kind of treatment to feel more normal?

[00:25:57] **Meghan Beier, PhD:** Yeah, absolutely. I have one more question for you. As you know, this podcast is really geared towards mental health providers and allowing them to understand MS better, so that when they're working with people that have a MS, they can really understand it. What do you, what would you say to a psychologist or a therapist that hat that is working with somebody with MS? What would you want them to know?

[00:26:24] **Ashley Pike:** I think my biggest struggle that I have with myself is, is what's happening to me because of my MS. Or is it something else? And that is something that I have to ask myself at least once a day, I would say, is this because of my disease? Do I need to go to the doctor? Do I need to make a phone call? Or is this something that normally happens to somebody else?

My fiance and I, we have been through some, some joint sessions together dealing with MS. And it's really opened his eyes as well as mine that, with our communication, that I have a little bit of barrier, you know, and it could be both of us, but you know, my needs can be different maybe because of MS.

And it sounds like it is because. It's a common thing that happens. So this is something that he understands so that him and I can communicate better. And I wish I knew off the top of my head when it was.

People with MS, we, we feel ashamed. This is something we can't control. We have no grasp on it. And we feel this guilt, this incredible guilt. That we can't be ourselves. We can't function in a normal society. We can't be that mother that is the soccer mom that picks up all the kids and takes them to practices and has everybody over for sleepovers and, can cook for them all and everything like that. We are you know, and I I only speak for the females because I, I am one, and I know the males probably have maybe some sort of this same guilt.

We can't be that 50/50 parent. We can't be the 50/50 doing this stuff around the house. Do we, strain ourselves and trying to meet that 50% and wear ourselves out, or do we ask for help and feel that guilt internally?

And that is something that I think. I personally think that a lot of people struggle with, with MS. We can't do what we want and it's not that we don't want to. It's like we physically and mentally can't. And how do we cope with that as being a normal person in society, keeping up with everybody else that doesn't.

[00:28:38] **Meghan Beier, PhD:** Absolutely. Yeah, I think you're absolutely right. I, you know, I don't live with MS, but I have been working with people that have MS since 2007. And what you just shared is, is a very common theme that I hear a lot. So thank you for being vulnerable enough to share that.

[00:28:59] **Ashley Pike:** Something that I had recently learned about myself. I was frustrated for so long that I can't do the things that I used to do, you know? And maybe it's oh, well, you're almost 40. You're not that 20 year old anymore, but I don't think it's that, you know, it could be a little bit of combination, but I definitely think this disease puts these barriers on you, just out of nowhere and it's a really hard pill to swallow.

[00:29:26] **Meghan Beier, PhD:** Is there anything else that I haven't asked you that you think would be important for us to know?

[00:29:31] **Ashley Pike:** You know, I think we covered a really good realm of things. I think this is a really good start for people to understand that we may look okay, but we're definitely not okay. And that's kind of the take home message, you know, and it may not be that we're ready to talk about it, or we even know how to talk about it. You know, it's kinda like in the words of Shrek, you know, we're onions, we have many layers. So, you know, we kind of have to peel them back one by [00:30:00] one, and maybe we don't even know where to begin, but I think, you know, if we can all get on the same page, That we're all here and we're not looking down on you. We're not, trying to say that you're not this, you know, that we want you to be better. We want you to feel better, not just physically, but mentally, you know, having that goal in mind and taking it forward. I think that's a really good starting point from the bottom.

Aaron Boster, MD

[00:30:26] **Meghan Beier, PhD:** Now that you've heard from Ashley about her experience of being diagnosed with multiple sclerosis. Let's hear from Dr. Boster, who answers the question, what is MS?

[00:30:38] **Aaron Boster, MD:** So in order to understand, MS. I want to start by thinking about the immune system. All right. So the immune system are a bunch of little white blood cells, which are made of the bone marrow. And when they grow up, they become soldiers. They go tool around the human body and they identify, um, our own cells and they wave and say hi, and then they identify foreign invaders.

And when they see a foreign invader, they make a memory of it and then they lay waste to it. And it keep a memory of that foreign invader. So the second time you get chickenpox, you don't manifest spots on your body because your body clears it. Now sometimes unfortunately, um, the immune system makes an error in judgement.

And through a series of weird events, it can identify part of your body as being a foreign invader. So once it does that, it can't unlearn that and you know, auto-immune conditions are very common. So if the immune system picks on the pancreas, we call that disease, diabetes mellitus. And if the immune system picks on the joints, we call that disease rheumatoid arthritis.

Multiple sclerosis is an autoimmune condition where the immune system inappropriately attacks the holiest of Holies, the super computer that runs the body. And the super highway. You know, the spinal cord that takes all the information from the brain down to your feet and back up. And it manifests really kind of in two ways, people can have discrete episodes of neurological dysfunction where God forbid they lose sight in an eye, or they can't feel their leg or their hand is clumsy.

And we call these relapses or flare ups or attacks. And it's a time period where a naughty autoreactive immune cell crossed from the bloodstream into the blood-brain barrier and attack the part of the brain or spinal cord and caused it to short circuit. Now there's a second way that you can have a pathology in MS, unfortunately, and that's a term which has recently been termed as PIRA progression, which is independent from any relapse. And this is a situation where there's a slow burn, where people slowly accumulate neurological

disability over time. I always like to point out that that's in the untreated state and we don't do untreated MS. At least not in my shop.

[00:32:35] **Meghan Beier, PhD:** Great. And you know, there's lots of theories or, I I've heard a lot of theories about what causes MS. And I've also heard that we don't really know what causes MS. So can you talk a little bit about that?

[00:32:48] **Aaron Boster, MD:** Yes, I think you're right in both states. So, so there's a lot of theories and we don't have the definitive answer. I will share with you like the party line, the best that we have today. Um, and so the idea is that. There's a genetic predisposition. So for example, you and I are pasty white folks that would trace our ancestry roughly back to Northern or Western Europe, very likely.

And folks that trace their ancestry back to that part of the world, tend to share genes. And I don't mean BlueJeans and, and that includes the genes for, um, our immune response. And so there tends to be a haplotype, a genetic variant amongst folks from Europe, which would predispose them to be more likely to experience a form of auto-immunity compared to a different group of people.

Now, very clearly, that's not enough to cause MS or everyone in Ohio would have MS. But the idea is that that is probably a predisposition, which would kind of stack the genetic genetically against you. And there's a belief that there are environmental factors, which can augment that risk profile. So for example, we've learned that children who are morbidly obese, double the likelihood of developing MS.

Uh, and so there's an entire literature about inactivity and obesity early on pre-puberty we've also learned, for example, that low levels of vitamin D pre-puberty increased the risk of develop MS. And lastly, and maybe most importantly, exposure to tobacco smoke, including secondhand smoke significantly increases the child's risk to get MS.

And so, as you can imagine, um, someone growing up with that gene background may be exposed to secondhand smoke and may not have a high level of vitamin D or maybe inactive. And they've increased the risk to develop MS. Now, clearly that's not enough. Otherwise, you know, a bunch of overweight kids in Ohio would all have MS.

And they don't. We then believe that there's a problem where your immune system sees a bad guy. It sees a virus. And typically we think of either EBV or rarely we might consider chlamydia, but let's talk about the kissing sickness. So you get EBV, mono, and your immune system does its best job to build an arsenal to beat up mono.

Except it makes an error in judgment. And with that genetic predisposition and those, [00:35:00] those environmental changes, it, it builds an arsenal which identifies your brain as being EBV or a foreign invader. And once that mistake is set up, it can't be undone. So that's the leading idea. Um, and it's not perfect, but it's a works in progress. As my mentor used to say,

[00:35:17] **Meghan Beier, PhD:** Right. Yeah. I've heard all of those things too. And I think that's a really great explanation. Um, I've also heard that it's very challenging sometimes. Maybe not always, but sometimes to diagnose MS. And so what does it take to diagnose somebody with MS?

[00:35:33] **Aaron Boster, MD:** So there's no blood test for MS to your point, much to my chagrin, that would make my job way too easy. Maybe now there are five elements to an MS diagnosis. If I use patient friendly language. And I have five fingers in my left hand. So as long as they go through every finger, I'll never forget any. So let's do that now.

So the first one is your story. And we call that the medical history. Cause it sounds highfalutin, but it's stuff you tell me. And really what I'm listening for is one of two things. I'm either listening for a story of attacks. We are. And I'm listening to an event that fits the typical description. Sub acute onset lasts a couple of weeks.

It gets better, blah, blah, blah. So I'm listening for a history like that, or I'm listening for a history of progression of an insidious decline over time. So that's the first element. The second element is the examination. So when we have you do all the funky tests that neurologist have you done. What we're really doing is we're trying to see if we can buttress what you tell us with findings on exam.

For example, if you tell me that you were kind of walking, like you were drunk, but you weren't. And then I walk with you. I would look for unsteadiness of gait, which would support what you just told me. third thing is the MRI and MRIs are our very best diagnostic biomarker. And so we are, our diagnostic

criteria have increasingly utilized MRI because it allows us to diagnose much, much faster.

The earlier the diagnosis, the faster the treatment, the better outcomes and the theory and the MRI typically involves a scan of the brain and of the cervical spine. And we're looking for spots. The real word is brain damage, but neurologists kind of hide it by calling it something which is nonsensical. Um, and we're looking for brain damage in certain locations.

So there's these special locations that we look for. And then number four is a spinal tap. Now most patients, in my opinion, do not require a spinal tap for diagnosis, but there are times where the spinal tap can make the difference. Um, I had a case like that today, actually. And so in some people it's very appropriate to obtain CSF, to look for essentially an overly active immune response in the central compartment.

And then number five is my favorite. Hey, Aaron, prove it's nothing else. Um, and there's actually a very large list of things that mimic MS. We call that the differential diagnosis, if you will. And so the onus is on me to make sure I'm not missing something else. So, so those are the five things that we look for when trying to make a diagnosis.

[00:37:53] **Meghan Beier, PhD:** Can you share what some of those mimics are? I mean, it is a very long list, so you don't have to go through all of them, but maybe some common ones.

[00:38:01] **Aaron Boster, MD:** Yeah, for sure. So, uh, you know, I'd like to kind of think about it in, in buckets. So there's a bucket of infections that you probably don't have that can mimic on us. And these are things like HIV, syphilis, tuberculosis, things like that, varicella. So it's very common that an MS neurologist may get a battery of infections. You didn't think you have those infections, but we don't want to think we want to know. So that's the first thing.

The second category are metabolic conditions. And so sometimes low levels of B12, for example, can cause neurological issues or a weird thyroid can cause neurological issues.

Interestingly, diabetes can sometimes mimic MS, even though they're very, very different conditions. And the third category would be sort of other

connective tissue autoimmune conditions. So for example, lupus can sometimes look like MS. Sjogren's can sometimes look like MS. Now, there are other categories that we look at, but, but those are the big buckets that most MS neurologists are going to be thinking about when trying to work someone up. And the way that we're going to sort that out. Number one is by history. Number two is by MRI and number three are by laboratories testing that we'll get through the blood to kind of cross things off our list.

[00:39:11] **Meghan Beier, PhD:** And can you share a little bit, you know, sometimes I have patients who come in and they say I had my first symptom years ago and I didn't get diagnosed until, a couple months ago. Why does that happen sometimes?

[00:39:23] **Aaron Boster, MD:** So, um, it happens for a multitude of reasons and we like to start by sharing we've gotten better. First of all, the diagnostic criteria, when I started in this game involved all clinical measures and when we invented the MRI, we were able to speed up diagnosis three times faster. So some of the people that you're talking to may have suffered from a historic, you know, poor criteria.

But, but there's other reasons. So. When you slur your speech one night and your significant other says, Hey, you're starting to speech. You do whatever you red blooded American does. You just go to bed and hope that when you wake up, it's better. And [00:40:00] if it's better, you'll ignore it. Even if your speech was slurred for a couple of days in your twenties or thirties, there's a high likelihood that if it got better, you would just go about life.

And so I'm not trying to make a disparaging comment about humans, but, but natural behaviors. Okay, well, that's better now. So I'm not going to go seek the attention of a doc. And very often, it's not until we start talking about MS. They say, oh my gosh. Oh wow. When I was 30, I couldn't see. And I didn't know what it was and it got better and I ignored it. Or they didn't ignore it, but they came to the attention of a doctor and they weren't able to make the diagnosis.

And so that's, that's a major factor. Now there are other factors. Um, there's, there's even, for example, Um, ethnic minority communities, there's systemic racism where doctors are not as attentive to African-Americans as they are to Caucasians. Um, and so we have to fight against things like that. You know, the

bottom line is I always like to remind people, it's your brain and it's your body and you don't get a second one, particularly not a second brain.

If something is wackadoodle, we should figure it out. You know? And, and although it's not easy to diagnose MS. It is. Quantifiable in many respects. And so I asked you if you're listening to this podcast and you have some weird neurological thing, holler out a neurologist and let us work you up so we can try to figure it out.

[00:41:18] **Meghan Beier, PhD:** Great. That's great advice. Um, can you talk a little bit about clinically isolated syndrome, radiologically isolated syndrome? You said we've gotten better at diagnosing MS. Does that mean those things have gone away or do, are those still viable categories?

[00:41:33] **Aaron Boster, MD:** That was an excellent, uh, second part of your question. Let's break that down or unpack it a little bit. So when someone has, an optic neuritis as an example on the first event, which is de myelinating and inflammatory involving the central compartment, there's a question on the table. Could that go on to become multiple sclerosis?

And we've gotten savvy. We know that if you have certain MRI characteristics, and if you have certain lumbar puncture characteristics that you may be more likely to be, uh, headed towards MS or not. So just by way of example, if you have optic neuritis and your spinal fluid is normal and your brain MRI is normal, you've got about a 20% chance, a one in five chance over the next 20 years of developing MS.

If however, you have spots on your brain MRI, that look like MS, that risk goes up to 80, 85% just based on that MRI. So, so whatever the situation may be, when you have that first clinical event, we call it something specific. We call it a clinically isolated syndrome. Now I used to joke that, you know, there's a similarity between the clinically isolated syndrome and the tooth fairy, and that neither actually exists. And, you know, very often when we're dealing with clinically isolated syndrome we're then following someone for years with annual MRIs, with examinations and so on and so forth, because we're looking for, for the next event that would qualify them for diagnosis. Now you brought up one of my favorite categories in MS.

And that's R I S we're radiographically isolated syndrome. Clinically isolated syndrome is when you have the first clinical event. Radiographically isolated

syndrome occurs before that, when you get an MRI for some other reason, and in the modern era, you get an MRI. If you sneeze, or if you're accessibly flatulent or there's a numerous reasons why a doc might say, let's get a scan, right?

So you stick your head in the scanner and lo and behold, you have spots that look like MS. And then you take a very careful history, no history of MS. Then you do a extensive neuro exam, no things on exam. And the thought is we might've caught it on the MRI before it presented clinically. Now think about it for a second.

Very often at the time of diagnosis, the human being has multiple lesions on their brain. It just didn't rise to the, to the level where it became clinically relevant. So if you happen to get an MRI because you were sneezing a lot and you see spots that may be something even preclinical. And it turns out that about a third of people with RIS in the next 10 years, going to declare themselves as having MS. Now you, you asked a very enlightened question about if the, if we gotten better, has that gone away? And the answer is partly, I'll give you an example. Not long time ago, 2016, if you had optic neuritis and an MRI of the brain, which spots that wasn't enough to make the diagnosis and we've, we've updated our information.

If you now add positive spinal fluid, that same human now is diagnosed with MS. Whereas in 2016, we would have called them CIS. And that's not airy fairy. That's actually based on statistics, the likelihood of going on to have an event. So by virtue of our diagnostic criteria, people that we used to say were at high risk to have MS. Are now properly diagnosed with early MS. And that's a good thing.

[00:44:42] **Meghan Beier, PhD:** In the last question you mentioned systematic racism, and I've heard that a lot. Many of my black and African-American patients have talked about taking longer to get diagnosed or being misdiagnosed. What can you tell us about who gets MS. And how has that [00:45:00] changed over time? Because I think some of that research has changed

[00:45:03] **Aaron Boster, MD:** You're right. You're right. It certainly has. So, so women tend to develop MS. More often than men. What's fascinating is in the sixties. It was like 1.5 to one in favor of women. Now it's three to one. So

there's been an international rise in MS. In women, not in men. And we don't know. Which is like a very concerning quandary.

So women are a higher likelihood to develop MS than men. And this tends to be a disease of younger folks. So the average age of onset is 30, depending on which paper you read, you know? And so you could have a bell curve, you know, the twenties to the forties as the average age that I see of new onset of symptoms.

Now we used to say that it was a disease predominant of caucasians. And then we would say, but if you're an ethnic minority, you have a more aggressive disease course. Now I think recently we even challenged that. And it's starting to become more prevalent and prevalently understood that, in fact, probably the, the prevalence in ethnic minorities is very similar to Caucasians, but the prognosis remains that they have a more aggressive disease course, which to me means we need to be faster at diagnosing so we can get them on high effective therapy quicker.

[00:46:13] **Meghan Beier, PhD:** You mentioned a few different symptoms, and there's lots of symptoms that people with MS are effected by. Can you share kind of some of the most common things or maybe even the things that have the biggest impact on people?

[00:46:25] **Aaron Boster, MD:** Absolutely. I would like to address those separately because I that they're different actually. So, so if we bucket symptoms, I would bucket them in three big categories. So I would say optic neuritis is a very classic symptom and that's, you know, the optic nerve goes from your brain to your eyeball and light goes down it in the back of your head where you process vision.

And if you think of the optic nerve as like a two lane road, when it gets inflamed, it's like a traffic jam. And so light signal going back dies and you don't see anything. And optic neuritis is a very common initial presentation of MS, it's also one that brings you to the attention of the doctor because humans who have vision problems attend the doctor.

Not so much, but whenever a human loses vision, they're very quick to go see a doctor. So that's one symptom. A second one is a bucket of symptoms, uh, in the setting of transverse myelitis. So Milo is Greek for spinal cord and itis

means inflammation. And transverse just tells you that both sides should be affected, although they don't have to be affected equally.

And some of the very best research and transverse myelitis comes from your institution at Johns Hopkins. And transverse myelitis causes an inflammation of a different highway of a different, so it's not the optic nerve, it's the spinal cord. And typically everything below the spinal cord can get beat up.

So you may have numbness or abnormal painful sensations from like the level where it is down. You may have weakness or in coordination of those arms and legs that are affected. And unfortunately the "down theres" can be affected bowel, bladder and sexual function because a lot of those things are housed within the spinal cord.

A third category is other brainstem lesions. So the base of the brain is really high real estate. So it's not very different than like Manhattan. And it's very hard to have brain damage in that area, without it becoming clinically manifest. And so the base of the brain has a lot of the functions that runs your face.

So facial sensation and strength and symetry and all these other things, speech, characterization, et cetera. So we can see a brainstem syndrome.

Now, as far as what are the most impactful symptoms, it might not be what you think at first. Because for a very long time, we thought of MS. As a problem that we defined by a walking, which is an error because walking is not the basic determinant of quality of life in humans.

So I would say that the biggest impactful symptoms I divide into what I call the "up theres". And the "down theres". So the "up theres" are thinking and memory, energy and mood. A constellation that you deal with on a daily basis with your patients as do I. And unfortunately, in the setting of MS. People are twice as likely compared to general population to experience clinical depression. They are twice as likely to experience anxiety compared to general population, some evidence that they have an increased risk of bipolar disorder. Um, and, and so it's very, very common that people impacted by MS struggle with mood issues. Very, very common. The energy is the biggest symptom in MS.

Hands-down and it's a fatigue, which their spouse generally does not understand. The best I've ever come up with explaining MS fatigue to someone without MS is as follows. Monday, you go to work and you work a great day and you come home and you have dinner with your family, and then you watch TV and then you don't go to bed.

You stay up all night. Maybe you check out my YouTube channel and you watch half the videos, right? Stay up all night long. You're exhausted. But, you know, you slap water on your face, take a shower, put on your best face and go to work. And you work all day on Tuesday and you come home from Tuesday and you have dinner with your family, and then you don't go to bed and you stay up all night and watch the rest of my videos.

Then Wednesday morning, [00:50:00] I'll come to your house with some coffee and we'll go for a walk and talk about fatigue. And that's about the best I've come up with to help someone understand the profound and pathologic fatigue that people with MS can experience. It's actually the leading cause of loss of work because they're so freaking tired.

Now. Very very closely tied to mood and energy is cog fog, cognitive fatigue, and cognitive impairment affects upwards of 70% of people impacted by MS. And I think it's one of the leading causes of loss of work and people impacted by MS. And so the"up theres" are very commonly affected and people impacted by MS and oftentimes ignored by doctors much to my chagrin.

Because honey, it looks so good. You know, and if I come in for seven minutes and don't really actually talk to you and talk at you, you look fantastic. It was great seeing you I'll see you next time. And I never picked up the fact that you can't think through a math problem when you're trying to help your kid doing their homework or that you're getting lost in your own neighborhood.

Now the second constellation of symptoms, that in my opinion are very impactful or the "down theres." So the down there's our bowel, bladder and sexual function. And if you would like to make an adult human really miserable mess up the "down theres." So incontinence of urine, uh, or urinary retention, leading to frequent urinary tract infections, um, constipation is extremely common amongst people impacted by MS and unfortunately all of the circuitry of sex is in the brain spinal cord. And so it can take a hit and you can have pain during intercourse. You can have inability to achieve an orgasm difficulties with erection or lubrication. There can be a major serious problem. So to me, those

are the biggest categories that I want to combat to improve someone's quality of life.

[00:51:41] **Meghan Beier, PhD:** Absolutely. I deal with those things all the time, especially as you said, the "down theres," many times I work with people who aren't leaving the house anymore and their social life has died because they're not leaving because they can't find the closest bathroom. And yeah, so it, it's such a huge, such a huge impact. And certainly one where I think mental health providers can play a role hand in hand with the neurologist.

[00:52:06] **Aaron Boster, MD:** The, the relationship that you craft with your patients is unique within the field of medicine. It is an intimate relationship. Within intimate relationships and someone may develop a degree of comfort with you. They don't share with their spouse or their priest or their doctor. And so I love what you said. Because our goal is to make someone live their very best life, despite having MS.

And if they're comfortable enough to share with you that they're scared to leave their home because they're, they're scared to be incontinent. What a great service by helping encourage them to talk to their neurologist. I make a very big habit of talking about the "down theres" and the "up theres" with each patient, almost every visit in an attempt at helping them understand that I am sensitive to that, and I will help them. In hopes that it makes them feel more comfortable in sharing, because it's very embarrassing to talk about this kind of stuff sometimes.

[00:52:54] **Meghan Beier, PhD:** Yeah, absolutely. I had somebody recently who told me she's been working with the same neurologist for over 10 years and she never talked to him about her sexual dysfunction. So it's amazing that you bring that up

[00:53:05] **Aaron Boster, MD:** And it's super important. Um, you know, and, and again, I w I want you to have a really good quality life, and if you can't achieve an orgasm, that's going to be challenging.

[00:53:13] **Meghan Beier, PhD:** Yes. Yeah. It's going to impact you and you know, any partner that you have.

[00:53:17] **Aaron Boster, MD:** Amen.

[00:53:20] **Meghan Beier, PhD:** Earlier on you talked about kind of two different categories that you were looking for in that clinical history. And I think some of those tie to the subtypes of MS. But my understanding is that those categories are also not quite as distinct as we would like them to be. And so can you talk a little bit about those subtypes and how they overlap?

[00:53:40] **Aaron Boster, MD:** Absolutely. Absolutely. So, so human beings like taxonomy, we like to put things in boxes, even if they don't belong in a box because it makes us feel more comfortable. And so neurologists are good examples of that. And we're sometimes a little bit nerdy in our heads. And over the years, we've come up with a multitude of different ways of trying to describe MS.

And they all suck. The reason I say that. And the reason I use that word is because they do patients a disservice. Because all the phenotypes presently are the equivalent of saying, dare I say, buxom blonde in quotes. Right? So if you are ill appropriate enough to call someone a buxom blonde you're commenting on two outward features of that human being.

You don't know what languages they speak, what music they love, you don't know their politics or their personal history. You just knew two outward things about them that I would submit don't tell you very much. And that's about as useful as calling someone at secondary progressive MS, or something like this.

I look forward to a day in the future where we characterize MS properly, with immunologic and genetic discussions. We're not there yet. And so we're stuck describing the phenotype. And that's a very poor surrogate. Now, instead of getting really down a rabbit hole about all these different letters and alphabet soup, [00:55:00] I would rather think about it with you in two categories.

There's relapsing forms of MS and there's progressive forms of MS. Period. And the secret is they're actually the same disease. So relapsing forms of MS are characterized by having a relapse. A flare, an exacerbation, an attack.

If you have MS, and you've had a relapse, you have a relapsing form of MS. And we would fold into that term, CIS, RMS, SPMS, blah, blah, blah, blah, blah.

People with relapsing MS are at risk of having further relapses and they're at risk of progression. And fortunately we have 25 different formulations of drugs approved by the American. That have been shown to slow progression and

decrease attacks. Now there's a second kind of MS. That we see, which is a progressive form of MS.

And this includes both primary progressive MS. And secondary progressive MS. Now the lines are indeed blurred. When I was in training, it was "impossible;" it was "not possible" that someone with PPMS could have an attack. Except they could. And we would see it and we would be like, I don't know. And we give them steroids and then they get better, but they still have PPMS.

So we've become a little bit more honest. And people with primary progressive MS typically don't have attacks, but they can, and people with secondary progressive on us have a relapsing form of MS that are still at risk of attacks. So at the end of the day, I think that we've done a relative disservice by coming up with all this taxonomy without underpinnings that makes sense. Right? Cause they're not based on pathology. And I think that the farther we move away from that. You know, my patients have MS and I give them medicines to slow the accumulation of neurological disability to prevent attacks and prevent new spots on MRI. And that's my goal. And that's my goal if they have PPMS and that's my goal if they have a relapsing form of MS.

[00:56:56] **Meghan Beier, PhD:** You talked about attacks and there are "real attacks." Right? And then there are the kind of exacerbation yeah. Pseudo attacks, right. Those experiences where maybe people are sensitive to heat or things like that. Can you share the difference between those two?

[00:57:13] **Aaron Boster, MD:** Yes. And just a point of clarification, the two attacks are real, so they're not, they're not a, um, a make believe. Or sometimes people misinterpret and they think pseudo means fake. Except it doesn't mean fake any similar to, but it ain't. And so a pseudo attack is when a human being has a real neurological problem, but it's not because of new inflammation in their brain.

So it's because old damage kind of came back out to visit them. And I'll use The example that you had of being overheated. So a really good way to get overheated is to have a urinary tract infection or a fever of some sort. And it raises your core body temperature and old areas of neurological injury short circuit allow me to explain. So we'll use as a prop this wire. And let's pretend that this is your, uh, this is your, uh, extension wire for your Christmas lights. Okay. And you have it out and your husband's using the snowblower and he runs over it and he doesn't cut it in half, but he cuts it. So he does what any

proper husband would do, he just puts duct tape around it and puts it away. And the next year you get it out and you plug in one Christmas light and it's beautiful. It's green. It's very shiny. It looks gorgeous. And then you plug in a bunch of other Christmas lights and the thing short circuits. Because you've overloaded the circuit. When he cut it, it's now damaged.

And it doesn't work at a hundred percent. It works at 90%, which is good enough for a couple of Christmas lights. But if you try to plug them all, they short circuit, and then when you start to unplug Christmas lights, then it starts up again. This is your optic nerve when you've had optic neuritis. So your optic nerve no longer functions at a hundred percent.

Maybe it functions at 80% and under normal circumstances, you're cool in the gang. You can see just fine. But if you have a urinary tract infection or COVID, and your core body temperature raises. It's going to cause this to short circuit and you're going to revisit old injury. Now you really are blind.

You really can't see, but it's not a new optic neuritis. It's an old optic neuritis. That's coming back out to say hi. And fortunately, when the core body temperature drops, that symptom typically dissipates and goes away. It's interesting because someone will come to me and say, Aaron, I'm having an attack and I'll check their urine and they have a raging UTI, and I don't treat them with steroids. I treat them with antibiotics and the neurological status gets better. So that's a pseudo attack.

[00:59:27] **Meghan Beier, PhD:** Right. And for real attacks, how does somebody know if it's a pseudo attack versus a real attack.

[00:59:34] **Aaron Boster, MD:** So I think if you're having an MS attack, then the typical definition is new neurological dysfunction lasting more than 48 hours in the absence of a fever. Why in the absence of a fever? To avoid the pseudo attack concern. Also typical definition suggest a month of disease stability leading up to the attack. Again so that there isn't some other thing creeping in.

Um, it is complicated though, because you can [01:00:00] have an infection which then triggers an attack.

[01:00:03] **Meghan Beier, PhD:** Hmm.

[01:00:03] **Aaron Boster, MD:** How do you sort that out? Well, someone has neurological stuff. You identify an infection and treat it. And the infection is done being treated in the neurological stuff persistents and gets worse. Great. It triggered an attack.

Now we give steroids.

[01:00:15] **Meghan Beier, PhD:** Okay. That's super helpful. How does MS progress over time? And I know that's very different for every individual, and has that progression over time changed with the advent of these new high efficacy drugs?

[01:00:29] **Aaron Boster, MD:** Your question is profoundly contemporary as there was a paper this week on that topic. So thank you for asking the question. So, so. MS over time. I like to think of it in two categories, the natural history of MS. And then treated it MS. Which is rather different. So the natural history of MS is a very unpleasant experience that I don't like to participate in.

And the natural history of MS is a very sad story where people lose neurological function, um, and, and just continue to get worse. And that's really what we saw up into the sixties and seventies and eighties, when we didn't have therapies. Uh, that's what my family experienced. My family experienced the natural history of MS because my uncle was fixed in a wheelchair long before the first MS therapy was FDA approved. And when it came out, it was a lottery and my family did not win the lottery. And so we were not eligible to receive therapy.

Treated MS is rather different. And in 2021, as you and I recorded this podcast, we are able to make MS boring. We can't cure MS, we can make it boring. So, so that's my goal in clinic is to, yeah, you have MS, but it doesn't get to pick what you do.

You do. If you want to do a postdoc, you do a postdoc. You want to climb Machu Picchu, you climb Machu Picchu and we don't let MS pick for you. Now, fortunately, um, in this paper that I just referenced, uh, which came out this week was lovely. And what it showed epidemiologically is that MS is occurring more frequently and it's less severe. And the paper suggested there were two drivers of that.

The first one is better diagnostic criteria leading to an earlier diagnosis. As I mentioned earlier, earlier diagnosis, earlier application the therapy, better outcome. And the second one is we have drugs. So if you look at the epidemiology in the last twenty-five years, the, the, the experience of MS is much more mild and we believe in large part that's because of the application of disease modifying therapies.

[01:02:26] **Meghan Beier, PhD:** That's great. That's great. I'm going to switch gears a little bit here, because I've asked you a lot about what MS is. Um, but in your experience, if you were referring somebody to a mental health provider, what would you want that mental health provider to know about MS.

[01:02:42] **Aaron Boster, MD:** Very very important question. Um, and in fact, I hand select my mental health providers who I've worked with for years and years because I sent them so many patients. We've had so many conversations. They're typically very savvy. Um, because it's such a barrier to have to explain to someone what the heck MS is that sometimes it prevents someone from wanting to go to a therapist cause they don't want to have to tell yet another stranger, their entire story.

So, so having a sensitivity surrounding MS, where you're not saying, "is that a brain disease?" You know, where it is is, is really respectful and, you know, and, and, and to be expected. I think, I think understanding that people impacted by MS can be cognitively impaired and have cog fog and can have other cognitive deficits is very, very relevant and helping them understand or understanding the degree of fatigue they experience is very relevant. The needs of someone with MS, in the mental health space sometimes can, can, uh, be more intense, um, or they may be needed more often than the general population as a result. And it's my opinion, that frankly, all adult humans benefit from a therapist. I have benefited greatly over the years from working with therapists.

You guys are very helpful. Thank you. And, and people with MS are people. Except they're people that are, that are stuck with some things they don't want. And so. To not be upset about that is to not understand it. And to appreciate that it's not Okay is an opportunity to then work on it. And, and I think, you know, I would want a mental health professional to understand that, that this is a vibrant human being, trying to do their very best they can, and they just need some help.

Um, you know, I, during the pandemic became, um, much more competent as a psychiatrist because I couldn't get any psychiatrists to help. And so I now mixed medicines that I never thought I would put together. Um, with success in, in an effort at trying to help patients. And I would submit to you that if there's a silver lining to the COVID-19 pandemic, it's what you and I are doing day-to-day, which is telehealth. Because you can deliver care to someone in their living room and arguably maybe more effectively in some respects.

And so, you know, I think that the ability for my patient to connect with a trained therapist, a good listener, someone who cares and will help them process from the comfort of their home is a [01:05:00] gift. Um, and so I have leveraged that to the extent that we can in our practice.

[01:05:05] **Meghan Beier, PhD:** Absolutely. I 100% agree with the telemedicine part of it. Um, not only did we have a huge influx of people who we started seeing. We see people more consistently for longer and we see more disabled individuals because they couldn't make it into the clinic. And so now we really are able to meet more people.

[01:05:26] **Aaron Boster, MD:** That's very, very special. I'm delighted to hear that. And it's my strong hope that, um, when the world starts to develop its new normal, that we maintain the benefits of telemedicine for patients, I would be very remiss if that went away.

[01:05:40] **Meghan Beier, PhD:** I hope so, too. So thank you so much. I really appreciate all your time and expertise. If people want to follow the work that you're doing and, I know you have a YouTube channel and you have lots of other things going on. Where can people find you?

[01:05:54] **Aaron Boster, MD:** Oh, so nice of you. You can check out our website at, BosterMS.Com. So B O S T E R M S.com. That's the Boster Center for Multiple Sclerosis. I do have a YouTube channel. I make YouTube videos every Monday for folks impacted by MS within a goal of kind of upping their game and educating and energizing and empowering.

Um, and so you can find that YouTube channel, it's my name Aaron Boster, MD. And I do live streams once or twice a month, which are super fun and kind of ask, you know, ask me anything formats. I also have a presence on Facebook and on Twitter and LinkedIn. Again, it's my name, Aaron Boster, MD. And on those media, I typically will put out the latest and greatest research from the

night before, each morning to help people impacted by MS stay up to date. So those are places where you can find me, uh, and, uh, you know, don't be a stranger. If you're in the internet, stop by and see.

[01:06:45] **Meghan Beier, PhD:** Wonderful again. Thank you so much for all your time.

[01:06:48] **Aaron Boster, MD:** Oh, it's my pleasure. Have a great day. And thank you again for having me.

Kevin Alschuler, PhD

[01:06:51] **Meghan Beier, PhD:** In this final interview, you will hear from Dr. Kevin Alschuler. And as I mentioned earlier, he's going to speak about his study, looking at the emotional symptoms of people, newly diagnosed with multiple sclerosis.

[01:07:04] **Kevin Alschuler, PhD:** In 2014, we received the grant that you mentioned, um, from the National MS Society. And it was for a study that we ultimately named the life after new diagnosis or LAND study. And the goal of the study was to get a better understanding of the experiences of people newly diagnosed with MS, in, especially the first year following diagnosis. There's not a lot of research that has been conducted on newly diagnosed patients for a variety of reasons, including just the fact that that's a very challenging time for people living with MS and participating in studies is probably not high on most people's agenda at that point.

But we were really curious on the question of, you know, what's it like to be diagnosed with MS? What symptoms do people already have? Uh, both physical symptoms as well as psychological symptoms? And then how does that evolve over the course of that first year post-diagnosis? And our thought was that, you know, from our clinical care, that there are some patients who start out doing really well, and then as reality sets in and it seems to get harder for them. There's other patients who start out struggling and after a while, it seems like they get their footing and things get better, and others seem more consistent. And so we wanted to look and see if we could learn more about whether those patterns are actually present and if they are, why and for whom and how that impacts important things like quality of life.

[01:08:47] **Meghan Beier, PhD:** Yeah. And I think I've seen some of that as well. I mean, interestingly enough, I was in a meeting, with a neurologist last week who said, he started bringing a social worker around with him because people would cry when he gave the diagnosis. And now here go talk to the social worker, and there is, there's also been people that I've, I've spoken with who felt relieved after getting the diagnosis, because it was such a question mark for a long time; or they finally felt like they got validated. Or, you know, I've had people who got the diagnosis felt very anxious, saw me a couple of times and then said, okay, I'm good.

So maybe similar patterns to what you're describing. What were some of the take homes from that study? What did you find?

[01:09:31] **Kevin Alschuler, PhD:** Yeah, well, first off we've experienced a lot of the same things. Yeah. I've definitely had, uh, probably the highest proportion of some patients have had a long and winding road up to their diagnosis and there is this phenomenon, that you wouldn't necessarily expect to see, where people are almost relieved to get this diagnosis. Not because they want MS, but because it's gone from a mystery and an unknown to at least something that has a name.

[01:10:00] We were a bit surprised actually by the results. We have the papers actually currently under review, so hopefully those will be out in the world soon. But what we noticed is that. Uh, there was a lot more stability in the first year than we expected. And, um, it it's a variety of stability. So some people were doing well and that stayed stable through the whole year. Uh, some people were suffering a lot and that stayed stable throughout the first year and everything in between, but there wasn't a lot of variability over that first year.

And we don't know why that's the case, but it could be for some of the reasons you mentioned. That some of that adjustment probably starts leading up to the diagnosis. And it also could be that one year isn't enough time. That we need to look at three years or five years, you know, a longer adjustment period, and that one year just wasn't enough time to catch that variability.

The other thing that, that really stood out to us in the results was that most patients already have a number of physical and psychological symptoms at the point of diagnosis, and often at a level that's impacting their functioning and impacting their quality of life.

Some of this may be a reflection of the fact that the symptoms started a while ago. It took a while to get today. To, you know, being diagnosed with MS and so, it's not like this it's truly new on the day that they were diagnosed. But I think it's a really important lesson that we've learned from the study and fits with one of our motivators, which was that if we can understand what's going on earlier in the disease course for patients, we might find ways to help patients earlier.

As I know, you know, from your clinical practice, um, the kind of traditional way that we've been used, it's, we're called in to help people, once things have fallen apart, and it's really hard to help put things back together or dig out of a hole or, you know, whatever metaphor you want to use. And it's a lot easier to help people when there are early signs that things are headed in the wrong direction and to try to help move things back in the right direction, um, before they get into a difficult place.

And so this study, by showing how, you know, how many physical and psychological symptoms patients are already having early on. It reminds us that maybe people like you and me should be involved with our patients on the front end, not down the road, after things are, are more difficult.

[01:12:48] **Meghan Beier, PhD:** Right. So almost giving tools that people, you know, it or highlighting the tools they already have, or maybe even giving them tools to work with so that as the disease progresses or changes that they have those tools to lean back on.

[01:13:01] **Kevin Alschuler, PhD:** Absolutely.

[01:13:02] **Meghan Beier, PhD:** I'm curious, were any of the people in that study also in psychotherapy, or was that a rule out

[01:13:10] **Kevin Alschuler, PhD:** It wasn't a rule out. Um, in fact, our goal was to get as many people from as diverse of a population as possible, um, diverse in terms of demographics, but also in terms of their MS disease and their treatments and so forth.

The only limiting factor is that it was patients from two clinics here in the Seattle area. And we limited that, because we wanted to make sure that patients had been diagnosed consistent with the formal criteria for MS diagnosis. And we knew the providers in these two clinics really stick to those

criteria. So we wanted to, control that piece. But other than that, the study was open to a broad variety of patients.

I couldn't tell you off the top of my head, how many were in psychotherapy or were receiving some kind of mental health care. But I know there were some, and that wasn't a rule out.

[01:14:08] **Meghan Beier, PhD:** Okay. Interesting. Um, and I guess, you know, either from this study or just from your own clinical work, it'd be interesting to hear a little bit more about what are some of the barriers or some of the concerns and worries that you've heard from patients either before they're diagnosed or shortly after they're diagnosed.

[01:14:29] **Kevin Alschuler, PhD:** So I think, you know, if we're going to take the perspective that a study, like this reminds us, that we can help people early on, then we need to have a good perspective on the idea that there might be a certain factors that impact patients and that we're not treating necessarily full blown, major depression or an anxiety disorder or something like that. But we're, we're kind of treating signs and symptoms or we're treating factors that might ultimately lead to having those [01:15:00] problems.

So when you and I were working together there, um, they started to focus in on the concept of coping with uncertainty. And that's one of those factors that. It can kind of, um, lead to depressive symptoms will lead to anxious symptoms, lead to future problems.

And so this is one of the most common things for MS patients, that their future is uncertain. They don't know if when or how their MS is going to get worse, how that might impact them, how that might impact their functioning, their quality of life. And we unfortunately don't have great answers for those things.

And so there is a lot of uncertainty and, and most of it can't be solved for our patients. And so this was a theme that we picked up on in our study that uncertainty is difficult for patients, but also the ability to co-exist with or tolerate uncertainty varies a lot from person to person. And that, if we can help patients become more tolerant of that, uncertainty, be better able to co-exist with uncertainty, that may be a really important skillset that can help get them on a, the healthier, better, more favorable path, over the subsequent years.

[01:16:24] **Meghan Beier, PhD:** Yeah. And, um, am I remembering correctly that you had some follow-up studies or at least some papers looking at Acceptance and Commitment Therapy strategies to manage uncertainty?

[01:16:34] **Kevin Alschuler, PhD:** Yeah, we did. So, yeah. And that was really like the goal of the study, right? It was to understand this patient population, but from that, then to figure out what are some ways that we might draw in new treatments. Or adapt treatments, to start addressing some of these issues. And so the uncertainty, uh, concept, for example, led us to looking at different ways that we might help patients manage the uncertainty of living with MS.

Our traditional approaches have been that we treat the resulting problems. So if a person's struggling with uncertainty and it makes them anxious, we treat the anxiety. We wanted to look at, could we do it the other way? Could we help patients better manage uncertainty? Which would then as a by-product reduce their anxiety.

And so we ran, myself and Ivan Molton, who's another colleague at the University of Washington. Ivan got a pilot grant and now a, full grant from the National MS Society to test two different treatment approaches. One that's more of our traditional Cognitive Behavioral Therapy (CBT) type approach to managing the resulting distress. And the other, a more Acceptance and Commitment Therapy and Mindfulness based approach to learning to co-exist with and accept the presence of uncertainty in an effort to reduce the district. Uh, the pilot results were super favorable. So we'll see. We're in the middle of the trial right now.

We'll see which one's better. And a question that we've also been doing a lot of research around and we'll be able to answer it here is that it's to not just look at which treatments better, but which ones work better for which patients, and trying to do a better job of being able to match treatments to different patients and make better choices as we pick treatment plans for patients.

[01:18:33] **Meghan Beier, PhD:** Another colleague that, you know, well, Abby Hughes and I were just talking about, a trial that we ran in couples. And we were looking at either a traditional support group versus themes from DBT Dialectic Behavior Therapy for emotion tolerance. And and that was done with both people with MS and their support partners. And we found so far, we

found a significant difference that the people who were sort of taught, both of them and their support partners, to tolerate that emotional distress, which could also be uncertainty were doing much better after the trial than those that were in a traditional support group. Even though they had lots of favorable things to say about being in that support group.

[01:19:17] **Kevin Alschuler, PhD:** Yeah, that's, that's definitely interesting. And I think, you know, so much of our patients' orientations as well as the medical field's orientation, and even some of our orientation, that's psychologists to try to fix problems, right. People want to make things go away, especially if it's distressing and uncertainty, um, having certain emotions as you were just talking about it as well.

Um, You know, is unsettling. Obviously for most people, it's distressing for most people and there's a motivation to make it go away. And I think a condition like MS poses such a big challenge because there's such a big piece of living with MS that we [01:20:00] can't make go away. If people are in that mindset that I have to fix it. I have to make it go away. They feel very stuck because they've kind of started spinning themselves in circles, trying to find a solution. And if we can give new or different skills, um, that, that our patients can use to co-exist with that uncertainty, I think it really frees them up to not get spun up on these challenges, and instead put that time and that energy into the things that make their life better.

[01:20:36] **Meghan Beier, PhD:** Yeah. And as you were saying that I, I was thinking about a couple that I'm working with and the patient who has MS was talking about how much that she felt, she felt guilty about how her emotions and her physical symptoms are impacting the people around her. Her wife. Her family. When she feels sad and grief about her symptoms that she feels like she needs to hide that so that her wife doesn't feel distressed.

And so we spent a lot of time talking about how both of them can learn to tolerate that distress, so that they weren't feeding into each other. I do think these family systems are just as important as well. It's really cool study, and I'm looking forward to the results of the whole trial.

[01:21:18] **Kevin Alschuler, PhD:** We are too. We've also, um, spun off some other studies from this. So we did a pilot study looking at early pain intervention because we saw that pain is already prevalent in a high percentage of the patients in our study and is already at levels that would be

impactful or interfering. And that's another one we did a pilot study. We were looking at getting into a full trial for that as well. All of these are kind of taking things that we've done research on, but we've done research on with our patients who are 10, 15 years into life with MS on average. And we're saying, you know, what would it take to bring those interventions to the first year, three years, five years of living with MS? And is it helpful to bring them to those earlier stages? So some of this is building on our prior work and isn't necessarily new from that perspective, but it's new to this population. And if you think of living with MS is like a trajectory over time.

You know, making small changes early can result in being in a dramatically different spot later on. And that's what we're hoping we'll ultimately see in this research program.

[01:22:38] **Meghan Beier, PhD:** Yeah. That's awesome. Is there anything that you've changed about your own clinical care with people based on the results of this study or other ones that you've done?

[01:22:47] **Kevin Alschuler, PhD:** Yes. I think there's a couple things. One is our interest in uncertainty has definitely, um, impacted my own care. Like I spend more time on that with patients than I used to before. I think it was something, it was there. I was aware of it. We obviously talked a lot about it with patients, but now thinking more about like really what do we do to help patients?

And obviously a lot of that's what's in our study right now as well. But the other thing is that I have a strong interest in not just the care we provide a psychologists, but the role that we can play in a multidisciplinary center. So our MS center has neurologists, rehab physicians, uh, nursing and infusion area. Right near us, we have physical therapy, occupational therapy, speech therapy, and so forth. As a result of our interest in the concept of helping patients earlier in the disease course, we've started to build out some programs to do multidisciplinary assessments of patients early in their disease.

Our physicians have always kind of been the gatekeeper or the people who, you know, refer patients to us and they do a great job. But it's also the case that early in the disease, there's a lot of decisions to go on and there are to make. And a lot of, um, you know, you're getting on disease modifying therapies and you're helping a patient understand their diagnosis and you're getting imaging and so forth. And we thought it would be helpful that, you know, maybe we as psychologists should meet with patients and talk to them

about their situation and view it through our lens. And same thing for the rehab physician and our vocational counselor and, and so forth. And so, you know, it's all getting back to that same idea that if I meet a patient early on, I may notice something that we can help with that isn't getting high enough on the priority list in a medical visit. Not because they think it's unimportant, but because there's 50 things to do and it came in at number 30. And so it just didn't make [01:25:00] the cut when they were talking about it. And so that's been our goal so that we can, you know, again, draw patients in earlier.

And so that's more of a systems level change. It doesn't really change how we're, you know, Working as psychologists, but it does change who we're seeing. And we were off to a good start with that in 2019, then pandemic came around. Yeah. And so that's something, once we're back off zoom and working more in that team-based setting again, we're hoping to jump right back into that because it seemed like it was, was going to accomplish what we were hoping for.

[01:25:40] **Meghan Beier, PhD:** And what were some of those things that when you do that initial assessment with somebody, especially if I'm thinking about community mental health providers who might be seeing somebody with MS for the first time or who was newly diagnosed, what are some of the things that you look for in those initial assessments?

[01:25:59] **Kevin Alschuler, PhD:** Yeah, so, you know, I think in our earlier, newly diagnosed or early MS patients, we spend a lot more time looking at these subthreshold predictors of distress or a future distress. Right. And so things like uncertainty that we were talking about, but also maybe new symptoms, physical symptoms that they're having that have a self-management component.

And I think, you know, our medical system tends to be medications first. And then if that doesn't work, then we try other things. But we've done enough studies to know that many of the common MS symptoms are best treated by using self-management strategies or combining self-management with medications and, you know, so things like teaching fatigue management strategies, teaching pain management strategies, starting to look at introducing cognitive compensatory strategies or doing some cognitive rehab, you know, things like that.

And so I think, one of there's two things that I can recommend with working with patients with MS, especially in the early phase. One is to look for those predictors of future trouble. Right. And make that the intervention point, as opposed to saying, are they depressed? Or are they not? are they anxious? Are they not? But start looking at how do we help get patients on better trajectory. And then the other is having an appreciation for the fact that life with MS is full of managing and coexisting and adjusting. And it's very different than trying to fix or change, and get rid of problems that are in people's lives. Um, you and I would talk about this in the past. I think we've talked a lot about the idea of. Uh, uh, two layered approach where we try to fix the things a person's doing quote, unquote, wrong, right?

So maladaptive thoughts, maladaptive behaviors, and so forth. But then when that's done, they're still stuck with life with MS. They're still stuck with symptoms. They're still going to have an impact on their life. And so then we shift into that, that idea of management and tolerance and acceptance and willingness and all the more ACT type themes that give the person the tools to live their highest quality of life despite the fact that there are these challenges in their life.

[01:28:39] **Meghan Beier, PhD:** Oh yeah, absolutely. I spend a lot of time telling people that it's okay for them to feel sad sometimes, or feel frustrated sometimes or whatever, but we just don't want to live in those feelings forever. So how do we experience them? Um, acknowledge them and then, you know, continue moving forward and living, like you said, the best life despite MS.

You've talked about a number of different things like intolerance of uncertainty or learning to tolerate uncertainty. You've talked about self-management strategies. You've talked about, ACT based strategies. Many of these things I think are going to be familiar to most mental health providers. But if they're not, do you have any go-to resources or things that, books or articles or websites, things that you like, that provide good explanations of some of these themes?

[01:29:29] **Kevin Alschuler, PhD:** Yeah. So I think we have a variety of resources, some of which are specific to, um, the various topics you brought up and some of which kind of help guide us as we're then merging MS into it. Right. And so, um, for example, on that last one, there's the classic ACT workbook: "Get Out of Your Mind and Into Your Life," which is not at all MS

specific. But we use that a lot with our patients cause it's a nice, clear a [01:30:00] workbook that can kind of partner with our treatment to help patients learn acceptance strategies as, as part of our work. And then we view our job as bringing in the MS context and shaping it to our patients.

I think self-management of physical symptoms is probably the area that tends to be more familiar to rehab psychologists or health psychologists, then to psychologists who have other areas of focus. So that's, you know, learning those strategies, the non-pharmacologic strategies, to manage pain or fatigue, for example.

We worked with Anna Kratz at the University of Michigan, then another trainee from the same pipeline as you and me. Yeah. Um, and, uh, developed a web based package called My MS Toolkit. We did that a couple of years ago and that is for patients to use, but I think it could be very helpful as well for providers who are wanting to learn these approaches to, to look through that. And so it's a variety of modules all of which are targeting, pain, fatigue, and depression in MS. And we walked through various components. So there's you know, on thoughts and then behavioral strategies and on relaxation, sleep, communication and so forth. And I, and I think that could be a helpful resource to look at as well. And, um, I believe that's my MS. Tool kit.org. .

[01:31:35] **Meghan Beier, PhD:** I actually talked to Anna Kratz. So, um, if you're listening to this, this is one of the first episodes, Dr. Kratz is coming later. She's going to be talking about managing fatigue and some of these themes. She does also talk about the tool kit, so that will be available for people to find.

[01:31:51] **Kevin Alschuler, PhD:** Great. Yeah. And I think one of the things that makes MS care there lively for us, but also very complicated is that most patients have many symptoms. And so the interventions we all learned in grad school and that we'd all love to use with patients are. Single issue six to 12 session treatments that work great, but then you get our patients who are depressed, and they're having relationship problems, and they have, you know, a disabling fatigue, and they have pain that is intermittently problematic, and their cognition has changed and, and so forth. And. Yeah, it gets complicated to mix all those pieces together and to figure out, you know, which to target first or whether we can take some of our interventions and teach overarching skills that then can be applied to the different symptoms in different ways as well. And so, like I said, it makes, it definitely keeps it from being boring for us, but it also makes it very complicated.

And I think sometimes when we first look at a case or when a patient's first coming in and describing all their challenges, it sometimes makes it look really difficult at first, until you start to dig in and realize that we can share skills across problems.

[01:33:15] **Meghan Beier, PhD:** There usually are some underlying themes that you can kind of pull out. I often tend to also tell people that even when there were sort of done working together and I just did air quotes, but, um, that, uh, many times that just means that we're on pause. If you never need me again, great. But if you, but if, as things change or, you know, as new symptoms crop up, that we can always do sort of booster sessions and revisit some of those themes that may be were present from the beginning.

[01:33:46] **Kevin Alschuler, PhD:** I totally agree. I talked to patients about becoming a better self manager becoming better at adjusting, as opposed to probably what we typically do, which is to say, you're here to get better at self-managing your pain, or you're here to adjust to this new change in your mobility, right? Like we may use that as the centerpiece of our treatment, but the broader goal is are they learning how to, to adapt and adjust over time? Are they learning how to self manage symptoms in general? Because that's the nature of MS. There's probably going to be more changes. Probably going to be more symptoms over time. And so if we can start early with teaching some of those skills and helping our, our patients learn to use them to their advantage and to help cope with changes, then hopefully they are able to use them even better as time goes on.

[01:34:45] **Meghan Beier, PhD:** Absolutely. Well, thank you so much. This was really interesting. Lots of really good information. If people want to follow you or find you on social media or on websites, where's the best way that people can learn more about the work that [01:35:00] you're doing?

[01:35:01] **Kevin Alschuler, PhD:** Sure. So, um, our research group, uh, now has social media and a website.

We are at, UW, like University of Washington, www.uwmsrehabwell.org. We're on social media as well, on Twitter @uwmsrehabwell, um, and then, uh, I personally have: http://kevinalschuler.com and @KevinAlschuler on Twitter. Um, so, uh, my last name is A L S C H U L E R. Um, so you can find us on those, those places as well as, like I mentioned, like we have the, My MS Toolkit site as well https://mymstoolkit.com/.

Conclusion

[01:35:43] **Meghan Beier, PhD:** Thank you for listening to the Find Empathy podcast!

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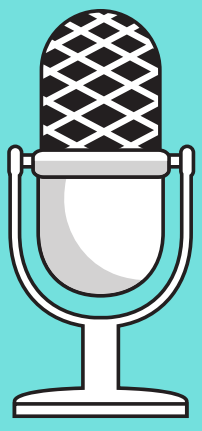

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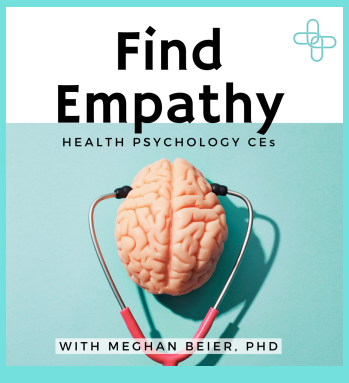

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