Testing Your Home for Mold
With Bill Weber

BW

Bill Weber

0:00

So, if the air sampling does reveal a problem where indoor is higher than outdoor, then there is a problem. If it doesn't reveal that, it doesn't mean that there is no problem.

KS

Kendra Seymour

0:19

Hello everyone. My name is Kendra Seymour, and this is Your Indoor Air Podcast brought to you by Change the Air Foundation. Today, I'm joined by Bill Weber, and his expertise is extensive when it comes to indoor air quality, and construction and building codes, and mold. And he has graciously offered to take us on a deeper dive into testing your home when it comes to mold and other microbial growth. So, you know that said testing is just one piece of the puzzle, and there are no perfect tests. And unfortunately, you know, at this point, there's no single test that will tell you everything about your home. So, in this episode, we're going to tackle, you know, where do you start with testing? How does that fit into your overall investigation? And kind of answer some of those common questions and things that come up with homeowners and renters. So, Bill, thank you so much for being here today.

BW

Bill Weber

1:05

Absolutely. My pleasure. Thank you, Kendra.

KS

Kendra Seymour

1:08

Now, if you're not already familiar with Bill, he is a Principal Consultant at AVELAR, Northern California's architectural, construction, and building code experts specializing in the forensic analysis, design, and repair of commercial properties and single and multi-family residential buildings. Bill is the founding member of the Building Science Institute and an active member of ISEAI and CIRSx. He is one of only a few hundred people in the country to earn the coveted Certified Restorer designation from the Restoration Industry Association. He is also a Board-Certified Indoor Environmental Consultant. A Board-Certified Microbial Remediation Supervisor. Mr. Weber is a licensed general contractor in California and is as a Subject Matter Expert for the

Contractors State Licensing Board, focusing as a visionary and a leader in the fields of remediation, mitigation, investigation, and repair of damaged structures. He possesses extensive knowledge in the drying, assessing, remediating, and repairing of construction defects, and smoke, fire, and water-damaged properties. Bill has experience with property investigations, microbial sampling, remediations, and repair recommendations throughout the country. He has been a member of the revision committee for the IICRC S500 and S520 Standards, and was a contributing author of the Surviving Mold Remediation Consensus Document, and several educational ISEAI documents. Most recently, he is the contributing author for 'Prescriptions for a Healthy House'. Bill has been an active speaker at property and facility management training sessions, city and county government educational sessions, insurance panels, legal environments, and peer review seminars, presentations, and workshops for over 27 years. Bill, you probably have one of the most extensive bios I have ever read. That is so impressive.

BW

Bill Weber

2:51

I'm passionate about the subject. That's the only job I've ever had. Started at 16 years old, cleaning carpets and just really have appreciated where it's taken me.

KS

Kendra Seymour

3:03

Yeah, and so you have so many elements that I think go into healthy homes and buildings, from the construction to actually, you know, that restoration and keeping them healthy, that I'm super excited for our conversation. Before we jump in, though, I do need to take a moment to say thank you to our two corporate partners, whose generosity makes our work possible and keeps our resources free. And it's not just our interviews, but our free downloads, and our interactive features, our policy work, and research. So today, I want to give a huge shout out to Boulder Holistic and MV Restoration for supporting us and our work and the mold and indoor air community at large. And if you want to learn more about our Sponsors or are interested in sponsoring, please head on over to our Partnership page at ChangeTheAirFoundation.org.

Okay, now, before we jump into sampling methods when it comes to mold and mold in your home, I think a question sometimes people have, whether a homeowner or renter, is—is there such a thing as like, a mold-free home? Can you talk to us a little bit about your thoughts on that…and maybe unpack a term that gets thrown around, and that's "normal fungal ecology"? If anyone's ever had any testing done, they've probably seen that term on their report. So, I'd love to hear your thoughts on that.

BW

Bill Weber

4:20

Sure. Yeah, there's no such thing, Kendra as a mold-free anything, any environment whatsoever. In fact, a lot of my career had to do with hospital cleanups after sewage losses. One of my most challenging environments to do a mold and sewage cleanup

was in a chemotherapy drug mixing lab, where there was actual chemotherapy going on in the room next door. Where we had to create containments and do everything in triplicate. And even in that situation, the infection control talked about one particle per cubic meter. Even in that environment with immunosuppressed people, and sewage, endotoxins, and all of that. So, no, it's not mold-free. And what we're really trying to achieve is normal fungal ecology. And what does that really mean? And that's a good question because in the Standard, it talks about normal fungal ecology, but it really doesn't define it. And what normal fungal ecology is in a barn is going to be different from what's in a living space or a manufacturing plant. So, the answer is that it varies. And so, that's why it's so important that not only the testing get done, but also that there's context. And then there's the visual and olfactory indicators that you use all together. And of course, the history, and how is the person feeling in that? What symptomology do they have? And so, it's really this confluence of information in order to make good decisions. In fact, when…I know that we're going to talking about sampling methodologies coming up, and what's important to know is every project is going to be a little bit different. In fact, I don't have this broad spectrum, every house gets the same, or every building gets the same testing methodology, because I need to know, what are we trying to achieve and what's got to be that end result? And that then determines where we're going to go for. And then, yes, ultimately, normal fungal ecology is the removal of what I'll call the mold factories in the building. Because we know that we are going to have mold, but we just don't want to have the factories that are producing it. And we don't want that surplus of mold fragments, the secondary metabolites, and the bacteria present. We want to get rid of those inflammagens. And again, for everyone it's going to be a little bit different.

KS

Kendra Seymour

7:09

Yeah, I think that's what's hard too because sometimes, you know, what we're seeing here is that if you open a window, some mold spores might waft in. And that doesn't mean, you know, burn your house down or, you know, you have to move. Having active, you said it, the mold factories, active mold, or dormant mold growth, or water damage in your building, that's what we want to take care of. And we want to take care of, you know, the byproducts, maybe that cross-contamination. We can talk about that a little later. But yeah, you were not living in this bubble, you know, or in a clean room. Yeah, but that doesn't mean that we're going to excuse that the basement has water and mold growth and behind my shower. And so, you know, I think that's something that people, you know, sometimes stress about is, "I, you know, have to get every single thing out." And that's not possible, really, and that's okay. But working with someone like yourself can, you know, help them determine "what is a healthy environment for me? What makes sense in our home, in our location, in our state, or whatever?" So, I wonder if you could give me your thoughts on something that I think doesn't have an easy answer, and it has to do with thresholds of certain amounts of mold indoors. And there's a reason why there is no single list that says "X" amount of this mold is bad, but "Y" is safe. So, can you talk to us a little bit—because that ties into normal fungal ecology. You

get a report back, and you're looking over the results like, how are you determining what is potentially problematic and what's not?

BW

Bill Weber

8:42

Yeah, so there's a lot to unpack just in that, in those questions, Kendra. And there are thresholds, actually, there's thresholds that have been established by many different countries around the world. In fact, Bob and Gail Brandys, who are known, extremely well-known and competent Indoor Environmental Professionals, they've put together a couple of books with those standards, and a lot of those standards actually have to do with culturable mold in an environment, and because speciation is so important. Okay.

KS

Kendra Seymour

9:27

Yeah, so that you're saying that the type of mold matters, right? That we're not looking at it as like all molds are created equal. Is that what you're saying?

BW

Bill Weber

9:34

Oh, absolutely. But there are thresholds in terms of the number of cubic, or I'm sorry, of colony forming units in an environment. There are established standards for that in different countries. In fact, I was again, very passionate about this subject, but Russia has done so much research because in World War I and World War II, they were studying molds as being bioweapons, bio-terror weapons. And so, a lot of information about toxins as a result of that. But they've established a lot of thresholds for their own country and the people of Russia. So, there are some numbers that are established. When I get results back, whether it be PCR results, air sampling results, culturable results, we are looking for chronic water damage indicator molds, because that's going to lead us to either historic or current water damage chronic situations that are happening. So, Stachybotrys, Chaetomium, Scopulariopsis chartarum, Trichoderma. These are all molds that we're looking for that indicate there was or there is a long-term problem. Then, other mold types that enjoy the warmer side of the building or in the attic. So, these are the pathogenic species, like Aspergillus flavus, Aspergillus fumigatus, Aspergillus ochraceus, Aspergillus niger. Those are indicators that there's probably elevated moisture on the warmer side of the building. And so, when we get these results back, it can help us understand what the fungal ecology is of the building, or of the home, or of the zone, or of the room. And then we can start assembling that data with "What are we witnessing or what's the historical references for that building?" to put it all together and create a plan of what's next.

KS

Kendra Seymour

11:59

Yeah, I think what is sometimes frustrating, and we'll get into this in just a moment, is that a lot of people rely on, you know, only air testing or something like that. And their IEP will come in and spend like maybe 30 minutes, and will take just a couple of random

ambient air samples in the room. They'll take an outdoor control. They're not really looking around. And they get the report back, and they'll say something like, "Well, your indoor total spore count is lower than your outdoor spore count." And that's so frustrating because it is completely, you know, conflicting with what you're saying, that those types of molds and their amounts matter. Some molds, you know, need a lot more water, and if they're growing, that's a clue that there's something bigger going on.

BW

Bill Weber

12:40

You know, there's so many studies, Kendra, regarding this, and I really don't understand why air sampling is being used as a basis for decision making. In your example, there's actually a study Michael Schrantz was a part of where air sampling was used indoor and outdoor, and it was less indoors than outdoors. But then, when that mold gets speciated, we see molds indoors, like Aspergillus fumigatus—that is not outdoors. The air sampling only provides the genus and not the species. So to compare one for the other, there's not a way because the air sampling reports the Aspergillus and Penicillium types as the same group. But if there's different species of Aspergillus inside and different species of Penicillium outside, it's completely different. And that's again why speciation *really* matters.

KS

Kendra Seymour

13:51

Yeah, and I think too, and we won't get into this too much during the course of our conversation, but you know, testing is really just that one piece of the puzzle. Now, before we jump into, because we'll start off with air testing, you know, one of the things that I think comes up when people are having maybe their home investigated by an indoor environmental professional, or they're thinking about it, and maybe they're going online and doing some research, is there's this question about whether or not mold growth behind your wall, underneath your floor, in your attic, or in your basement…can that impact your living space? Because there are some professionals that say, "Nope, not really, it's not going to be a problem." And then there are some who are like "No, absolutely." There's, you know, all these principles and building science, and your attic, and basically, it's all part of your system. So where do you stand on that question, if it can impact your health?

BW

Bill Weber

14:44

The entire building envelope has, it communicates within itself. There is what's called the stack effect, which is where warm air rises… and when that warm air rises, it's going to lift up these lighter molds that can be found in the basement or crawl space area. They are going to get through pathways that are in the flooring, in the walls, and those are like the plumbing chases. Just as a great example, if someone has a basement

where it's unfinished and you look up, plumbing is going up. There's these annular spaces around every pipe, every conduit, every wire that goes into the next level. I have a project currently where I just wrote up a report that the builder of this brand-new house had some construction errors. The crawl space stayed wet for not…just about a year. And what we're finding, as we're opening up the walls of the second floor, is in each one of those penetrations, we actually have mold growth in every single bathroom where all the plumbing chases are, every single electrical outlet on that first floor, every hold down (and that's where the walls are bolted to the foundation, the concrete foundation, and there's what's called all thread that holds the building on the foundation). Every single one of those. And so yes, there are pathways. And then there's what's called reverse stack effect, and that's where the attic air actually will enter into the living space as well. Now, as we get newer and newer construction, there is a lot more sealing of these pathways that are happening where they're using spray foam a lot to guard against that. And the energy efficiency requirements are a lot more stringent now than they ever have been too, so they don't want air to flow between these areas. And so, in the newer houses, not as much as the older, draftier homes, but it still happens. Not only that, but just the wind pressure on the house causes these pressure differentials to happen, and that's how we get influenced from the outside. That's what moves the air in the house. If you've ever opened and closed your front door, and then the blinds in the other room shake and rattle, that's from a pressure differential. And so that's why the fact is that, yes, all, the whole building envelope is one. And whether it's in the whether mold and the secondary metabolites are in the attic, in the crawl space, in the basement, they're going to end up in the living space.

KS

Kendra Seymour

17:51

Yeah, I mean, if anyone (this is probably a very juvenile example of this), doesn't believe that they have ever burned toast, or, like, made bacon or something strong odor, like if I'm making cookies, my kids will come down from upstairs and be like, ”Oh, are you making cookies?” It doesn't take that long for those odors. And I've even seen, you know, I've done some work on our current house and used some theatrical smoke, and, you know, some of our recessed lights, you know, in the attic. And you can see that there's some air penetrations so we've had to seal that. So, you know, people don't think about all those penetrations that are in your walls, or the gaps between your baseboards and your flooring, you know, allow for, you know, air movement that, you know, you may not see unless you're using something like theatrical smoke or some sort of energy assessment. But it happens.

BW

Bill Weber

18:41

Let me just add to that. So, I had a legal case that we won—it was such a cool thing. So, this was a townhouse and an HOA, and there were problems in the crawl space, but my client didn't own the crawl space; they only owned inside the townhouse. And there was a problem in the crawl space that supported mold growth and bacteria growth inside this crawl space. It was actually built on an old abandoned well, and it had a lot of

problems. And so, the defense said that the crawl space air does not influence the living space air. And so, I also used theatrical fog. I put the fog into the crawl space, and then we were able to videotape. We set cameras all over the entire house and outside the house—video cameras to show where all the theatrical fog was coming up. So then, even above that, the master bedroom of this townhouse had the highest amount of the molds that had been found inside the crawl space, and they had blamed the owner of the unit for this mold growth. And so, that fog, not only did it go from the crawl space up into the living space, but then we saw a flow of air that all migrated towards the master bedroom. So, we were able to film the fog coming up from the crawl space, migrating down the hall and towards the master bedroom. And so, the arbiter in the case, the judge, I got to show that video and explain what was happening, and that's what sealed the deal.

KS

Kendra Seymour

20:37

Wow! And we'll, that is just, first of all, super fascinating, and your clients are very lucky to have you. Because I hope we have a moment at the end, if we have time to talk to you a little bit, because I know you do a lot of legal work and helping people out. It really is, you know, I think even more complicated when you talk about townhouses and apartments. There was a study I read about in Dr. Joseph Allen's book that he released a couple of years ago, and he talked about in your apartment complex, I believe the number was anywhere from 9% to 35% of the air in your apartment comes from your neighbors. And so, when you start getting into joint, we share walls, or you don't have control over the attic or the crawl space, it makes it so much more complicated. So, my heart always breaks in those situations.

BW

Bill Weber

21:25

Yeah, for sure. In fact, to add on to that as well, when I get called from a patient who is in a multifamily dwelling, we need to have that serious talk because I might be able to remediate that unit and get that unit clean, but I don't have control over all the units but that one. And so, if what we're finding in their apartment, condominium, townhouse is something that's systemic to the building, there's no—there's no way to really repair that. Not only that, in a common interest development like a condo or a townhouse, they don't own the sheetrock in most cases or anything outside of that. And so, just to open up the walls requires HOA approval. And then, well, HOAs really don't want to do that, because if they find something systemic and they have 120-400, whatever number of units, that's bad for them.

KS

Kendra Seymour

22:33

Yeah. I mean, the cost to remediate one home is expensive, and you multiply that, so it does certainly limit options for people.

Now, let's shift now into kind of starting to break down some of these tests for people. So, we just, we briefly touched on air testing. Let's kind of unpack that; that tends to be the, what I see as the most common, like default method that people will see if you call an Indoor Environmental Professional, or maybe you're having your landlord say, “Oh, we'll just do the air testing.” So, talk to us about what that test can tell us and what it can't tell us, and maybe where you see people making mistakes using that kind of testing?

BW

Bill Weber

23:16

Yeah, without going into so much depth, I'll just keep this kind of surface level. So, if the air sampling does reveal a problem where indoor is higher than outdoor, then there is a problem. If it doesn't reveal that, it doesn't mean that there is no problem. How's that? That’s like the major first one. The other thing that is really important on the mold sampling data is how much background debris is on the slide or on that cassette. So, there is a row that will identify what the mycologists will call the amount of background debris. And it's completely subjective, and they give it from a zero to a four plus. And when we get into that three plus or four plus neighborhood, it means that there was a lot of dust, maybe a lot of pollen, maybe some other fragments. And so, what that does is it doesn't—when there's a lot of background debris, maybe it's underreporting the amount of mold that's on that slide. So, that's another thing to look for. I think a mistake that a lot of the air sampling technicians will also make is that if there's only one, let's say, Chaetomium spore on the plate, they will say, “It's only one. It shouldn't, you know, it's only one. We see that often.” Well, the truth of the matter is that Chaetomium is very difficult to capture on an air sample. First of all, it doesn't really like to go airborne on an air sample. What that tells me is that the really slick exterior spore on the outside was able to get into the air—first of all—and then be captured by that sticky sauce that's on the slide and stay there. So, if you see Chaetomium, it's like an over-inflated football kind of shape, and it really doesn't like to stick to anything. It wants to bounce off or slide off. And so, to capture one means that there's going to be more than one. It's just you got lucky by getting one. And then, because it's so big, it takes up a lot of real estate on that slide as well. And so now you have to think, because that Chaetomium spore is on there, is there a lot of Penicillium and Aspergillus that just didn't have the room and bypassed that area because there's no more sticky sauce. And so those, I think, are three really big facts of air sampling that I think get underreported, and a lot of people don't know. And I think that just the interpretation of the data can lead to someone saying the air sampling looks fine, when I would say the air sampling didn't look fine because of all of those.

KS

Kendra Seymour

26:35

That's so important, too. And this is why we always say that, you know, no single test should be used to make the determination about a home. It really is part of that bigger picture, right? You're doing a thorough investigation. You're taking into account the history of the home, patient-reported health, and symptoms. It's all part of, you know, the bigger picture. And we talk about that a lot at the foundation. People can check out our website for kind of the big picture context and how it fits in. But you brought up the one spore. And, you know, for those listening, and I know, you know, this case, Aria, we told Aria's story. She had, for those who aren't familiar, she was a little girl, and she woke up one morning and she had a huge patch of hair missing from the back of her head. And it started, you know, what ended up being a multi-year long journey with alopecia, and she lost all the hair on her head, face, and body within a short period of time. And her parents looked and looked for answers, and it was a very arduous process, and eventually they looked inward into the home. The only clue that something was wrong in the home, after having multiple other inspections, was one spore of Stachybotrys. And it was her father, Jamie, who happens to be a board member, who had said, “Why is that there?” That was enough of a clue for him, even though it had been dismissed by some others. And I know you had consulted on that, and it turns out that it was her bedroom window that had a tremendous amount of water damage and mold growth. And within, you know, I think it was days of remediating, she started to grow the hair back on her head. And it was, if it, that it's about understanding, you know, how to read it, how to put that in a bigger picture. And that's where I think having a skilled person like yourself, who understands all of the building science and the mycology and all of it is so important, because I've seen that dismissed too. “Oh, it's only one spore. It's not a big deal.”

BW

Bill Weber

28:31

Yes, oh… and one more thing I wanted to say about that is the lab will, on the lab report, say how much the lab looked at the slide. So, there are some labs that only look at 25% of the slide and then extrapolate that information, while other labs will look at 50 to 100% of that slide. And so, if there are IEPs watching, they should use a lab that looks at the entire slab slide and not just 25% of it.

KS

Kendra Seymour

29:08

Yeah. And I remember when I first learned that, it kind of blew my mind too, because I don't think people realize it's actual people in white coats, and they're sitting there, and they're counting, so there's room for error. It's done by the eye. It's why Penicillium and Aspergillus are grouped together. They look very similar, but they represent hundreds and hundreds of different kinds. And you can send something to one lab and then another, and maybe get a different outcome. And so, no test is perfect. You'll probably hear me say that multiple times listeners, I apologize, but it's an important thing to understand too. Now, one last thing, and then we can kind of move on to some of the other testing. Do you use air testing yourself? How would you use it—if you

do—effectively to give you, maybe, you know, the best chance of giving you a reliable, you know, reading?

BW

Bill Weber

29:58

Yeah, that's a great question. And what I use my air pump for are wall cavity checks—and there's no established amount or numbers or anything, but it can provide good information without major destructive investigation. You know, if I'm able to extract air through an outlet of a wall that I'm curious about, that will help. I can also swab where the wall meets the floor to see if the pathway has produced some elevated fungal enzymes. And so, the air pump I mainly use for wall cavity checks. If I'm going to use air sampling inside of a room, I may want to use that to show exposure, right? So, what's difficult for a jury to understand is how does dust equal exposure, right? Something that's on the surface of your bureau behind you? How does that get from your nose and your mouth, right? And so, in legal cases, especially those that have to do with personal injury, exposure is important to be able to show, and air sampling can show that a lot easier than explaining how the dust actually goes from where it started to end up on that bureau behind you and say, “all that dust was in the air at one point” right? And you know, it's just helping people understand what's going on and what I use it for.

KS

Kendra Seymour

31:55

And that makes sense. So, when you're taking your—you're not just picking a random wall, like there's some evidence, or history, or something that's led you to suspect that that wall is problematic. So, you're getting closer to the source. And I think a lot of people, if you see this…maybe this is a bit of a red flag, you know, they will set up air sampling in the very center of a room, far from all the walls or, you know, places where mold and water damage will grow, and you're just that much less likely to, I think, get a reading. And some people I know will disturb the air a lot. What are your thoughts on that? They're like, “We’ll kick everything up into the air.” Do you have any thoughts on that changing?

BW

Bill Weber

32:36

Yeah, I think that one of my presentations that I give about air sampling versus other sampling methodologies is if you were to leave your home for a week, Kendra, and there was no activity in there, and I tiptoed in with my air sampling device and I took some air samples, it's likely that I'm not going to have anything in that air sample, or very, very little. If I were to come into your home with a leaf blower, and blow and agitate, to disturb all that air and then take my sample, it would be so full that the mycologist would not even be able to read it. And so, what is a good representation of the disturbance of air in your home? Running the HVAC, having the kids run through, having the two dogs go from room to room. You know, every house is going to be a little bit different, but at some point you have to make a decision on how much activity or how

you're going to stir the air. So, there is not a commonly used practice for that, except for what I hear most often is that, “They told me to close all my windows and turn off my HVAC 24 hours before they arrived to take the air sample.” And I still don't understand that. I don't even get that—like how is that a representation of what your day-to-day life is like? And so, yeah, it's not my favorite.

KS

Kendra Seymour

34:13

Yeah, and I think this is where it's science, but it's also somewhat art. You have to understand, like, all of these nuances that are so important. So, let's talk a little bit, and just briefly, because it's pretty straightforward. Another type of testing is like surface sampling, like a tape lift or whatever. Talk to us quickly about the purpose of that and when you might use that kind of testing.

BW

Bill Weber

34:34

Yeah, sure. Tape lift is simply, I suspect that this might be mold, and so I'm going to use a piece of clear tape. I'm going to gather that discoloration onto the tape, and I'm going to send it to the lab, and they're going to tell me if it's mold or not, and if they can, I mean, if it is mold, I'll find out what the genus is.

KS

Kendra Seymour

34:54

Yeah, this is like a game I like to play with people. It's like, “Is it mold or is it dirt?” Or because there's always the landlord or the spouse who's like, “I think that's just dirt. Oh, it's not a big deal.” And the tape lift is 30 bucks. It's pretty straightforward. Like, just test it. Because I'm sure sometime, you know, you're trained enough where you could probably be like, “Oh, based on the pattern, like that looks to me…” but I think people would be surprised sometimes to find out the things that, you know, come back positive, and it's actually mold growth. And they were kind of dismissing as… oh, that's just some whatever they think it is.

BW

Bill Weber

35:27

It's keeping in mind that if you can see it on the surface, behind that surface, it's probably a lot more than what we see.

KS

Kendra Seymour

35:38

Yeah, we have an interview coming out with Michael Pinto, and I think he talks about his stats and things like you see. You can expect to find two to five times more mold, or maybe it's five to 10 times more mold growth, I think it is actually—excuse me, five, behind the wall, which is mind-blowing, right? It's just the tip of the iceberg what you see.

So, let’s get into now kind of more like some of the newer testing that you're going to see a lot among health care practitioners who treat patients with CIRS or mold-related illness. You're seeing it a lot, I think, among people because it can be done as a do-it-yourself type test. And that is PCR type testing, and so maybe they refer to it generally as ERMI. ERMI is a specific kind of test. There are lots of PCR testing—it’s the same technology. But let's unpack that a little bit. What can it tell us? What can't it tell us? What are some mistakes people are making when they use this type of testing?

BW

Bill Weber

36:38

Yeah, I think that it's polarizing. That test is polarizing, and I think it's polarizing because, one, it's available to the public, and when the public uses that test and doesn't follow the guidelines or instructions of how to do it, they can come up with results that offer something significantly more than really what's present. In fact, I just had a patient who called me, and they had an ERMI result that was really elevated…not something that we would generally see. So, I said, that’s why I asked some questions, “Where did you collect the dust from that you were using on the ERMI?”

And they said, “Well, I know that I had some problems under my kitchen sink, so I collected dust under my kitchen sink, and then I had a bathroom sink that also had a problem, and then I got it from the tops of some cabinets in the laundry room…”

And I said, “I'm sorry, but you know that the test really doesn't accurately portray what's going on necessarily. It does tell us some speciation of the areas that you picked out. So, it's not, it's not a complete waste, but it's not answering the question that you had, which is, what's the condition of my house?”

I think what I really like about PCR is that there are numbers to compare because it was a government-funded study. We have a lot of numbers to compare the geometric mean of a reference home or a non-water damaged home with what the sample results indicate for your listeners’ homes. And so, with that extra data, now we get a sense of how water-damaged it is…how many fold a mold species is over what a reference home in the study indicated. What I like about it is that from an ERMI we can draw information to come up with the HERTSMI-2 scoring system, and that's something that Dr. Richie Shoemaker created over a lot of time and published papers about that would help a patient understand what their risk is in the home based upon five water damage indicator species. And that's really cool. So, when someone asks me about health, I can tell them I'm not a health practitioner. I'm not licensed to give you any advice on health, but there is what's called the HERTSMI-2 score, and I can send them the paper, the published paperwork on that. And what that HERTSMI-2 score indicates is that this is a number that was derived, and what we see, what the publication says with those types of amounts, that either you could probably do well in that house, there's more investigation, or it's really unsafe to occupy for those with Chronic Inflammatory Response Syndrome. So that's what's really good about it. The downside, the biggest

downside Kendra, is there are materials that are inhibitors, and when inhibition occurs, or partial inhibition occurs, it can actually underreport what's really going on. So that would be like bleach, very commonly used in homes, tea tree oil, essential oils that get diffused, olive oil. So, when you wipe the kitchen cabinets down, looking for dust, and it has a film of olive oil on there, that can inhibit the results. So what happens is, as a layman, right? Collecting that sample, it's to get the sampling right, number one, and get the interpretation right, number two, and put it together to make a big decision—that's hard. It's just really hard. And so that's why I think someone who's trained in understanding how the sample is taken and then how to interpret the sample is extremely important. The other major thing that I talk to practitioners all the time about is an outdoor sample needs to be taken as well

KS

Kendra Seymour

41:20

How would you do that for a PCR type test, what would that look like?

BW

Bill Weber

41:24

Yeah, so outdoor, what we're looking for is to understand what influence the outdoor has on the indoor… and so we can see and compare what when you go outside, what are you exposed to, and when the wind blows and it's getting into your doors and windows, and through all your different appurtenances and outlets that's outside, and everything getting into your house. What are you being impacted by? And so how we would collect that is off of surfaces that are glass, plastic, or stainless steel because rust oxidation is an inhibitor, so we got to stay away from rust. And I like to take it from the windward side of the house, so whatever that weather comes from is going to have the greatest influence on the house. And then I'm going to take it from—I'm going to collect it from items that are generally three feet or more above the ground to get an idea of what settles, as opposed to what's developing in the soil. And in a best-case scenario, you have like four chairs and a plastic table, or a glass table, maybe the barbecue with the stainless-steel top, and that's what I would collect it from. And worst-case scenario, where we're collecting it, maybe from the mailbox, or the stop sign that's right next to your house, or maybe even the fixed pane windows of the house. And that's just to give us an idea. It doesn't have to be perfect. It's just knowing what's going on outside.

KS

Kendra Seymour

43:00

So, you do one outside? —And for those listening, you know is there is a vacuum canister, one that was the method used for the original study, but now it's more. It's like, essentially a microfiber cloth. So, you do one outside. How do you do your ERMI's inside then?

BW

Bill Weber

43:14

Well, this is… I'm going to give you my rationale and tell you how I do it. What I do is, I want to divide up the structure into segments of 500 to 750 square feet each, and take a sample from each one of those. If the patient has a 3000 square foot house and they use one Swiffer wipe to do a composite sample all the way around, the best thing that's going to show us is, is it high or is it low? However, it can miss stuff. So, for instance, I'm just going to give you a picture of in the master suite—there's a mold problem, And we took a little bit of dust from the dresser, and maybe the top of the TV, and then collected dust from around the rest of the house. Now, is it possible that because you've collected all this dust around the house, that it would underreport what's in the master bedroom or the master suite? Yes, the answer is yes. And that's why I want to take it from smaller segments because if there is a problem, at least I know that it's coming from that 500 to 750 square foot zone of the house. Of course, Kendra, that's going to be quite pricey, right? Because they're going to be between $250-$300 per sample, but it's good data. And I'd much prefer that your listeners not spend $500 on a test that doesn't give them the information that they need, and rather $1500 or $2000 on tests that are going to be very—much more informative.

KS

Kendra Seymour

45:01

Yeah, and I think that's hard, because testing can get costly. And so it's about making sure that you're doing the right test, in the right way, at the right time. And that's something that I think people, they don't always get all three of those pieces, you know, cracked right. And most of us don't have an infinite pile of cash, like, at our disposal to just, like, waste money. I'm sure there's people out there who just don't mind, but I know most of us want to do it right. And I think you can do an ERMI yourself, but when you can do it with the guidance of the IEP, who's going to be doing the rest of that investigation, I think that's super important. And I think too, you know, I struggle with this too, because I am not pro or anti any test, right? It's about being strategic in which test you use and how you use it. But with PCR, you know, technology, it is so divided out there that sometimes people will say that, “Yes, the test was developed by the EPA, but then later on, they issued a statement that people shouldn't be using this test to make decisions about their home or building.” And therefore, those people who are against PCR technology say the test has no merit. So, what would you tell someone or say to somebody they're speaking with, who says, “No, well, the EPA says, don't use it.” Like what would you say to that?

BW

Bill Weber

46:31

I've said in court and to the jury, I've explained all of that, and the EPA issued a statement in November 2021. It's the most recent, and it talks about that this should be

used for research purposes. And for me, as an IEP, I'm a researcher, that's exactly what I'm doing in every building that I'm going into. I'm researching to try to understand what the fungal ecology is. So, for me, as being a researcher, I'm using it exactly what it was for. I do agree that to make a life decision on whether you're going to move or stay, whether you're going to tear out all the walls or not, should probably be put on hold until a qualified Indoor Environmental Professional can help at that situation. But I can just tell you that in my experience, over...how long have I been using ERMI? 9-10 years. In that experience, what the information that it provides is very accurate when it's collected accurately, and it has led me to places that we could not see. And maybe it's because someone painted over it. Maybe it's because it was just hidden. Maybe it was because it was on the exterior of a building. I have an excellent case study that, if we had time, I'd like to share with you just about the exterior building envelope having all the problems, and nothing on the interior of the house, and PCR found that for us, along with wall cavity checks. And so, it's extremely valid, and I use PCR nearly on…a lot. I just use it a lot.

KS

Kendra Seymour

48:30

Wow! That is probably the best answer, and makes so much sense, because you are using it to collect data points to help make the informed decision. So, that is fantastic. I hope everyone jotted that little nugget of wisdom down, because it's about, you know, getting that bigger picture I think. So when…and I do want to ask you about how you decide, you know, what type of tests to use and when? But I realized we forgot to touch on mold plate or gravity plate testing, because those are popular for—it like, looks like a Petri dish for those who may not be familiar, and it has like a growth medium on it, and you're supposed to stick them out and wait a certain number of hours or days, and then you see what grows. So, can you talk to us about that type of testing that actually preceded air testing and was from my understanding was the go-to for a number of years. So, what value is there in that? What can it tell us? Kind of unpack that just quickly.

BW

Bill Weber

49:29

Yeah, I think that's a really cost-effective way to understand what might be viable and floating in the air in a given environment. Yeah, absolutely. It is one of the few that will let us know if we have a candida issue because PCR is not going to pick that up, and culturable analysis isn't going to pick that up. But those gravity plates are good for that, if that's what you're looking for. So, if I had a patient that called and said, ‘I have a Candida problem and I need help with that.” I would use those plates for that. I think that the potential issue is, is you can have a lot of outside influence and if those petri dishes fill up, is it because of something that's outside having influence on that? And so, there's not a lot of controls, but just like all the other tests that we're talking about, it's a tool. It's a tool in the toolbox and you just need to know when to use it.

KS

Kendra Seymour
50:33
Yeah, and I imagine too some of those heavier, stickier molds don't make their way onto the mold plate, and I think people sometimes freak out, because they will almost always grow something. Unless the medium, the growth medium, is invalid. So, you have to send them off to be analyzed in a lab. And a lot of people don't do because that's an additional cost. And so, just keep that in mind. We did want to touch on, you know, you were the first to, kind of, really, I think, kind of push this a little bit more with me anyways, is talking about cultural dust testing. So how is that different from the ERMI testing? Kind of unpack that for us because I know that's an important tool in your toolbox.

BW

Bill Weber
51:13
It is, and it's becoming more and more of a tool for me. And the reason is, is because…so the PCR analysis for ERMI is 36 mold species only. There's over 100,000 named mold species that we know, and I'm sure hundreds of 1000s that we don't even know yet, but that ERMI is only targeting 36 of them. When the ERMI processes that we don't know if that mold is alive, if it's dead, or if it's in-between, dormant. And so, what culturable does is, and we don't know if it's going to be inhibited or not when we're when we're sending it to the lab. With the culturable, the added advantage there is that we know that whatever gets cultured is viable, and so it's more in the recent past than historically, like if we have a 1900s building, we know that the mold in the PCR could be from 1930, or it could be from 1980, or it could be because it picks up dead mold, but the culturable will tell us a more recent history. It's not restrained to those 36 mold species. It's restrained to the 100,000 plus species that are out there. And if there's any inhibition in the PCR, it's not going to affect the culturable. What can affect the culturable are a couple things like suppression. So if we have a highly toxigenic mold like Stachybotrys or Chaetomium, or one like that, it can suppress the growth of other molds within that petri dish, and so we may underreport some others. The other is that molds grow at different speeds. So, for instance, Aspergillus Penicillioides is very rare to find on a culturable plate, because it takes so long for it to grow that the other molds on that plate will take over the entire plate before Penicillioides get started. So, there's a few intricacies with that. The other thing is that you have to wait, because culturing takes wait time, which is about two weeks to get those results. And so, if you're if the patient is looking to purchase a property, maybe they don't have that time to wait, but it speciates, and it really that, plus the PCR together is really the best that we have to date. All that data, those data points between the two, I do that on nearly every one of my legal cases, because it covers a lot more territory.

KS

Kendra Seymour
54:15
Yeah, it sounds like it. So what's the collection method like for that kind of culturable dust? Is it still like the microfiber? Wow, okay.

BW

Bill Weber

54:22

Same thing. Yeah. In fact, what I like to do is I collect all the dust on one that gets sent to the lab that's processing the PCR. They take their five milligrams of dust that they need for the PCR, and then they send the balance to the lab that does the culturable work. And so, we get it from the same cloth, on the same surface, at the same time, as opposed to two different cloths (and you're doing this), where you could have some…one mold type on one another mold type. And that that can get confusing. Under certain circumstances and for legal cases it gets a little bit hard to defend, as opposed to, I took all the dust on one electrostatic cloth and I submitted that one to this lab. You know, that kind of a thing, yeah? So, yeah, it's very simply just picking up the dust.

KS

Kendra Seymour

55:19

So, one of the things that… I know we're running out of time, if somebody is remediating in there, maybe it's a bathroom, or a basement, or an attic, or whatever, you know, at the end, we really encourage them to bring back their IEP, you know, to act as an independent third party, to do some…it's called post-remediation verification for those listening. It's a type of post testing. And what the purpose of that is to say, you know, when the containment is still up, you know, was this remediation…did it meet what it set out to do? Is there still evidence that there is a problem here? And so, what does testing look like for you and your client when it comes to post-remediation verification?

BW

Bill Weber

56:01

Yeah. So I'll start off by saying first, if there is a stringent budget for your listeners, that they can do some of their own really easy testing, and they should—if they feel comfortable getting into the containment and looking around—the very first thing that they need to do is, is it a dust-free environment? Is it clean? If it is, they can actually use Q-tips. This, with your standard Q-tip. And wet it and run over surfaces with the Q-tip, and if that Q-tip comes up dirty, it's probably still dirty, and it needs to be cleaned again. And so that is a good field guide, even for a remediation contractor that might be watching this right now. If that Q-tip came out clean, you are likely to pass a PRV hands down, like it's a clean place. So, that's a good litmus test, just for a patient who doesn't have a lot of money and who can't afford the PRV, let's say. If they can, I like surface sampling within the area that was remediated. No, not the rest of the house, but just in the area that was remediated—the bathroom. And swab sampling can reveal a lot. I prefer a sampling methodology called mycometer (M.Y.C.O.M.E.T.E.R). It measures the amount of fungal enzymes that are present. It doesn't tell us what mold is there. I don't really care. I'm looking for a clean environment. So, if we have a dust-free area that all the materials were taken out, it's dry, it doesn't smell, and I can run a Q-tip without dirt coming off…I'm going to use a mycometer to measure the amount of fungal enzymes

that will tell us whether it's return to normal fungal ecology, or if we still have a problem and needs more work to be done. And you know, sometimes a remediation contractor might stop short of an area. So, for instance, maybe it was a toilet that leaked and caused the problem. But they didn't want to get into the tub, like the water ran really close to the tub, and they stopped, because if they go any further, the whole tub has to come out. And so I'll swab right where they stopped, at the sheetrock, and see, do we still have a problem, and does that tub need to come out? Or make a recommendation that it should come out because it's affected. And so, the swabs are able to get into areas that are small. And whatever was in the air, lands on a horizontal surface, so the swab will pick that up too. And so, I really don't— I want to say I don't care what's in the air, but I know that whatever was ever in the air, 48 hours later, it's going to be on a surface. And if I test the surface and it's clean and everything else is visibly dust-free, I'm pretty sure that that we've done really well.

KS

Kendra Seymour

59:19

So, what is so funny, though, is, and I've talked to a lot of IEPs, and remediators, and stuff, and even just people, homeowners and renters getting this done…and the amount of visible debris still in containment, like, there's trash, there's, you know, drywall pieces, like, right then and there, like, that should be an automatic failing Q-tip. And I know some say it's a white glove test, like, before you would even consider other testing, like, visually, if the area is still messy and has debris, like, there's no way they did that small particle cleaning to remove those particles you can't see. So, it blows, you know, your mind that you think, you know, they go to all this trouble, and it's because, I think a lot of people know it's hard work to get that environment clean that's probably going to be the cleanest place in your home if it's done right.

BW

Bill Weber

1:00:14

Yeah, right. And not only that, there's a couple other red flags that your listeners can look for. If there's a lot of tape and plastic that's covering up areas, those really need to come off. You talk about dirt and debris. I went to a project to do a PRV, and I got in, there was this, there's tape over where the stud meets the drywall. There's tape everywhere, and then there's plastic. So, I remove some of that. There's moldy debris behind that plastic. And so, if there were, even if there was an air sample, and this air sample came up clean, there's still moldy debris. And I hate when contractors, you know, just try to hide things. They shouldn't be encapsulating, using paint over the surface, because that falls below the standard of care. And I am not an advocate for antimicrobials and their use unless there is a like a sewage backup or something that occurred. And even if a sewage backup occurred, you don't have to have an antimicrobial, cleaning can take care of that. But antimicrobials need to be rinsed off and cleaned off after their application. And so those are, those are the big bullet items for me when I go do a PRV, yeah.

KS

Kendra Seymour
1:01:39
And I'm glad you brought that up, too, because, you know, that's why just air testing, you know, like it's, it's a multi-pronged assessment, when you're, we're going to clear the containment. And I would encourage people, I understand finances are tight, but that is a cost that I would not skip if you can afford it, because I've seen even good remediation companies have containments, and it fails. And these are microscopic particles, like it's a lot and so sometimes, to your point, we had this happen in a previous house where they stopped short of the tub, because there wasn't necessarily indication, it's more cost, it's more labor, they were trying to save us, and it ended up failing PRV. And so, we said, “Take out the tub.” And sure enough, there was more mold growth underneath. And so, we couldn't see it until you removed the tub. And so, I was grateful that we had that. And we kind of, you know, in hindsight, I probably would have said just…we were about 90% gutted anyways, so just take out the tub to begin with. But, live and learn.

BW
Bill Weber
1:02:46
Can I say one more thing about that? So, I think that the other thing to be leery of is when the contractor refers the IEP, because sometimes there's a ‘buddy-buddy’ situation and they're not aggressively pursuing that underneath the tub or behind the tub, because they want the contractor to look good to the client. And so, they may take an effort that's less than, in order to, I mean, if it looks good. But to me, that's not good enough, because you got to have the patient's health first and foremost. And I'm not going to be lackadaisical, like that for me, that's a huge responsibility to tell someone, “The contractor did a good job, you can build this back now with assurance that we've gotten everything.” Like that's a huge statement to have, and I want to be sure that's correct. And after…on a legal project, there was the defense cleared a project, and then my client said, “I want your assurance too, Bill, that they, the contractor, did a good job on my project.” I went in there and failed it visually because it wasn't good enough.

KS
Kendra Seymour
1:04:10
I think, I hope that's a takeaway here like that. It's not just about looking at a number on a piece of paper, like because how the test is done, all these things can be influenced. The interpretation can be influenced. And to add one more nugget on there, if you are in a rental situation, and maybe the landlord or the owner of the building is paying for the remediation, if you can, I would encourage you to pay for the post-testing yourself. And there's a couple reasons. If you are the client paying the bill. First of all, you get access to the test results. It's in most places if the remediation, or I'm sorry, if the remediation company and the IEP are being paid by the management, the building company. They are the ones who own the results, not you, and they may not have to share them with you. And so, you want that person advocating for your health and on your behalf, and being your advocate. So, if you can, you always want to be the person paying for that and owning the results, and working with that person ahead of time to determine what

criteria. I know it's an extra cost, but it's just a protective measure you can take for yourself. So that's super important, all right.

So, hopefully we've kind of gone through the whole gamut. My last question, because somebody might be sitting there and being like, “Oh, that's a lot. I don't even know where to start now.” So, if someone thinks or suspects that maybe there's something going on in my home, or I just want to be sure, where do you recommend they start?

BW

Bill Weber

1:05:43

So, it depends on what they are trying to find out. You know, there…I do get calls that say, “I'm just curious if I have mold in my house.” This is a curiosity thing. Then there's others that say “My wife is coming home from surgery. She's going to have surgery in a month from now, and the doctor's really concerned that there might be, you know, that her healing might be, might have a problem with pathogenic molds.” So, then I'm going to test for, I'm going to culture pathogenic molds, right? So, it really has to do with that, the purpose of the testing, right? Why? Why would you call me? And so, from there, we establish what maybe needs to be done and a lot of times, I'll just recommend self-testing, and then maybe some help interpreting the data. In our firm I, fortunately, I have a staff that's able to walk someone through, even through FaceTime, on collecting dust results, you know dust, all over the country we do. And then we help with the interpretation of the data and, and we just see, you know, what can you afford? You know, this is the ideal. This is, here's the gold medal, here's a silver medal, here's the bronze medal, here's the tin metal, right? If you can just get one inside and one outside, let's see what it comes out to. Um, I can tell you this though. I will not do just one sample. I will do only exterior and interior, because I need to know what the baseline is. Because I don't want to tell you that you have a problem in your house only to find out that you have a dump that's two miles upwind from you, right? So, I think that I know that's not really a clear black and white answer. I'm so sorry to all the listeners on this, but it's, you know, to make big decisions on bad data just sucks. It does, and I don't want them to do that.

KS

Kendra Seymour

1:07:46

Yeah. And that is super important. We always recommend you work with a good Indoor Environmental Professional that you can make decisions based on your unique situation. Every single home and situation is different. The health and circumstances of the people in the home are different. Your financial situation is different. So, it's really important. And you know, I will give a little plug for us, like, if you go to ChangeTheAirFoundation.org, you go to resources, we have a Start Here thing, and I take you through how to find a good IEP. We don't make recommendations on specific people, but we give you lists of things you want to look for, and it talks about a lot of the stuff that it'll cover about what that person should be doing. And we'll link to that.

Because it's important you find someone that is going to be a good fit for you and your home. And unfortunately, not all IEPs are created equal, and so you have just like you're finding a good doctor, yeah, mechanic, a roofer, you have to do your due diligence. And so, we try to provide some of those resources. They've all been written by me as someone who has been through this many times, and just trying to make the process a little less overwhelming. We have some ISEAI resources and IICRC resources on there as well for people. I know you had mentioned those, Bill, so that people can use to help them make that informed decision. Thank you so much for being here. I really appreciate the opportunity to pick your brain, especially because you know the legal stuff. I almost wish we had an episode where you could just talk about all your legal cases, because that's super fascinating! And getting things to hold up in the court of law, I know, requires, it's just a whole special thing on its own. So, thank you for doing what you're doing for the mold community, advocating for them, and I'm so glad you were able to join us today.

BW

Bill Weber

1:09:40

Thank you very much Kendra, it's been a pleasure being with you.

KS

Kendra Seymour

1:09:44

And for everyone listening. If you found this interview helpful, do me a favor. Head on over to ChangeTheAirFoundation.org, and sign up for our newsletter, because it really is the best way to get great information like this directly to your box. We'll see you next time. Thanks so much.

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