Introduction and Guest Background

This is Doctor Talks, real talk from real doctors on the issues that matter to you most. Welcome to this episode of Mold, Microtoxin, and Chronic Illness.

I'm your host, Dr. Anne Shippey. Today we have Mike Schrantz. He's a building scientist. He's the owner of Environmental Analytics in Tucson, Arizona, where they do environmental assessments in residential, commercial, medical, and have a global reach.

He's the member of multiple organizations to try to help advance this field. He's very passionate about it. I think he lives and breathes it. So I'm really happy to have you here today, Mike.

Thanks so much for taking the time to share your wisdom. an absolute pressure and I look forward to it. So I think this is one of the most challenging areas of helping my patients get well from mold and microtoxin illness is really making sure that we get them into a clean environment.

And so you play, you and your peers play such an important role for us and yet we're not building scientists. And yet I, you know, a lot of times I have to help guide the process.

So I'm really grateful for people like you that are, you know, really partnering with the docs and really care deeply about helping people get well. Yeah, absolutely.

Definitely is a village. Definitely takes an effort of the clinical discipline and the environmental discipline to get it right. And I'll tell you what, if there ever was a common theme in the different camps of chronic illness, it's to get out of exposure when the environment is considered to be that type of an exposure.

So yeah, I can't wait to dive into it with you. Yeah. So let's start out with the first step. I've told my patient, yeah, I think at least one of the important root causes is that you're being exposed to the toxins from toxic mold and you need to figure out where it's coming from.

So you need to choose an inspector. So usually I'll give them two, three choices of people that I've worked with before, but I tell them, you know, it's really up to you.

You get to pick who you want to work with. And of course I have patients all over the country. So There are some areas that I know people that they can access better than others.

So for the person that's choosing an inspection inspector, what kinds of questions, what kinds of things should they look for? You know, I think the, I can't wait to give you a couple of good resources for your, for the audience as well, but.

You know, honestly, it's a passionate understanding about exposure and chronic illness. Unfortunately, it's almost like a light switch in our industry.

You either seem to be cut from the cloth. That's the traditional inspector who is going to go into your house for 30 minutes with an infrared camera, look for thermal anomalies, say that they don't see a moisture or mold problem, maybe take a sample in the air in the living room.

Everything looks okay. And they're off and they just charged you for it. And your doctor is getting confused because the data doesn't seem to match the hypothesis of exposure.

And then on the other side of the equation, you have those who do understand. You have those who realize that

this is not an issue of trying to find something that has to be 20 square feet of mold growth on a wall to justify a problem.

Most of the issues that.

How to Choose a Qualified Inspector

I work with with clients on are hidden you don't you don't see them in fact I love it not for the client's sake of course but I love it when I do have an easy one where it's like oh well maybe there's you know you have all that mold right there you should obviously address that normally it's hidden so I think it starts with a a thorough understanding and appreciation for your chronic illness these IEPs indoor environmental professionals They don't they're not doctors we need to stay in our lane any any IP that's out in the field that's telling you about mold and how it's this it can make you sick and get into the details and maybe tries to address your symptoms you that you don't want that sort of individual working for you because confusing and it can cry it can run in the way with what people like and are doing to help you from the clinical side.

However, Being able to appreciate the fundamentals of what is what is exposure to toxins what is chronic inflammatory response what is lime what are the other sorts of chronic illnesses that are affected by this is key.

Sitting down and talking to you about that and taking the time to learn your story. I think that's where it all starts, Ann. I mean, every client I work with, if I'm out in the field with them, the first 30 minutes of my visit is sitting down and talking to them.

It's learning. It's basically like a client interview, a client intake, just like you probably handle your clients when they walk through your door. Yes.

I love that part of it too. It sounds like Q2 too, where you really get to establish the relationship and really get the context for what we're up to.

Well, and what we can learn. They'll tell us little tidbits of things that they just overlook. Eight times out of 10, I'll have a client tell me something, we'll ask about the history and then they'll just nonchalantly say, and then we had this little toilet over for a week, but that wasn't much and they'll keep on talking and I'll have to pump the brakes and go, wait, wait a second.

Do you mind telling me a little bit more about that? And so there are so many pearls that you can learn because so many people assume that unless it's a flood or a major leak that flooded a quarter of the house that it couldn't have produced a microbial issue in their house.

Beautiful. I think that's really one of the signs of a good inspector is somebody who is really helping to uncover those clues. Go ahead. No, sorry. I was going to say it's challenging because that's a great important point.

I know that there's a lot of things that still people there's, you don't want to hire somebody who's going to take advantage of you or they, they might be a great sales person, but they might not actually understand what you're going through.

It's been such a challenge in our industry and probably why you asked the question that we've done a couple of things in the industry to help individuals, for example, and a minor shameless plug or IEP radio, which is what I am the host of as a free resource for those listening.

Is that episode 28 talks about what to look for and it gets into the details of it. This idea of not playing doctor, the interview with the client. I'll just, I'll just broadly stroke it.

We can dive in where you want to go next, but the visual assessment, the walking through the house or the building to see what are you seeing that's obvious or suspect.

the huge topic of sampling and what questions do we think this sample is able to answer? And then of course, does it make financial sense to spend the money on that?

And I would say most importantly too is what's the output? We have a lot of clients that come to us and they'll have hired an inspector that did a decent job.

I know it's a bit subjective, but then they'll hand a report and it'll be just a copy of the laboratories. like findings of the lab data, but they'll have the title, like my title right here will be on it, but there's no interpretation.

We often don't leave, environmentally speaking, the interpretation up to a laboratory because the interpretation of mold and mycotoxins is a very complicated field because we live on a thing called Earth where we're surrounded by mold and mycotoxins and we're going to have a normal background level and a lab doesn't Sometimes be able to are not able to really understand if a level is elevated or not, but yet they'll leave the lab to do the interpretation.

And then they'll sell them have any recommendations. So if you're working with an IEP again, indoor environmental professional. and they're going to do all the other things that we've talked about.

They've sat down with you, they've talked to you about what their plan is, their sampling, the value of it, what questions, the limitations of the samples.

I mean, to be very transparent, they need to be able to produce a report with you with recommendations, detailed step-by-step recommendations, not something that says, I think you have a problem in your basement, good luck, figure it out, but here's what we've identified in your basement, and here's the step-by-step recommendations to remediate it.

That's beautiful. So do you think maybe a way to assess that would be to ask for a sample report from a couple of different inspectors? Do that all the time.

See the level of effort that goes into it. Yes. I mean, some of those reports, they probably can take a whole data, right? Yeah, I would say to your point, asking for a sample report can go a long way.

And the great thing about what Anne just brought up was that you could do that before they even stepped foot in your house. I mean, this is just like, can you email me something, show me an example of what you do?

And then you can review that and say, okay, I understand this, this makes sense. And that's kind of the quickest way to do a little litmus test of what they can.

I think the other end is, of course, and we might dive into this a little bit later, is overwhelm. uh what is it analysis paralysis and the idea of getting 150 page or 100 page report 50% of it which is boilerplate and the client's eyes going cross-eyed because they don't really know what to do with all of that information they just kind of want a nice simple takeaway yeah you might want that data like as an addendum but really what you want up front is okay here's where the problems are and here's what i need to do about it Absolutely.

Absolutely. I mean, the summary page with the bottom line, just call it what it is. A lot of times the reasons that IEPs, like even myself, will have such a lengthy report is a combination of education and liability.

You want them to understand, but really it's the whole, because it's hard to say just one comment about something. Like when someone says we found a mold problem, what does that even mean?

Is a mold problem a square inch of mold underneath your kitchen sink? Is it mold that's more than that underneath your kitchen sink? Is it mold that's that plus mold that has transferred throughout the house through cross-container?

What's a mold problem? So you end up disclaiming a lot and that's all well and… to an extent that's understandable and appreciated. But Dan's point, if you can just put the main stuff in the beginning and then have a summary of

what the recommendations are going to be, then you can always catalog.

And a good report will do that versus just throwing everything at you and one big report that's not really broken out the way we're talking about and you're left overwhelming.

So yeah, that's a great suggestion. And we've done that a lot with virtual clients where we don't know that the IEP as we'll say, we'll get a copy of the report and let's see what they can do.

Beautiful. So we could segue to so many different things now. This is so awesome to get to do this with you. I think maybe let's go ahead and talk a little bit about sampling because what I've seen some inspectors do is they go through the entire house and collect a whole bunch of samples and then sit down with you at the end once they've seen everything, done everything.

and then strategize on which samples to actually test. And then after we do that, we'll go into the types of testing. Sure. You're going to have to ring me in from time to time on this, I'm guessing, Anne, but I'll do my best to address this, which I love that you pitched this to me.

Yes, sampling. So let's be clear on an assessment. It's not just the sample data that we're looking at. We're taking in mind we're weighing that with and or against the historic or visual evidence to support a finding and a conclusion or recommendation.

Again and the reason for that is because if we had a cheat sheet that said this particular mold species 14 is good and 15 your arm's going to fall off it'd be a lot easier to just look at the sample data and say well clearly this is 14 so you're fine I mean you need to look into this further Whereas it's not that in reality.

Understanding Sampling Limits and Spore Traps

Reality, I mean, your normal fungal ecology, where you're at right now versus where I'm at, are going to look different. And if you were to switch the data, one of our places might make it look like there's a mold problem in the other person's home, only to find out, nope, that's normal for that individual's home and climate and all of that.

So it's all that to say. When you get to the sample data, what you're really doing is you're saying, what questions are we still trying to answer? that the visual historic as evidence can't.

I don't need you to spend thousands of dollars in sampling if you have an obvious problem in your crawl space underneath your home with mold growing on the floor on the choices and then that sort of thing.

If there's a legal issue go ahead. Would you just say okay there's enough visible here like as you know looking in the air conditioning yeah that there's been a slowly beneath the sink Some of those things is just enough to say there's no mold here, there's no way there's not mold here and we should just treat it as mold regardless of testing.

Yeah, let's go there. So we'll use the example of the HVAC system. First of all, so most of us in the US have a heating and air conditioning system to cool the air in the summertime, like where I live in Tucson, Arizona.

And inside of that unit is a thing called an evaporator coil. This is the part that cools the air where the air goes through. And in the process of cooling, it does oftentimes will remove moisture, the point where that moisture will condense.

It'll come into liquid form and drain out of the system as designed. So far, so good. But a lot of times those areas that evaporator coil and housing that surrounds it.

experiences so much moisture and there's so many available. Remember, mold spores are viable. They're everywhere. We're breathing them in right now. That's called normal fungal ecology.

Well, those are still in the air as well. They can grow in those systems. So to Anne's point, if we go into a system

and we see obvious growth as a professional, It really does boil down to confidence and assumptions.

Is it reasonable to conclude that this is microbial growth or do we have a patient, a client that's looking at this and going, you know, I really want to document this because it's a lot of money to clean this.

And it's like, yeah, we can do a sample. The good news is, is it doesn't cost a second mortgage to do a quick sample on something in the evaporator oil.

But yes, if it's what we call a flat tire. Obvious problem going to recommend clea where sampling can be very comparing baseline. Dr Sh done and we're trying to data in the home that wou clinical biomarkers that she's using to show exposure.

But for the most part, we don't, we don't to your point about the kitchen sink leak. Yeah. If we have, I've had times where we've looked at the bottom shelf underneath the kitchen sink cabinet and it's warped.

It's, it's delaminated warped because of a slow ongoing leak. Now, in that particular situation that I'm thinking about, there wasn't obvious mold visible on the surface, but the warping and the, I guess you might say the breakdown of the structural integrity of the material was so severe that I know as a professional, the likelihood that you're going to have microbial growth underneath that area, underneath that bottom shelf is almost guaranteed.

And to go through the ethics of saying, well, we could test it, but what if it comes back negative? Am I still going to say, oh, well, it came back negative.

So leave that work piece. And thank you because that's it. That's the elephant in the room is, is where do we sit down with the. Client and say this particular sample, there might be some value.

Maybe it's because the spouse is sitting behind the other one and going, I'm not touching it unless there's in. And so it's like, fine, I'll do some sample and hopefully we get lucky.

But just so you know, we're not closing our eyes and just sampling for the sake of it has to make sense. Yeah. And even the EPA website says that if you get a negative test, you can't assume that there's not mold there, right?

There's arguments on both sides. And that is one good argument. That's right. It's never, it's never good enough. The testing is never good enough to absolutely prove that there's not.

And we can get into reasons why on that. Right. But yeah. And you brought up another thing too. There's so many places to go on this. Like it is really stressful for families, for couples to navigate this testing process.

Yes. There's such an art to this with each inspector and each home and each family to really get to the best answers. But the worst thing is to miss it or to make a conclusion.

And I've seen this time and time again where an inspector saw something warped, saw the wood around the window showing signs of having moisture. or dirt in the, you know, they'll call it dirt in the AC.

They said it was dry, so it's not a problem. It's dry, it's not a problem. And so the conclusions that the professionals are making are so misleading.

This goes back to and let me just do this real quick and then we'll go right back to the sampling piece, which is to the first topic of what to look for is if you have, I made a reference earlier about an inspector that comes out to your building and uses an infrared camera, which is looking not for moisture or molds, looking for thermal anomalies, changes in temperature.

And they use that as a tool to help then confirm if there's a moisture problem, because a lot of times if something has moisture on it, it's wet, like drywall, it'll be cooler and it will show cooler on the infrared camera.

So it's a pretty cool tool. You then can verify it with, and this is not a moisture meter, but then if you had a handheld moisture meter, you could put it up against the wall and go, oh, yep, that's moisture versus something that's not moisture related.

Here's the problem with everything I've said. There are inspectors that will go out to your building and say, well, I don't see any moisture. You're fine.

Yeah, but I had a leak here. Yeah, they say. But it's dry. That's a big no, no. Let me be clear about one thing. And this is I don't know that it's a hot debate anymore.

I think maybe 10 or 15 years ago it was, which is we don't care. whether the mold is alive or dead, growing or not. If you have a mold source in the home that happened from say five years ago, there was a leak, but maybe you repaired the leak and it's not leaking anymore, but they left the mold in the wall cavity, darn it.

We are still concerned about that as a potential source of exposure because of the inflammatory concerns that a vast majority of clinicians have. And that inflammatory concern is felt to exist where that mold is alive or dead.

So if you start talking with an inspector and they're all about like, oh, if it's wet or it's only a problem, if it's growing, That's probably the biggest red flag to not use them, because it's probably it's probably a good chance they're not going to find an active wet issue not leave it to me to say that and you listen to the listeners out there will find a bunch of wet issues, but historically in my experience.

we aren't finding active leaks in homes. It's issues that have happened in the past that have either been corrected intentionally, meaning somebody repaired the roof leak, but they didn't remove the mold, or it was an issue of like a leak in a plumbing line that oxidized on top of itself and temporarily fixed itself, but that's, it could happen again.

So let's not. Like when I had my first run in with mold, there was a flashing on the chimney. that when the wind, the rain and wind would blow a certain way, then it would leak, but it was never enough.

You know, it was inside the wall cavity where it was just running down and it would never, unless the timing was just right, it would have never been picked up with the moisture, any meter, infrared camera.

To your point, that's very common. It would feed the mold, move it a little further and then go dormant and then maybe that, yeah. With the way that, you know, building biology works, the desiccated microtoxins from that mold patch come into the house and come into the air and we breathe it in.

And that's what's making us sick. It doesn't have to be the actual mold cycle of growth. So I'm so glad that you have really emphasized this. Right. Yeah.

And perhaps going back to the sampling thing, like you said, it can be very stressful and maybe I can pull a layer of the onion here. There are, as many audience members, I'm guessing, know at this point, different types of mold samples out there.

For example, there are air samples. You sample the air for spores. Fragments, mycotoxins, those are the big ones. You can use a Petri dish to grow the mold to see what might be.

Let's get back to the spore trap again, just to talk a little bit more about what that looks like and so that people really recognize what we're talking about.

Yeah, that's a good point. What people are going to do when they're putting up a spore trap. Spore trap sampling, by the way, is probably used by, I would say 95 to 99% of inspectors out there.

And that's not bragging rights. It's considered to be kind of the, I don't want to even use the word golden standard because gold implies it's a good thing, but it is a thing that's commonly used because what it is, is it's a cassette about the size of a silver dollar, but a lot whiter.

It's about an inch, a little bit more than the inch thick. So, you know, it's, It's cylindrical in this shape and it goes on a pump or a tube hooks underneath it and it sucks air through it.

Um, there's different, there are different sorts of spore traps that sample different rates or mounts volumes of air, but the inherent design is the same.

It traps the spore in the cassette, hence the term spore trap, which then is sent off to a laboratory where they pull apart the slide and there is typically a sticky adhesive, um, slide piece of plastic that they look at stick under a microscope and they simply start counting the spores.

So that is what a spore trap sample is. So it's pretty limited information. You're queuing me up. Yes. So one of the issues with spore traps, I want to be clear because I know Anne knows this about me, but I'm involved in a lot of the different camps out there.

So I get the pulse of the arguments. And unfortunately, I know how to play nice in the playground. So I get along with a lot of people. What I can tell you is I don't think that spore traps are worthless.

I think a spore trap samples are worth less. And I think that having that gap between the words is important because I have seen situations where rarely, albeit, but spore traps can pick up high exposure issues or they're great for certain things like wall cavity sampling, which is not sampling the living spaces, but like say a cavity in the wall.

So you actually put the spore trap into the wall. Or you drill a tube that then is hooked to the spore trap and then it goes into the wall and it takes that sample.

But back to your main point is that in the vast majority of cases, these spore trap samples are somewhere between a five and a 10 minute sample. Let me just use some basic visual interpretations for everybody so they can understand it.

It's a grab sample. It's a moment of time, an average spore trap. And again, for those professionals listening, I'm well aware that there's different sample flow rates and all that, but even a sample that samples at 15 liters per minute, which is the upper limit of the amount of air that these spore traps will typically collect.

If you do a five-minute sample, that's about 2.65 cubic feet. So picture a cubic foot. Picture that and then just do it by two point, just say two and a half for easy math.

And if you did it times like a 10 minute sample, that's about five cubic feet. It's not a lot when you stop and you go, I got a lot more than that just in this room, let alone my house.

The other issue is that you might have heard me just say a second ago, a cubic foot or 2.65 cubic feet that's that's assuming perfect mixing it's not sampling all this the spores aren't getting in line like we did at legoland the other day with our kids and all taking our turn to go through the spore trap and be sampled there's going to be the only spores that will be captured within that spore trap is whatever was ever in the capture zone.

In other words, if this fist is the spore trap and this finger is a spore, if it's not close enough, it's not going to get sucked into that and get trapped on there.

It will just bypass it. And I could just walk by my pump and I might push that spore away or into it. So it's very to Anne's point. It's very limited and more times than not, and I would say cleanly across the board, what ends up happening is we get false negatives.

We get this issue where it's not that you can't have a house that doesn't have a problem. But when you have an issue of, like, say, suspect exposure, wherever that came from, whether it's visual evidence, whether it's working with your doctor and they're doing markers on you that indicate environmental exposure.

We'll see a spore traps being done, typically just one or two in the house, like the master bedroom in the living room, an outdoor control sample, and nine times out of 10, if not more, they will come back and they will say, we don't see a problem, you're fine.

And therein lies that huge issue with the limits of spore trap sampling. So, and especially for some of the molds that don't send out very many spores, right?

They send out more micro toxins and spores, or they're really heavy and it's not close to the pump. It's just not going to pick them up. Right. You, you, you dabble with heavier spores.

I mean, there's classic arguments like stacky botrys and ketonium where you don't normally see those in the air, at least not. picked up by these devices.

So it presents a challenge in that. And not to mention the fact that spore trap sampling itself can also have issues of bypass where some really small spores go right past the, they literally go around the slide.

So, so I think the summary is, and I think the consensus holistically by many professionals that I work with is that we w we don't use spore trap sampling as a in means to say that we think that this home reflects.

And here's a term that the audience needs to know about normal fungal ecology, normal background levels from the outside. There's no such thing as mold free.

You have to find a bubble on Mars if you want that, but to be clear, but we're talking about some other fungus on Mars. Right. I mean, some moisture being determined.

So that's perfect. Out of bacteria, at least to your point. But people understand. And when we say normal fungal ecology, we're not saying it's OK to have mold growing in your wall cavities underneath your crawlspace.

Better Testing with MSQPCR and Mycotoxins

We just mean normal background levels of molds and mycotoxins. from the outside. And I think that there lies another issue, Anne, which is the interpretation of samples.

Not only in the case of spore traps, are they limited, but you'll have people that say, well, you don't have, your total spore counts inside of your home are less than the total spore counts outside.

And you're like, yeah, but the indicator molds inside the home are elevated compared to the control sample. What about that? So it just goes back to that interview question that you asked about in the very beginning.

Perfect. So the summary on spore traps. Let me see if I wouldn't use them. Exactly. But if you do happen to have a spore trap result and it's negative, you have to toss it out.

If it's positive, it might be helpful. Yeah. And please understand that what I'm spending the time and money on it. That's the issue, right? I know what Anne and I are doing is broad stroking the masses.

There's always gonna be situations where spore trap samples may have use. I have colleagues that I have a high level of respect for that will sometimes combine spore traps with other sample methodologies that we haven't even got into yet.

And I do think that can be complimentary because it does help address other concerns like air versus surface and that sort of thing. But you can't just say, if it comes back negative, I'm fine.

I don't want to make a mountain out of a molehill. And if your road to recovery is great and you're doing a great job with your clinician and you're getting better, I don't need to upset the apple cart.

But if you're plateauing, if you're not improving at the rate you should be, or if you're getting worse, we don't put many eggs at all in a spore trap.

We want to go, we want to dive deeper. Deeper. Okay. So then you were starting when I had to come back to the square trap, you were talking about plates and constant plates.

Great for helping identify. It's hard not to go into the weeds with you and I'm not going to on this one. You're doing great. It's good for looking for recent growth.

There's an argument to be made that if it's actively growing in the house or somewhere in the house that it would be viable. And if it's viable, it means that it's able to grow on an appropriate auger, which is this Petri dish with a certain auger in it.

I think the other benefit of Petri dish samples are they're affordable. As we know, we haven't talked about it yet. There are other sample options out there that offer, in my opinion, more benefits, but they're more expensive.

And sometimes if we're trying to dip our toes in the water and with assessing a home, knowing that we might do more, but we just kind of want to get the train moving to investigate it.

There is the potential to say, well, why don't we do five or six or seven or eight petri dish samples with professional guidance to see if we can find any hotspots.

Again, like spore trap sampling, however, it has limitations and we wouldn't conclude at all that everything's just fine all of a sudden because you didn't have stacky botchers or some other mold grow on a petri dish for a number of reasons, which I'm happy to get into with you.

Let's move on to what we really think works better. Let's go on to QPCR. I think you're going to go into QPCR, but where are you going next? Yes, but I'll give a I don't even know if it's a disclaimer.

I want to say something to the audience. There is no one gold standard on any of the more forensic type of sampling, including MSQPCR mold-specific polymerase chain reaction.

Samples out there. I have found in my career that like any tool, if you do it enough times, you can get pretty good at it. I think there's are some limitations.

Like I've taken tens of thousands of sport trap samples. And I still think it's limited, even though I really know how to do a good job taking those samples in the past, but.

Are you saying that even though you're very experienced at taking these samples that sometimes you don't have the accurate results, sometimes you still miss it?

That's right. And to your point, that's why we brought up the limitations of the spore trap samples. If I need If I need a butcher's knife to cut a piece of meat and I grab a butter knife, I don't have the right tool for the job.

And a spore trap sample is that butter knife, it's not going to get it done. And that's the issue. And I think we've all learned. I mean, the things that I'm sharing with the audience today are a lot of it is going to the school of hard knocks is you've learned through experience, not necessarily because I had the best mentor telling me everything.

Although I did have a couple of great mentors, I still do. But with MSQPCR, so this is a different thing. This is, it's not spore trap looking under a microscope to count the spores.

It's not growing spores or mold on a Petri dish to see what's viable. Think about it. Mycotoxins don't grow on a Petri dish. Non-viable molds don't grow on a Petri dish.

The other thing that it doesn't grow on a Petri dish, which is what MSQPCR is good at doing are mold fragments.

And so this is a huge thing if it's new to you.

And it's especially important for what we're talking about. We feel like 95% of those problems are where there's been an old water leak or an undetected water leak that's now somehow desiccated.

Yeah, and that's the word. So I'll give a 45 second thing here. So mold's organic to Anne's point, and over time it breaks down just like us. And so if you do have growth, eventually it does its thing, it sporulates, that's the mold's ability to try and survive.

But these things break down over time and fragment. On average, if you look at the studies online and we have plenty available, you can go to IEPradio.com and see those studies.

there's anywhere between 300 and a thousand fragments per spore. There's way more fragments in a given environment than there are spores. And it makes sense because they break down.

Well, that's cool to know that. The problem is, is that we've got some sample methods that miss that. And if we think or assume or have science or data to justify or suggest that this is also an exposure concerns, which we do, Then you would want to find a kind of learn more about those fragments.

Well, spore trap samples don't identify those fragments. Not the fragments that we're talking about. We're not talking about high full fragments or a Petri dish.

Fragment will not grow. It needs to have a nucleate compartment, which is the part that actually allows the mold to germinate. And if it's a fragment, it's busted apart.

It's missing those pieces and it won't grow in theory, certainly in practice. But MSQPCR is DNA based. So a lot of people know MSQPCR as ERMI samples.

Oh, it's that four letter word that I said. And ERMI is a dust sample. It is not an air sample. There's an episode that I do with a well-known colleague, John Banta on IEP radio, where we dive into the history of ERMI.

So I won't necessarily go into it here, but just to say one of the things I love about this sample is that Things that settle on the surface give us a history of what has happened over time.

If I have a month, I'm going to use real easy examples. If I have a month versus dust buildup in my house on elevated surfaces, that would suggest that I have a month worth of data or history of things that have what were in the air and they've settled out.

When you take a look at that data and you're able to identify the fragments, that is to say there's way more fragments than there are spores, you're going to get a better picture of the total biomass available.

You're going to have a better picture of what's totally there from a particulate spore fragment perspective. The other thing about this particular sample is that it speciates.

Don't worry, the limitations are coming up in just a hot second. But if it speciates the mold, it gives us a better fingerprint. For example, classic example that happens all the time, and you're probably familiar with this, spore trap sampling.

will come back on the report and it will say aspergillus slash penicillium, but it won't tell you a species. In fact, that grouping of aspergillus and penicillium represents thousands of species.

Well, if someone took an outdoor sample, and it had, let's call it aspergillus A outside and it was a high quantity, but you had aspergillus B growing in your home.

That's a different species. You wouldn't know that with sport trap sampling because it all looks the same and they

might just say, oh, well, it's higher than outside.

So it's more the resolution. It's a better fingerprint of what's going on. You might ask at this point, if you're holding on, Well, why wouldn't everybody do this type of sampling?

There's just a few arguments against it. One of arguments is that it's expensive. An average spore trap. When you say expensive, let's talk cost. Yeah.

That's yeah. Yeah. So between the different costs. Yeah. So spore trap sampling, for example, again, it varies on the inspector and what they try to charge you.

And that's a separate topic we can get into if we have time and is about a hundred dollars. Whereas a Ermi sample, this panel of 36, or you might just say MSQPCR to get away from that is about 250 to 300 per sample.

Now, technically, the Swartrap sample is probably costing your inspector somewhere between 20 and $40 a sample, but they're going to mark it up for supplies and their time and a little bit of time and that sort of thing.

But as you can see, Even if I did say $50 versus 300, that's six times more expensive. And that's a lot if you start thinking about sampling your house.

This is a relative conversation to other bigger topics like you not getting better and what's the cost of that and blah, blah, blah. But that's a lot of money if you're sampling three, four or five, six samples in your home and not especially if you don't really know how to interpret it.

So cost has been an argument against its use. I don't agree with that particular argument, although I have worked with people that don't have the money.

Yeah, for sure. Yeah, it's a really interesting ethical conversation like that. Right. We're not going to force it down your throat if you can't do it, but let's look at other options.

I was going to come back to this, but I think it's relevant now. Some cost saving things like do you ever do. I'm just going to summarize the PCR. Do you ever do the PCR test where you just get a whole house wipe kind of thing and get a full house assessment first?

Because sometimes people don't know, is the mold coming from my work? Is it coming from my car? Is it coming from my parents' house because I'm going visiting all the time?

To just even help them know which place it is that the microtoxins are coming from, Do you, what do you think about the whole house swipe just to even evaluate?

And then if it's positive, come back and do individual rooms and places. Yeah, that has been an tactic to use to help people as well. Can we dip our toes in the water and do a whole house sample?

Obviously there's limitations with that. If it comes back elevated, You really don't know how to narrow it down, but maybe it wakes up the individual in there and lies the challenge of is that the best tool?

Could you do that? Could you get away with seven or eight? eight petri dishes for the price of one Ermi sample to help at least try to narrow it down.

So it really does depend on the situation. I come from experience. I mean, I'm published with the EPA on Ermi samples, MSQPCR. I'm heavily involved. I'm one of the IEPs that are well known to be a pro for MSQPCR sampling.

But I believe it's forensic because at the end of the day, I've had a colleague ask me not too horribly long ago, What's the, how do you validate that test?

And I go validation is when we find the problem with it. In other words, when we, when we sample your master bedroom that was missed by everybody else, that there was no issue.

And then we find evidence, forensically of a source. And then we, we do get more aggressive and we try to locate it. There's different techniques to find it.

Yeah. And then that's, that's the justification. Once you've found the presence, right? Exactly. So I think MSQPCR in short. is a wonderful tool. You're not licking the ground, you're not snorting the surfaces.

Some people bring this up to you when you sample the surfaces and it's like, we understand that. The whole point is that it represents when you have enough data, you can extrapolate that to exposure and you can also, and that's more of a clinical discussion, but from an environmental standpoint, we can compare that with thousands of data points to say, no, this is not normal in your area.

In fact, one thing, Ann, that I'll just briefly throw at you is when we are working with clients, if I'm doing the work, fine, that's one thing, but I do a lot of virtual where I help guide people.

We'll have them do an outdoor control sample. Because your fungal ecology is so diverse that you might have a mold species present that to a lay person might go my gosh it's it's on the water damage building category of this this Ermi sample right.

But it turns out it's a very common outdoor mold. California is a classic example where there's a couple of molds that are on the water damage category list that are very common outside.

And we don't want your patients to be chasing their tails thinking they have an indoor problem if there's a lot of strong evidence to suggest it's coming from the outside.

Yeah, and definitely for central Texas, that's an issue. So then you might have to add in the microtoxin testing. Right. Mycotoxin sampling, when we talk about that, I know it's gotten a lot of, like anything, including MSQPCR, it's gotten a lot of debate on both ends of the aisle.

Doing dust samples, if that's what we're talking about for mycotoxins, has been something that I've kind of been on the fence of held off on, but I'll explain my rationale why.

The first thing I'll say is because I haven't done thousands of them. The second reason is because I have tried to reach out to the labs to get a better explanation of what they're calling.

Remember earlier when I said you shouldn't leave the lab to tell you the interpretation? Right. Well, that still holds here, but there is an element of curiosity of like, can you explain why you're saying that this is an elevated amount?

Like where's your data coming from? So we can learn more as IEPs to better do your client's service in the field. And unfortunately, we haven't gotten a really good response, if any, from those organizations, which leads me to my final point that years ago when our late Dr.

Jack Brasher, who is a well-known person in our industry, passed away, I was working with him loosely on doing mycotoxin sampling outside and not just a dust sample.

but we were doing, don't worry, I have good news for mycotoxins, bear with me. I was actually doing air samples as well. The problem was is that I don't think we had the ability to capture the mycotoxins that may have very well been present with the technologies we were using.

So getting the toxins out of the wipes so that they actually showed up in the test, right? Yeah, if it comes back negative. So that was an issue. The other issue again is we just need more data of what's normal because what really bothers me, Anne, is when I have used, just for the record, I have used mycotoxin samples before.

I've had situations where the clinician chose to use urine mycotoxin analysis to look for trending of what they're calling improvement with binder, biotoxin, getting rid of all the stuff and seeing how they're doing over time.

And when this particular patient, there's been a few have had spikes, we've tried to say, well, let's just out of curiosity, see what one of these dust samples will come back showing and if there's any sort of.

potential correlation. In my experience, that actually has worked once or twice, but I'm far more forensic, far more surgical, if you will, with MSQPCR, because there's an argument to be made that if you have a big mold problem in your house that's producing high counts and high concentrations of mycotoxins to the point where it's affecting you, there's a theory here that you should be able to pick up on the particulates, the breakdown of fragments, and that sort of thing as well.

Agreed, agreed.

Finding Hidden Sources in Buildings

It is interesting to, you know, to start to use this tool alongside and see how things correlate though, because I do think that, you know, some of these molds are more tricky to pick up the spores for and that the mycotoxin test might be As long as as long as there's yeah is agreed.

I'm not really sure if that's, you know, always necessary, unless there is kind of a puzzle that's to figure out because really what we want to do is identify the rooms and the places in the building.

that we want to, you know, potentially consider tearing apart to find the problem. Right. That's the bigger question of what is the value of the sample and what can we do with the answer?

My issue with a lot of the sampling and not just on mycotoxins or spore traps, but more also to do with the excessiveness of it all, which maybe we have time to get into.

But is that people are IEPs are out there taking these samples but they don't really know how to interpret it and they're letting the lab do the interpretation saying that we've found mycotoxins and as a result there's any level of remedial or cleaning measure being recommended for thousands upon thousands of dollars and from an ethical perspective I have a real real problem with doing that because I feel like It can be very misleading, not to mention the, I'll let you patch this how you need to, but the limbic system, potential issues that coming up that caused traumatic responses where people are going to start creating mold like plutonium, because we're acting like it's plutonium when we're taking these levels that we don't really understand.

And not everybody does this by the way. I don't want to give the wrong vibe to the audience. Put it in the context with all the tests. Yeah. But you're hitting on something really important because I think when these results are reviewed with the affected person, it's really important to get to the root of where the why the PCR is positive or why the microtexin is positive.

So I would love to hear, because this is where the really, I think the art of what you do comes through is, let's say you've got this bathroom that looks pristine, but you come back with a pretty significant PCR test.

How do you think about it? Like, what do you do next for the detective part of the job? Yeah, what I think and let me just end on a good note for the previous topic.

If. At the end of the day, it just boils down to if you as a professional are able to look at any set of data points and and use that. Legitimately to help answer a question like I think there's a source, maybe even narrow it down in the house like I think it's in the basement or this side of the house versus this side.

That's great. Then use it as long as there's value and that the value doesn't see the cost of ripping the house apart. And I joke a little bit on that.

I mean, that really just like, if you think about your kind of the house or the building doctor, right? The way that I think about running tests on my patients is like, once I run the test, what am I going to do with it?

Is it going to change what I do? Is it going to help me figure things out or not? And so I think that's the same thing for you, right? Like, what are the tests that I really need to figure this building out?

Well, and that's what and that's where lies part of this challenges because you have different experts in the field that do have different experiences now we're let's just rule out the people that I are either.

Basing things off of greed or fear mongering. Let's just, let's assume that the people that I'm talking about right now mean well. Okay. So those individuals, right?

Those individuals, they might have experience using mycotoxins, MSQPCR. I know I do with that one and other sorts of even particle counters, literally just a particle counter.

I don't even tell you if it's a mold spore or a dust particle. that can help us narrow down where there might be a source. It won't tell you what's the south wall in the bedroom or in that shower bathroom that you just mentioned.

But to your question, normally whatever the tool is, and I find that MSQPCR has been the one that's most proven out successfully, is that you still got to try to find it.

Like it's not like, oh, it's coming from the south wall in the shower. Normally what we start end up doing then is looking at There's non-intrusive and there's semi-intrusive options.

So if we used your bathroom as an example, there's an evidence that there's a source there, whatever the metric was, MSQPC or I'll pick on that one. we're still gonna look in there, right?

We've, at that point, we probably already did a visual assessment and if there's nothing, let's say there's nothing there, there's nothing that would help it.

Because that's really where the tough ones are and I think really what makes an individual inspector stand above the others is when they can figure out those really tough problems.

This is where the term building science starts to get its worth and weight in gold because you might as an IEP then look at this bathroom. So I'm gonna visualize myself in this bathroom with you all right now.

And I'm like, oh, I don't, there's nothing here. Like there's no swelling, no paint grouping, no mold growing on the ceiling, no damage on the vanity bottom shelf.

What am I to do? You've done the infrared cameras, you've done the moisture meters, nothing's coming back positive. Start looking at the makeup of the building.

Let's start seeing where there's all plumbing walls at. OK, this wall is a plumbing wall. It's got plumbing. It's got supply line. It's got waist lines like your sewage.

These are potential candidates. About the shower wall. Well, the shower wall, do we know how it's built? Well, it's composite. No, it's tiled grout line.

Well, if it was installed correctly, then doesn't mean you have a mold problem behind it. But can we sample it like with wall cavity samples on the back side of the wall?

I don't have to drill a hole through your tile shower if I can get through it from the back. Thank you, you're welcome. But then the other thing I'm thinking about is what about relationship in terms of type of framing if it's an older home balloon framing kid doesn't have communication from something that I'm not thinking about like, I'll be darn I didn't realize this but the bathroom.

was of original construction and there was a crawl space underneath it that had a mold problem and there's a punch of openings, gaps, cracks, plumbing holes, electrical holes that were not sealed off that allow this mold to come into.

Turns out it wasn't your shower. Turns out it was coming from that or flip the script and say not the crawl space beneath it but the attic up above it because there was a major mold problem up in there for any number of reasons which we can get into if we need to and the mold's coming down through your can lights that are not hermetically sealed and allowing it to come in, you mold mycotoxins and expose you that way.

So understanding the building, understanding where, well, how do particles migrate? Well, there's driving forces and there's pathways, there's openings and gaps and cracks.

And a lot of people have a hard time with that. They're like, Mike, does mold spores go through a wall? No, let's just clear the record. Mold spore does not go through a piece of dry wall or past a plaster.

However, there's a gap at the bottom of that drywall where there's baseboard. And a lot of times that intersection is not hermetically sealed, or there's the electrical outlet that's about a foot off the wall, off the floor, and it's not hermetically sealed, or the electrical outlet switches, or the wall that you had a bunch of pictures that you hung up on the wall.

And there's these holes that seem small to all of us, but when you think about the fact that an average mold spore is about five microns, not to mention those tiny fragments that Anne and I get all excited about talking about, and you think about the fact that about 250 of those five micron spores can fit on the top of a needle pinhead, you start to realize that this stuff is really small and can easily get into my environment if there is a driving force.

And driving force is not complicated. It's things like temperature differential. If it's hot in your attic and it's cool in your home, the air is going to want to come into your home.

If it's more moist in the attic and less attic in your bathroom, that's going to drive it that way. If you have an exhaust fan, oh, there's a ringer. in the bathroom and you turn it on, I think it's a great idea for removing moisture, but you might be pooling things into that bathroom.

Just a couple of classic examples. OK, this is beautiful, Mike. So I think this should be the question that people ask the inspector before they hire them.

Well, what if you get a positive test in XYZ room and everything looks pristine? What are you going to do about it? Because you gave such a great answer.

That was so awesome. You know, to your point, and I'm really glad you said that, and I mean it because what I'm finding is that, just a real quick thing.

I know I mentioned that we have a resource on IEP radio, the International Society for Environmentally Acquired Illness has a document on the resources page of finding an IEP.

So there's growing resources, even searsx.com has free video. There's a bunch of stuff out there. But at the end of the day, those are great tools to help get that inspector's foot in the door.

It's these real life questions. It's the sample report. It's the what would you do in a scenario where there's no obvious evidence of a source in the in the room, but your results, maybe your sample came back elevated.

How would you how would you react to that? How would you rule it in or rule it out? And if and if how they would rule it out to help and myself a little bit would say, well, if we don't see anything, we're done.

We're just going to say it's probably because your dog. then that's probably not the answer. You're not kidding. People do that. Yeah. Doctors actually do that.

Yeah. Which is the issue, right? This is what we hear all the time. And it's like, listen, it might be your damn dog, but I got, I got an idea. How about we be a little bit more scientific about it first?

How about we can't rule it that outer end report. It is not the dog. Yeah. Yeah. So, so no, and nor do you need to be shaving it or dipping it in ammonia, by the way, separate topic.

So so the point the point I'm making is it to Anne's point is she's right like asking these real life questions of what would you do in the scenario might damn well be more important than the quality of flashlight or infrared camera they have that's going to be in your house.

And to me, it's the degree of curiosity. Are they really curious about your house? Are they curious about you? That goes such a long way in these hidden mold problems.

And a quick tip to the audience too is, and I have a lot of clients ask me this at the end of the day. So it's kind of something I want to share with you is a lot of times it just boils down to IEPs, a lot of them, I think more than not mean well, but they are so used to go, go, go, or a flat fee that they're not feeling like they can take their time.

And I've had a couple of people turn around where all you've said to them is saying, hey, I just want you to know, you're the client telling this to the IEP, that I want to pay you for your time, that you're worth it.

And I don't want you to feel rushed. And so if there's an hourly rate, I'd like to know what it is. I'd like to talk to you about that. And because just to give everybody an indication, an average 2000 square foot home that doesn't have a crawl space or a complicated attic, meaning hard to get through, hard to navigate, that take you two and a half to four hours to investigate.

And that's if there's not a lot to look at. And that involves pulling out the refrigerator, the dishwasher, all those things to make sure there's not a slow leak happening in those places.

Yeah, taking the time. Yeah, even the sampling, once you sit down and figure that out. And do we have five minutes to talk about? You know, this is great.

I'm enjoying this so much and I think so important that if you've got time, I've got time. Okay, very good. Yeah, absolutely. I want to bring something up and and I know we talked a little bit offline about it.

So by all means, you know, steer me in the way that you think the audience would best receive this. But I want to talk about this issue about. I don't have any better way to say it than too little sampling versus too much sampling.

Yes. So here's what I'll say. Back in the good old days, the issue used to be there wasn't enough sampling. The classic, I took a score trap sample in your living room, I took one in your master, one outside, which is highly statistically insignificant.

And I didn't find a problem and you're fine. So that's too little. Many people agree across the board in many camps that that is true, that that's not enough to test the home.

What we're seeing today, and I want to, I want to qualify this so that the audience knows where I'm coming from. This is my opinion. I know I share this opinion with many other colleagues by the way, but I will tell you, I get this first and foremost from the clients that reach out to me to review what I'm reports from inspectors that I'm about to tell you, not the inspectors, but the process.

This idea is oversampling. I want to remind the audience that when you walk into a hospital to see your doctor or if you go see Anne Shippey, she's not going to say, let's sample everything under the sun, sell your home, sell your cars.

Avoiding Oversampling and Costly Mistakes

And let's spend a hundred, two or $300,000 in sampling. Hospitals don't do that. There needs to be some money left for getting well and for remediation.

Yeah. And on top of that, there needs to be this thought of saying, what questions can I answer with this? And do I really believe in what I'm selling you?

And here's what I mean. There are a growing number of companies that I see often How do I word this? The inspectors either explain it or perhaps for more various nature reasons, they will have the client do a multiple array samples for mold and or mycotoxins like these panels of tests with the narrative that each one of them are inherently limited and that we might miss something if we don't do all of them.

And so let me just tell you what ends up happening in my experience, a majority of the time. In a majority of the time, what I see from reviewing is, and I've reviewed hundreds of these situations now, is that the client will be, first of all, the sample costs, they'll be charged two or more times than the actual fees.

So if you know, and this is easy information, you can find this online, that an average Moll-Ermi sample costs $250. I've seen the invoice come back from some companies where it's over $500, sometimes closer to $600. So they're charging an excessive markup for just those samples.

And that adds up. That's a really important question. Just a direct question to the inspection inspector. How do you charge? Do you mark up your tests?

Having a little bit of markup for, I have a marginal markup. like for sense because they have to process the samples they have to get the reports back quality control samples how many how many IEPs are doing their own field blanks and sending them off for your benefit down the road but but that's an issue when it adds up to that that one sample being marked up and then having four or five of them in the home but it gets better Then the other thing that happens and it's like, well, that was for the army.

What about the mycotoxin dust sample? It's the same issue. Multiple samples overlapped. And then here's what we often see. we'll review the report with them and find out that even though a sample came back positive or negative, they still are making the same recommendations.

And so I'll try to broad stroke this and if you wanna dive into any particular topic we can, but you'll have IEPs that are charging over $10,000 for an assessment of an average size home, 2,000 square feet plus or minus.

And then when you look at their report, They're making the same recommendations regardless and you have to ask this question. It's an elephant. The room is if you're going to make these recommendations, what would have caused you not to make these recommended?

I mean, what what result is a pass is really what you need to ask is back to the kitchen or to the bathroom cabinet, right? If you see there's been water, do you need to sample it or can you just make a recommendation?

Yeah. If you're going to take a sample in the HVAC ductwork and you're going to find mold in there, not mold growth, but settled mold structures in there, that would include spores and fragments, but not growth.

The first thing I want to clue everybody in on is to an extent, that's normal. Just like you have normal dust buildup, your ductwork doesn't get cleaner over time, it gets dirtier over time.

and if you know that you okay that makes sense mike then the the natural question to ask the inspector is is what kind of result would you sample in my duct works you're about to charge me five six hundred dollars for it when you would say now you don't need to replace your ducts you don't even really need to clean it if you can't get a good answer on any, on what would they do with a pass or a fail, a good or a bad sample, you need to really review whether or not it's worth hiring that company who's treating it like it's an a la carte, you have to do it all.

And I wouldn't have brought this up with Neanna except for in the last two or three years, it's getting to the point

where I think there are companies that are becoming more aware about the chronic illness communities And while there are many people I have met that I think do really great work, some better than me, there are, I think equally, unfortunately, there are examples of people like, Hey, this is a great opportunity for me to make a lot of money.

And, and I, I have, if there's anything I'm passionate about. It's people getting taken advantage of in that right, because having dealing with chronic illness myself, it is it does cost a lot of money and it is it is a very vulnerable period of time.

So these sorts of yellow flags are great ways to turn this into a positive to not have that happen to you. And to summarize that last 10 minute conversation we had in less than 30 seconds is if you're going to do a sample, what is it going to help us answer?

It's the first thing. And there's a value there, right? Is it worth the value of the cost of the sample? And then what is a pass or a fail? What kind of an example can you give me where if I sampled the duct work, if I sampled underneath the wall cavity or inside the wall cavity that you'd say, no, this is fine, let's leave it alone?

Because if it's an automatic, we're going to have you remediate it. We're going to have you clean out your attic and spend tens of thousands of dollars because we found a spot of cladosporium mold growth on your trust member in your vented attic.

That's a problem and it's happening more. So just I'll land my airplane with the audience to say that not everyone's like that. There's a lot of great resources out there, but there is a growing concern for that.

And there's no reason why you can't get an excellent assessment of your home for a much more reasonable price than the numbers we're talking about. Okay.

So let's give us, give us a ballpark figure. What do you think people should be expecting? Right, right. A lot of, a lot of what ifs, a lot of what ifs.

Yeah, yeah. 2500 square foot house. And, you know, the person's pretty sick and doesn't want to miss anything. Like, what's the range? If you do any sort of forensic sampling, like MSQ PCR, by the way, we've said this a few times and we haven't said, and we said, Ermi, just to be clear, I'm not a fan of the Ermi score.

I don't follow the Ermi score, which is kind of weird for people, right? We didn't have time to get to that, but yeah, that's so misleading because even, you know, a little bit of Chitomium, a little bit of Stachy.

And yeah, we see normal backgrounds, the actual Ermi score. So I just crossed that out. If the Ermi's run, I'd rather just do the MSQ PCR without Yeah and you have having the people look at the end of the professionals look at the individual species I do believe there is a correlation by the way with hurts me score we seen that time and time again but back to your point your question.

If they're doing that sort of thing like let's say it's a 2500 square foot home so let's say that they're doing well I'm just going to make up a number.

four indoor samples for armies plus an outdoor control sample. Let's say each one of those are $300. So I'm not good at math, but that's 1500 right there.

So let's take $1500 and just shelf that real quick. And then we have the time for a couple of miscellaneous things, spore trap samples, maybe a tape lift here or there.

Let's, let's, let's give $800 for that. Now we're up to $2,300. We're almost home. And then we're thinking about the inspector's time. Okay. So none of that stuff had any real markup to pay for the inspector.

Well, let's say the inspector's hourly rate is $200 an hour and he's at your house for four hours. That's $800 that now we're at $3,100. So somewhere between 28, which I was about to say, yeah, you're going to be somewhere

between 3,100 and say four or $5,000. which would include a rep be some time built into t accommodate that report A little bit less, and it could be a significantly more is, but it would make sense by make sense.

If you told me at the last second that your inspector was also a building defect analysis and they were looking at your house for the last two or three days, obviously it's going to be more money than that.

But that's something you would talk about with them before you ever signed a dotted line saying you wanted that service. Great. That's so helpful, Mike.

And I, I just, your passion for, for helping people with this and your level of curiosity at the, you know, really moving this important science forward is really admirable.

I just, I, I feel like we, I could, I could talk to you for another hour. Right. Maybe we will sometime. I might be calling you back. Part two coming up.

Part two.

Resources and Where to Learn More

But I want you to say once again, like you have poured so much time and energy into your podcast, the website, you know, collaboration. So anything you want to share with the audience about where to find you and if they really want to understand this and dig deeper, where to go.

Sure. Okay. Thank you for that. Yeah. First and foremost for education, free education, go visit IEPradio.com. That's my podcast, videocast. You can do both.

There's not 400 podcasts. I don't use it for marketing or sales. I mainly just do it when hot topics come up where people push me hard enough and I'll interview somebody or I'll dive into the topic.

So you're going to find that a lot of the fundamentals, including what we talked about today and deeper, are literally in that podcast. In addition to that, there's references.

So a lot of people go, you know, you say this stuff, but where's your science? Like, where's your data? That's a great question. That's why there's a whole references page and you can see where we're pulling this information.

So there's no confusion of where we're getting the information from. My website where I do consulting, I do a lot of virtual work and I do at times do field work as well.

It's hard because there's so many people in need. So virtual has been really popular is go to environmentalanalytics.net. It's not a dot com, go to environmentalanalytics.net and you'll, you'll be able to learn more about me and how I can help you if that's interest you.

And then two or three more quick resources that are have nothing little to do with me. Again, I mentioned earlier the International Society for Environmentally Acquired Illness.

I know that's a mouthful. The letters I-S-E-A-I dot org. If you go there, you're going to find that there's a bunch of resources, not just to help find professionals in your area, assessors, remediation, but to be honest with you, just really on par with what we talked about documents like finding the right IEP.

We have a 101 document that's gotten thousands of views already on remediation fact sheets. Like really, let's say you're getting ready to get into remediation.

You don't have time to talk with me. You're feeling overwhelmed. Gosh, if only I had a resource that I could trust. Go to the resources page on that website and you'll see their 101 remediation document.

I'm very proud of it. I worked on it with the IEP committee and I think we did a great job. Yeah. Yeah, exactly. You've seen it. And then the last thing, and again, I just want to caveat this or disclaim it with this.

Most of us in this field know that our industries can sometimes be the different camps can be a bit polarized. Whether it's a pride ego thing, mom and dad didn't love us enough when we were a kid.

You can really get in the way of the community of finding consensus, which I believe what Anne's trying to do is to bring us together like so many other people that I'm willing to speak with and that I have this opportunity to speak in.

And for me, there is a new growing organization that I think people should keep their eye on. They're offering a lot of free information right now, which is SearsX.

It's not surviving mold, but it's SearsX. It's C-I-R-S-X dot com. And the reason I bring that to your attention is because there's a lot of environmental and clinical, but I'm talking about the environmental piece right now.

There are a ton hours upon hours of free video conference recorded stuff that you can watch as a person. If you any topic you want to get into, you want to get into inhibitors or what can cause false positive negatives with MSQ PCR.

You can go into that. You want to get into best practices for remediation and other topics like that. It's a free resource. So. Feel free to visit those sites because I believe it's a great way to dip your toe in the water to learn enough and not necessarily be an expert, but to then have a better idea of, as an ambassador, who are you going to start letting come into your house?

When you're looking for that right inspector and there's not enough Mike Trontz, there's not enough John Vantas and a whole host of other excellent IEPs out there, who are you going to use?

These resources are a great way to get you there. Thanks so much, Mike. I just really appreciate you taking the time today to share your heart and your wisdom and your hard knocks, right?

You learn so much by experience and it's really, really such a great contribution. I'm so happy to have had this conversation with you. Thank you so much.

This is a wonderful opportunity. Thank you, Anne. I look forward to the next one. Thank you for tuning into Doctor Talks. We hope today's episode has enlightened and inspired you on your path to optimal health.

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