

# Dr. Jill

Your Functional Medicine Expert®  
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## [#90: Dr. Jill interviews Dr. Lyn Patrick and Dr. Louise Tolzmann on Wildfires and Air Quality](#)

### **Dr. Jill** 00:12

Hey everybody! We're in for a special treat tonight, despite the devastation that's happened in my community. I know many of you who are local are joining us or you'll be listening later from many different avenues, either on YouTube, Facebook, or wherever this podcast shows. As I said before we went live, I am so honored and delighted today to have two amazing colleagues and friends from ISEAI who have experience and also some great information tonight for us on wildfires and how they affect air quality.

### **Dr. Jill** 00:45

Just a little background: If you haven't heard, I don't know who hasn't, but the Marshall Fires that hit us on December 30th in the community where I live in Superior, Louisville, Colorado, had a massive effect—the worst wildfire disaster in our state's history. Nearly 1,000 residential homes and many businesses burned. I'm here in my office. Right across the street is a burned statue. On this side of me, there's a whole neighborhood that's completely burned down. On this side of me, there's a whole neighborhood burned down and in the back. I am like this oasis. And there's a small section of offices here that are still standing. On every single side of me is massive, massive destruction and damage.

### **Dr. Jill** 01:28

My story was that I was on a writing retreat thousands of miles away on the night that this happened. All I heard was that my house was being evacuated. I started to watch—like many people from all over the world were watching—on the news and looked at the maps of the fires and the evacuation. My office was smack-dab up in the center. I went to bed that night, knowing my office had burned down. I just assumed that. My house was surrounded on three sides by fires.

### **Dr. Jill** 01:54

That night, I had to really surrender and be like: "You know what? I can come home

to no possessions." And yet, the people, our loved ones... My pet was okay—my sweet dog, Robby. I knew I'd be okay. And yet, the devastation of losing everything—I don't know if there's a more traumatic experience. Even though I am sitting here in my office and it's fine, I know a lot of our community members are not in the same boat. I have such great compassion and gratitude that we can come together and provide more information.

**Dr. Jill 02:26**

I'm hearing from businesses right around here. This is the first day in two weeks that we've been able to be back in the office. And now the air quality is beautiful. But we did a lot of work, and we'll talk about some of those things that we did. I've been putting in hours and hours and lots of money to get the air quality back to normal.

**Dr. Jill 02:43**

What's interesting, and we'll talk about this tonight as well, is that my air quality inside right now is better than outside because I've got air filters. I'm really proud of that. I'm here and I have no trouble at all with the air quality. But it took a lot to get it back. And I know those people whose homes are still standing and who haven't lost everything, maybe either have no idea of the dangers, maybe they're starting to feel burning lungs, have bloody noses, or have symptoms. Tonight, I just want to be a resource for all of you out there.

**Dr. Jill 03:10**

Obviously, our community is affected. But many other people in many other states have been affected far before this happened. This is becoming more and more common because of our climate change. I think it's a really important thing for not only me as a physician to understand and be able to help patients, but also for the community to know.

**Dr. Jill 03:29**

Last little bit here. If you want any information, you can find blogs all for free on my website, [JillCarnahan.com](http://JillCarnahan.com). This episode and all the rest of the episodes—I think we're going on almost 90 now—are on my YouTube channel and anywhere you listen to podcasts. And you can find those after the fact if you miss this episode live.

**Dr. Jill 03:49**

Okay, now to my distinguished guests tonight. I'm so excited. I'm going to introduce you both and then we'll jump right into conversation. Dr. Louise Tolzmann, to my side here, has an undergraduate degree in biochemistry from Simon Fraser in Canada and a doctorate in naturopathic medicine from Bastyr University in '97. She completed her residency and began seeing patients with cancer and teaching on nutrition. She's been in private practice in Portland since 2005.

**Dr. Jill 04:17**

She's also a co-member, as is Dr. Patrick [on the screen] below me, of the ISEAI group—the International Society for Environmentally Acquired Illness. I can't say enough good about this organization. I've been a board member since the onset. It's nonprofit and pulls together some of the most amazing, environmentally aware, conscious, and mold-literate physicians that I know. I learn something from every one of them all the time. Like I said, I'm delighted to have them.

**Dr. Jill 04:44**

She has particularly lectured on air quality, smoke exposure, wildfire risk, and toxic metals—we're going to talk about that tonight—and produced video resources for fire departments to utilize in the training of first responders. Once again, maybe some of you who are listening are some of the police, firefighters, or people who've responded, and you're wondering why your lungs hurt. I remember after 9/11 starting to see this with the burning of industrial buildings, housing, and all the materials. We're learning more about this. We'll talk about that tonight. Anyway, that's Dr. Tolzmann. I could say more but we'll keep going and you'll get to know her tonight.

**Dr. Jill 05:22**

Dr. Lyn Patrick has been a friend. We have worked in her organization of the Environmental Health Symposium for several years. She's put together an amazing conference there. I really got to know her through that and through a lot of the lectures and places where we teach together. She also graduated from Bastyr University.

**Dr. Jill 05:38**

I often say my dearest friends are naturopaths. I feel kind of jealous because I have the heart of a naturopath and I just infiltrated regular medicine. But I'm really more like you guys than my colleagues sometimes. I hope that's okay to say.

**Dr. Jill** 05:54

She has been in private practice as a state-licensed naturopathic physician in Arizona and Colorado for 35 years. She's a published author of numerous articles in peer-reviewed medical journals, a contributing editor from the former Medline-indexed *Alternative Medical Review* journal, and recently authored a chapter in the newly released textbook of *Clinical Environmental Medicine* in 2019. She speaks all over the world. She's well known for her breadth and depth of knowledge on environmental toxins and chemicals. She's always one of my go-tos on referencing. Not too long ago, I said, "Benzene—can you tell me more?" Or lead and all these things. I love to talk to Lyn about chemicals and toxicities. She's also a member of the ISEAI group. Welcome to both of you tonight and thank you again for being on.

**Dr. Lyn Patrick** 06:43

Thank you, Jill. As a fellow Coloradan and having been in many, many fires myself in the last 20 years, my heart goes out to everybody here who's been affected. I know personally how heartbreaking this can be. I've had to evacuate several ranches that were completely devastated when I lived in an extremely rural area. Our town was evacuated in 2012 and came within half a mile of being burned down—the entire town of Mancos, Colorado. I've had experiences that have allowed me to see up close and personal the incredible beauty and horror of this experience. Beauty meaning the strength of nature—how strong nature is—but also how terrifying it is.

**Dr. Jill** 07:42

Thank you, Lyn, because it's so true. And honestly, the beauty is also the community and what happens after. The outpouring of love and support has been absolutely amazing. There is beauty even in the midst of devastation.

**Dr. Jill** 07:54

Dr. Tolzmann, I haven't heard your story but you definitely shared that you've had some personal experiences. Would you mind telling us a little bit about how you got into this work and some of your experience?

**Dr. Louise Tolzmann 08:07**

I got into this work because of firefighters. It became part of my passion—working with firefighters, working with fire departments—to try to change some of the practices, realizing how much exposure they're getting, how much cancer is happening, and how many other illnesses and risk factors they have by doing the job that they have in having the exposures. And part of it is that there's this lag time between a cancer diagnosis and an actual exposure. We have all the language around what we know is a carcinogen. We know that's a carcinogen. But buildings have changed significantly and they continue to change significantly. Even just looking at the last 20 years, the amount of plastics in our homes and the amount of different building materials make those risk factors a lot higher.

**Dr. Louise Tolzmann 09:04**

I got into that and then I started lecturing on smoke in general, with the fires following in California. After having lectured and done all this stuff, I was in Portland, which is where I live, in the September 2020 crazy fires and crazy air quality. We broke records. We had the worst air quality in the world. And it all just went up the entire west coast. I mean, the satellite images of it out on the ocean... We only got to a level one evacuation for our home in terms of fire but the smoke made it uninhabitable. I'm in an old farmhouse—1850s. I knew all the things to do. I also knew all the dangers and risks. The combination is really terrifying.

**Dr. Louise Tolzmann 10:00**

I think the other thing that we don't talk about a lot is how much the chemicals themselves affect our vagus nerve and our nervous system. When you can't breathe or when you're exposed to a lot of these toxicants, it's like: "I... I can't think. I can't do any..." You go into flight or flight. You become panicked. And that's a really hard way to function. We ended up evacuating. Luckily, we had friends who had a home in Idaho and we got in the car with the entire family—[along with] the dog and the bird—driving with huge air particle masks on because that's something that I've learned. We all have respirator masks and we evacuated. The smoke ended up following us and we ended up coming back. But it's really hard to make your home safe in smoke events. And the reality is that every single year we have smoke events all over the country.

**Dr. Jill** 11:01

That's the thing. And that's why I think this is so relevant for us to educate our co-physicians, our fellow members of ISEAI, and the doctors all over the world who are dealing with this. I wasn't trained in smoke damage, smoke inhalation, benzene, toluene, and VOCs from the fires. And we'll talk about specific chemicals in just a few moments.

**Dr. Jill** 11:19

My experience: The fires happened. My office is safe. I go back and the smell—I walked in here and within 10 minutes, [I had a] massive headache and burning lungs. What happens—and both of you can maybe explain better—from my understanding, these things grab onto dirt and dust particles. Anywhere there's dirt and dust—like 2.5 microns or smaller—the VOCs can attach to them so you really need to clean in depth. I'm shocked here that two weeks later I can breathe. There's no trouble.

**Dr. Jill** 11:51

We used hydroxyl machines, which I'd love your opinions on but I think they are a little safer than ozone. We used a lot of hydroxyl machines to clear the air and air scrubbers. We fogged with the botanical products we use for mold because that would weigh down those particles. After we fogged, we had a very in-depth clean, wiping down walls, ceilings, floors, all the services, all my bookshelves, and all of that. And now we have five large-capacity VOC small HEPA filters that will filter particulate down to 2.5 here going full blast and it feels good. But it's been two weeks and it took a long time to get there.

**Dr. Jill** 12:31

Let's just talk briefly about that. After the fire, obviously, there are a lot of buildings still standing. We think about those who've lost everything and our hearts have so much compassion for them. But what I'm seeing is that the people, the businesses, and the people that have their homes in this area are really suffering too. What are your recommendations—I'd love to hear from both of you—about what you do with the home that's been in the fires and still standing and you can't breathe?

**Dr. Lyn Patrick** 12:57

I'll let Louise take that because she's had personal experience and, I think, has also

learned a lot from that experience. And then I'll add if there's anything I think needs to be added.

**Dr. Louise Tolzmann** 13:08

The thing that I know and you're right, Jill, is that it's in the dust but the ash is so toxic. It is so toxic. They did a study in Southern California. It was like 2007, I think, or 2008—after the Southern California fires—analyzing the ash itself. And this was after removing the toxic, hazardous waste. They were just taking regular old home ash and it was full of metals and all these other chemicals. Every time that ash is disturbed, that's what's coming in. It's been concentrated and it's everywhere. So it is inside the homes that are still standing and it's in the areas where people are sorting through trying to find things around their destroyed homes. So first of all wearing a respirator—

**Dr. Jill** 14:00

Let's talk about that so that people really know what you're talking about. You're talking about the respirator that some people use for auto body shops, where there are two charcoal filters on the side. And what are those called if someone's looking for them? Is it just a respirator mask?

**Dr. Louise Tolzmann** 14:14

It's a respirator mask. I meant to bring it; I'm so sorry. But it covers your face. [The company] 3M makes three different versions of it. There's more or less silicone versus... The one with more silicone is up here. You have two filters. The filters that you want are a solvent filter and a particle 100 filter. We've all gotten used to particles now. N95 is a 95-particle [filter by which] 95% of the PM2.5s are kept out. A 100 [filter] keeps 100% of the PM2.5s out. It's a double filter.

**Dr. Jill** 14:49

Do you have to get fitted for these or can you buy them?

**Dr. Louise Tolzmann** 14:54

You can buy them. There are three sizes. You can buy them at your local hardware store. You can buy them online. The masks themselves run anywhere from \$20 to \$30 and the filters [cost] the same thing. I bought them and fitted my entire family. We have a bin of them. When we go anywhere when we travel, it comes with us. We basically have our smoke pack. We drove across the country this summer and there

I was walking the dog while wearing this full-on particle mask in the middle of Nebraska. People thought I was insane.

**Dr. Jill** 15:32

But honestly, with the rates at which things are happening, if we don't protect... These are the precious resources of our body.

**Dr. Jill** 15:40

First of all, you talked about the ash. This is really important because people are sifting through. We had massive hurricane-like winds that made the fire blow. Of course, it was like 60 or 50—very warm for December 30th. And then the next day, thank goodness it snowed. We had a snowstorm. Then the ash got covered with moisture. That was perfect. It couldn't have happened better to tamp it down. But what I'm assuming now is that as it gets warm and cold and thaws, the ash will start to... Probably 6–12 months. What happens then with the temperature and the environmental changes with this ash now that's all over?

**Dr. Louise Tolzmann** 16:14

In some places, they do remediation by literally scraping up the top levels and dumping them. One of the things that Lyn and I have talked about are mushrooms. Mushrooms are bioremediators and they've been used after fires. There are several companies now that have lots of videos on them. One of them is Butte Remediation. They've got a website with lots of videos on how to do it and what they did. But there are lots of different mushroom companies.

**Dr. Louise Tolzmann** 16:48

What I did was buy basically oyster mushrooms. You can buy oyster mushrooms and sprinkle them over your garden beds and they bio-remediate. It's slower than scraping off of all of the ash. It's great. But when you scrape off all the ash, you're losing all the topsoil and you're losing [inaudible].

**Dr. Jill** 17:11

Then what I've heard is that you have erosion and then dryness. Because there's no shrubbery or anything, it causes more dust and debris, which just spreads it. So that makes sense.



**Dr. Louise Tolzmann** 17:21

Right. The thing to think about with our plants is that our plants are really good remediators but that's not necessarily something you want to eat. Lots of the leafy greens suck up lead and other metals. And there are metals in this ash. If you're just planting a garden after you've had a bunch of ash fall on it, chances are those plants are going to be pretty toxic.

**Dr. Jill** 17:46

So, you don't necessarily want to eat them. I've heard that with thallium and some of the gourds, squashes, and zucchinis that pull that out of the soil. This is why some of these leafy greens or green juices, if you're not careful, you're getting massive thallium doses in them. Lyn, any comments on that—with air quality and ash?

**Dr. Lyn Patrick** 18:05

What is occurring to me as we're talking is that we need to because nobody else is going to do this... We have a wildfire smoke action plan that we've shared with you and you can maybe put that up where people can access it. It is available, I think, through the NAEM organization. It's also, I think, on the Environmental Health Symposium website. But we need a step-by-step action plan. For example, with 1,000 homes that have been incinerated, you've got a 9/11 size problem here. And there are a variety of different things that have to be addressed. For sure, the air quality is number one—absolutely. Everyone needs to understand how to look at AirNow.gov because the air quality is going to change based on the wind temperature, humidity, and air temperature. So people need to know at what point they should start wearing protection.

**Dr. Jill** 19:18

Talk briefly about that resource, because that's a big one. You said AirNow.gov. What is on that site?

**Dr. Lyn Patrick** 19:24

Yes. It's just a way to put in your city or zip code and look at the air quality index.

**Dr. Jill** 19:29

And that would relate to weather, moisture, and all those things?

**Dr. Lyn Patrick** 19:32

Yes. The EPA maintains many monitoring stations all over the United States that, in real-time, post the air quality online. Dr. Talzmann took matters into her own hands and got a PurpleAir monitor to do her own home monitoring, which is also very helpful. Maybe you can say something about that.

**Dr. Louise Tolzmann** 20:08

They were completely sold out. But that reminds me that I'm going to get one.

**Dr. Jill** 20:13

Yes, I want to get one too. I love this.

**Dr. Louise Tolzmann** 20:16

PurpleAir.org is a great resource. AirNow.gov is a government site, but it just gives you one number—the AQI for your area. It's one number. If you look at PurpleAir, it's all the monitors around, so you can get a sense. You can unclick the indoor air monitors and just see the outdoor air monitors. The air in Portland right now is really terrible. I pulled it up today. Looking at it, it's a great image because you can see all over the different neighborhoods and get a sense. It's sucky. But you can also, rather than just having one number, get a sense of where it is and where it's clean again.

**Dr. Jill** 20:59

Where there are pockets and depressions. I used that all summer with our wildfires. I remember August 6th—I'll never forget the day—I was out hiking. I had not checked their quality. And it was like you in Oregon the year before—the worst in the whole, entire world. And I could not breathe on the typical hike I was doing. Later, I found out I should have looked because it was like I had smoked a pack of cigarettes that day. And I looked at PurpleAir. I'm putting these resources in. If you're watching live now, these links are in the feed. If you're watching on YouTube, I will put them in the feed below the video as well, so you'll find them. I'll make sure they're all there for you.

**Dr. Louise Tolzmann** 21:34

PurpleAir does have a link to be able to buy a monitor that you can have indoors or outdoors to help contribute to monitoring the air.

**Dr. Jill** 21:42

Is that the one you said is sold out at the moment but available?

**Dr. Louise Tolzmann** 21:46

It was the last time I looked but it might have just been during that wildfire craziness.

**Dr. Jill** 21:49

Okay, very good.

**Dr. Lyn Patrick** 21:51

I would advocate for everyone to get an indoor air monitor if you don't have an air filter that has an air monitor built into it. I think that that is really much more personal and useful than AQI. The AQI is the air quality index. It's also available and it's free. You don't have to buy anything. So that's number one.

**Dr. Lyn Patrick** 22:23

Number two, what we're talking about right now is protection. Protection has a bunch of different levels. One is, if you have an old, leaky house, how can you make that house less leaky? Dr. Tolzmann had an old, leaky house that she tried really hard to make less leaky. And sometimes you can. There's really good information that we put up in a bunch of blogs that I wrote for free—it's not behind a paywall—at the Environmental Health Symposium website: [EnvironmentalHealthSymposium.com](http://EnvironmentalHealthSymposium.com). Under 'Resources', you can go to the blog page. We have about four blogs on wildfire smoke exposure and things you can do to remediate that.

**Dr. Lyn Patrick** 23:14

One of them, the California Air Resources Board, has wonderful resources that help people figure out how to seal up their homes. I think this is going to be an issue for you guys because newer homes are made too airtight. They don't breathe well enough. Older homes aren't made airtight enough and they're too leaky. So being able to figure out how to seal up your home and make it tighter so that when you do filter the air inside the home, you're not constantly having to fight air that's coming in from the outside will be really important.

**Dr. Jill** 23:52

This is so helpful. And even with my office, we sealed all the outlets with the little, simple \$1 either silicone or foam pads that you can put in there. But that's just from the wall cavity air. That'd be like a mold remediation technique. Tell us, Dr. Tolzmann, what did you do around the windows? Or tell us a few of the things that you found out about your older home, because this is very relevant.

**Dr. Louise Tolzmann** 24:15

We attempted to tape windows and doors and do things to try and seal up areas. In retrospect, I realized we missed the fan above the toilet. It didn't occur to me that that was coming in. But in my bin, we have over a dozen rolls of painter's tape. You just go around all the windows and tape them and all the doors and tape them. You go in and out through a certain door. We have this whole strategy about which door we would go in and out of so it wouldn't pollute too much of our house. This summer, we had someone come and do an assessment of the house [to see] where it was leaky and what was leaky. It's one of those things where you have to work in steps.

**Dr. Louise Tolzmann** 25:03

Our house is really leaky. It's a huge, old, three-story home. It's also a matter of [determining]: Can we make certain areas safe? Can we prioritize being able to have these two rooms have all the air filters in there, seal them completely, come in and out through one door, and then let the other parts of the house be more leaky and be more smoky? But we weren't able to do that successfully, which is why we ended up leaving. And it was harder to problem-solve in the moment. Now we've got much more of a plan in place for exactly what to do.

**Dr. Jill** 25:39

You talked about this kit. It sounds like your masks are there. What would be in a kit?—because it sounds like everybody should have a kit. And what would that look like? What's in your kit?

**Dr. Louise Tolzmann** 25:47

In my kit are all the masks, filters, extra filters on the face, and all the painter's tape.

**Dr. Lyn Patrick** 25:56

She's talking about the cartridges that—

**Dr. Louise Tolzmann** 25:58

Yes. Respirators and extra respirator—

**Dr. Jill** 26:01

Cartridges.

**Dr. Louise Tolzmann** 26:02

Yes.

**Dr. Lyn Patrick** 26:03

[inaudible] and replace them.

**Dr. Jill** 26:04

A quick question about that: How often would you replace them? Say you were using them regularly, like right after the fires. Is it just a week or a month? Is there a time frame for replacement? No? Okay.

**Dr. Louise Tolzmann** 26:17

I guess it depends on how much exposure it's had.

**Dr. Jill** 26:19

Totally. Okay, it makes sense.

**Dr. Louise Tolzmann** 26:22

I've also ordered extra filters for all the air purifiers, so I've got a backup thing for that, and extra filters for the furnace filter. People do all those makeshift box fans with the filters on top. Those are great in a pinch. They will grab stuff in terms of just decreasing dust levels and things like that. But that's what I have in terms of that. I have a whole different thing when we start talking about supplements, nutraceuticals, or things like that. But in terms of this, I traveled with a bin that had face masks for the whole family and cartridges and we were ready to go in case we needed it.

**Dr. Jill** 27:00

Brilliant. It's super helpful. So let's switch just briefly to air filters. We can talk [about] anything here if you have any opinions. I always say [to have] a good HEPA

filtration down to 2.5 microns with a VOC filter, which is typically charcoal or some sort of absorbable zeolite. I have always used Austin Air. IQAir is another great brand. And I'm just starting to use some AirDoctor. Feel free to talk if you want. But what are your favorite air filters?

**Dr. Lyn Patrick** 27:27

The way that I talk about air filters is specific to the individual who needs the clean air. There are different kinds of humans who need clean air. There are humans who have a lung injury. They have COPD or very severe asthma. They need cleaner air than someone who's healthy and doesn't have a history of respiratory infection or respiratory disease. The filter on the air filter is very thick or very thin. And the way that's decided is by what's called the micron filtration capacity. Micron is just a little teeny, tiny... I don't know—a thousandth of a millimeter. I can't remember. But it's how we measure holes in things. And the air filtration that I use for my patients has a micron filtration capacity of 0.001 microns. You're talking about 2.5 microns, which is a very big hole compared to a very small hole of 0.001 microns.

**Dr. Lyn Patrick** 28:43

The reason that I recommend AirDoctor, just to name a brand, is that I think it goes down to 0.003 microns. And IQAir is a high-end brand and it's expensive. Not everybody can run out and spend \$700 to \$900 on an IQAir filter. But for people who are really sensitive to mold and mildew and have asthma, it is a lifesaver. That filtration capacity is 0.001 microns. We were talking before about ash. Ash is 10 microns and bigger, so that's really easy to filter out. You can filter that out with a MERV 12 filter. You can get it at Home Depot or Lowe's. And people do that; they build their own filters with a fan in a box and the MERV filters they get from Lowe's. And that will do great for the ash.

**Dr. Lyn Patrick** 29:47

I think the difficult conversation we have to have is that when you burn down a home, you not only burn down the wood in the home, but you [also] burn down the plastic in the home. Homes have a lot of plastic in them—the appliances, the bookshelves. And you create a lot of solvents, gases, and particulate matter that's really fine. It took a lot of heat to burn down those homes. There was an incredibly high temperature to have homes melt. Literally, that's what happened. So into the

environment went these things called ultrafine particles, which are tinier than 2.5. They are down to 0.01 microns in size, kind of like a virus. Really tiny.

**Dr. Lyn Patrick** 30:46

We have to think about: How can we help people have clean air and not go broke? For me, that's a conversation about: How's your health? Do you have a respiratory disease? Are you challenged in terms of your need for clean air? If so, then, if you can afford it, it's better to get one of those high-end air filters. Austin Air, by the way, is a great company. ConsumerLab just did a wonderful, very extensive project on air filtration, and Austin Air came out on top.

**Dr. Jill** 31:34

Wow. That's been my personal experience with the mold. I didn't know anything about air filters, but I knew that that filter, the one right beside me here, really saved my life. I could tell a difference every time I was around it. I became a believer. Then I found out there are all kinds of other good brands as well. But I am a fan. I will say, if you're listening and you're in our community—this is just for people affected by the fires—we have secured a really large discount. If you need an air filter, you can email [cleanair@flatironfunctionalmedicine.com](mailto:cleanair@flatironfunctionalmedicine.com), and we'll get you direct information about that. I can't even say on here how much it is, but for someone who's affected by the fire, we have a very large discount on these good air filters for you if you need one.

**Dr. Lyn Patrick** 32:13

And I would highly recommend getting an air filter, because the bottom line is that those of us who live in the West, like Louise said, are going to be challenged with this from now on. That is just what we're going to have to problem-solve.

**Dr. Jill** 32:28

And it's interesting; I'm not on the foothills. I can see the foothills. I'm close. But my thought was always, "Oh, those people in the foothills always have to deal with the wildfires." No! We're in the residential section, way away from the foothills. It had nothing to do with the foothills. And you realize we're all at risk out here. What were you going to say, Louise?

**Dr. Louise Tolzmann** 32:50

I was going to say two things. One, we all need air filters because our homes are so

toxic air-wise. Very often, indoor air is worse than outdoor air when outdoor air is good. But the other thing, I wholeheartedly agree with you, Lyn, it's all about the patient. And I think if I have to choose, it's always about the bedroom. Just make your bedroom super safe. Get your bedroom super clean. Get all the stuff out of your bedroom. Have as little stuff in there and run an air filter. You're in there for seven to ten hours. Breathing clean air at least at night—if you can just do one thing, that's the thing. Get it in your bedroom.

**Dr. Jill** 33:35

Oh, I love that. I'm going to shift. I have an article here that lists some of the chemicals. And you guys may have more but let's talk just a little bit about: What is in the fire? And then let's shift to what we can do about it. What can we do?—not only about air quality; we've talked about that pretty extensively. But there are some good supplements and things out there that we all use as tools to help the body detox from these chemicals. Again, this isn't exhaustive; please feel free to add. Aldehydes, acid gases, sulfur dioxide, nitrogen oxides, polycyclic aromatic hydrocarbons, benzene, toluene, styrene, heavy metals—I want to talk specifically about that and dioxins. Anything else that comes to mind? You can both have a turn talking a little bit about the chemicals and the metals, especially because that surprises people. Metals are being released. Lyn, do you want to start briefly [talking] about some of the chemicals?

**Dr. Lyn Patrick** 34:27

Sure. We knew about metals from forest fires because trees that have needles will pull mercury out of the air and sequester it in their needles, which is an amazing thing that the trees do for us. When those trees burn, the mercury becomes a gas. It will travel a long way on clouds of smoke. When 9/11 happened, one of the things that New York City did was start their own study, looking at the blood of NYC residents to see what was in there. What they found in the period after 9/11 was that the average blood level of mercury in NYC residents went up significantly. This wasn't because they all started eating more sushi all of a sudden. The Health Department had a lot of data because there are some problems with mercury in New York City. But what they found was that it had been going along fairly steadily and then it just shot up after 9/11. This was because the mercury from the buildings that came down, the Twin Towers, became airborne and was breathed in. And we



are very good at picking up mercury in our lungs and transporting it into our bloodstream.

**Dr. Lyn Patrick 36:05**

Unfortunately, mercury is one of the metals, as are lead, cadmium, and arsenic. And it's not only coming from the trees; it's also coming from buildings. Unfortunately, we still have mercury in the gauges of old antique clocks. We have mercury from people who spilled mercury on the carpet, from breaking a thermometer, from old fluorescent light bulbs, and from light bulbs that are compact fluorescent light bulbs—those contain mercury. There are a lot of places that mercury can come from in homes. Not everybody's gotten rid of their compact fluorescents. We went through this phase where we thought that's how we were going to save the environment and now we realize that was a bad idea. Mercury is one of the metals that becomes airborne and becomes part of that.

**Dr. Lyn Patrick 37:04**

And remember, you were just talking about PM2.5—those little particles floating around in the air. They're sticky. They're like velcro. What sticks onto them are metals, pesticides, solvents—or we'll say gases [like] benzene, toluene, and polycyclic aromatic hydrocarbons. These little molecules floating around in the air have a lot of stuff stuck to them that is toxic. That's why we're making such a big deal about not breathing them in. You don't want them on your skin, and you don't want them in your lungs. You don't want to breathe them in.

**Dr. Jill 37:42**

There are two things I just thought of. First of all, that's why, after the fires, cleaning is a huge part of safety. First of all, those are aerosolized. You need to bring them down. The hydroxyl machines, I believe, will do that. Also, for us, fogging worked. Even though that might not be the standard, it worked. And the physiology of the lungs—if you're listening and are like, "How does this happen?"—our bodies are meant to take in air, oxygen, and things into these alveoli. They're right up against the blood vessels. Our lungs are a direct route to our bloodstream. This is why mold is so toxic. We used to think years ago that it was ingested. It's not ingested most of the time. It's inhaled. The smaller the particle size, [the more] it goes right through without even needing transportation to the bloodstream. So

after the fires, we're loading our blood with toxic chemicals. Louise, any thoughts on the chemicals, your experience, and anything we can do to protect ourselves?

**Dr. Louise Tolzmann** 38:41

When you start to look around a home and think about a home, if we just talk about plastics, new home construction has plastic water pipes throughout the whole house. Sometimes there's plastic siding, plastic windows, or plastic fencing. Outdoor garden irrigation is often plastic. Arsenic and some of the other metals—

**Dr. Jill** 39:04

Lyn says the decks. Yes.

**Dr. Lyn Patrick** 39:07

Decking is plastic.

**Dr. Louise Tolzmann** 39:09

Right. And other decking is often pressure-treated lumber that can be arsenic and is also burning. So you're getting the arsenic. And homes often have things that are contained. There's asbestos that's still contained. It doesn't need to be remediated because it's maybe just around the pipes or someone feels like, "Oh, it's fine." But when that burns, it gets aerosolized. You're inhaling asbestos. Car batteries contain cadmium. There were cars that burned and homes with batteries. All the chemicals. Think about a garage or think about a basement with paint and all the different chemicals people use, as well as pesticides and herbicides. All of that was released.

**Dr. Jill** 39:57

Unbelievable! Let's talk just a little about supplements, nutrition, IVs, sauna—where do we start?

**Dr. Lyn Patrick** 40:11

Can I share my screen? Will that be visible?

**Dr. Jill** 40:13

Please. And I think I have it ready to go so please go ahead.

**Dr. Lyn Patrick** 40:17

Okay. This is what we call the "Fire Smoke Exposure Action Plan". This is something

that Dr. Walter Crinnion, Louise, and I worked on back, I think, in 2018 or 2019. All of these supplements have been used in human trials. No, we're not talking about animal trials. And some of these trials have a procedure where they'll put a human in what's called a pollution box or a pollution chamber. So they actually put a human in there. Then they will fog the pollution chamber with a very specific particle size and a very specific density of the particles so they can replicate fire smoke exposure. Some of these studies have used actual exposures in humans. So this is really good evidence.

**Dr. Lyn Patrick** 41:21

First thing, B vitamins—they're very cheap, very accessible, and very important in these specific doses. Of course, we know that the B-complex is a family. And you really should use them all together, not just folic acid. And by the way, that is my typo. It was folinic acid. I just looked up the original research and it was really folinic acid, so methyl folate. However, you want to dose that. And we know that people are very specifically sensitive to folates. But if there are healthcare providers in the audience, you know how to figure this out. But in a pinch, just good old folic acid will probably be helpful. So this specific dosage of these specific B vitamins. They don't automatically come like this in B-complex vitamins so you may have to buy them separately.

**Dr. Lyn Patrick** 42:21

Fish oil—EPA and DHA—used in the elderly who were exposed to specific... I think this was an outdoor air pollution exposure study. They looked at how the fish oil affected these elders. This is really important because air pollution causes heart disease. It can cause strokes and acute heart attacks. And heart rate variability is a way to measure how the heart is affected by toxicants. There was a very dramatic protective effect of fish oil on heart rate variability in these elders who were exposed to air pollution. A good-quality fish oil; a high-quality fish oil. Not the fish oil you get from Costco, because the fish oil you buy from Costco does not have some of the other pollutants that are found in fish oil removed from it. There are pollutants in fish oil that have to be removed by a process. A high-quality fish oil will have those removed. One and a half grams of a combination of EPA and DHA.

**Dr. Lyn Patrick** 43:46

Then good old vitamin C. This is just good old, regular powdered vitamin C that you can buy anywhere. It kind of doesn't matter what it is. [Vitamin C] and vitamin E have been shown to protect [one] from a whole variety of different air pollutants. You can see nitrous oxide here. It's been used in kids with asthma. Ozone, by the way, is one of the pollutants that everybody will be exposed to from these fires, for sure. A combination of sunlight and some of the solvents will make ozone ground level. It's very important to have vitamin C.

**Dr. Jill** 44:23

Lyn, if I can just say quickly—and I'd love a comment because it's relevant—some of the air filters that have specific mechanisms to treat the air can create ozone in the air when they react to the particulate. I'm not a fan of these at all. Would you agree?

**Dr. Lyn Patrick** 44:39

Yes. Ozone can create asthma in people who are prone to asthma. It can also cause COPD, a chronic obstructive pulmonary disease. If you have an air filtration device that's generating ozone, you don't want to be in the home when it's running. That's the bottom line. You don't want to be exposed to ozone. Absolutely not.

**Dr. Lyn Patrick** 45:06

Sulforaphane—this is the wonderful and powerful compound that's found in broccoli. Broccoli sprouts are exceedingly high in sulforaphane. There was a great study that was done in China, in a highly industrialized city. They gave a group of adults that lived in this highly polluted city broccoli sprout powder in a beverage—a powder you just stirred up in water and drank—and they showed a significant improvement in their ability to detoxify and eliminate benzene, specifically (benzene is an air pollutant that is going to be one of the things people are exposed to from the fire) and acrolein, which is also a combustion product, so it's also an air pollutant.

**Dr. Jill** 45:59

Lyn, just a really quick note on benzene. I just interviewed my grandmother for the book I'm writing about six months ago. I just found out—she's 90 years old—she's the only one in her family still surviving. When she was 15, they moved into an auto dealership that her father had bought. They lived above an auto body shop with lead and benzene. Her sister died early of metastatic cancer to the liver. Her father died of liver cancer. Her mother died of liver failure with no alcohol cirrhosis and no

known cause. And her brother died of metastatic liver cancer. I was shocked. And all the siblings other than her were younger so they all got a lot more exposure to the benzene and the lead than she did. But here's this story in my own family of benzene toxicity, and they all had liver issues.

**Dr. Lyn Patrick** 46:45

Yes. Benzene is a class A carcinogen.

N-acetylcysteine—that is an amino acid. It's got an NA in front of it. It's not just regular cysteine; it's acetylated. It's absolutely crucial for the protection of the lungs. There's very good evidence in human studies that NAC protects the lungs from air pollution exposure because it is a precursor to glutathione. Our lung lining—we have a fluid that lines our lungs. We think about volcanoes. Humans lived in a time when there was a tremendous amount of air pollution from volcanoes. But fast forward several million years and here we have a lot of things we're exposed to all the time. That lung lining fluid is very rich in glutathione, vitamin C, vitamin E, and several other antioxidants to protect us from the exposures we have—not just to air pollutants but to some of the bugs that get into our lungs [such as] viruses, for example. NAC is part of that whole system, so it's very important. The typical adult dose is 1,800 milligrams. The only people who should not take N-acetylcysteine are those with active peptic ulcers. If you're battling an ulcer and you've got heartburn, you should not take NAC because it thins the mucous lining of the stomach.

**Dr. Lyn Patrick** 48:25

Resveratrol is an excellent antioxidant. It has also been shown to protect the lung lining—that crucial and beautiful, vulnerable lining of the lungs that can become inflamed. And I want Dr. Tolzmann to talk about green tea because she did a lot of the research in our last webinar on this. Green tea is pretty amazing.

**Dr. Louise Tolzmann** 48:51

They did a nice green tea study. It had four different groups. They were using gasoline workers, people who were pumping gasoline. There's a big exposure of benzene when you're pumping gasoline. Two of the groups were pumping gasoline. One of those groups was taking green tea and the other one wasn't. And then in the other group, there were [those who were] not pumping gasoline: [Both those who

were] taking green tea and not taking green tea. They were measuring inflammation and also measuring DNA damage, literally. What they found was that it was beneficial to people who were not pumping gasoline at all. Doing green tea was really protective and helpful. But the people who were pumping benzene were protected down almost to the levels of people who weren't pumping benzene. It's really an easy thing to do if you like drinking it. You can just be drinking green tea. We know it has lots of other beneficial effects as well.

**Dr. Lyn Patrick 50:00**

Absolutely. It is available in little capsules. If, for some reason, you're averse to drinking it and you just will not drink it, it is available. Green tea extract is available in capsules. But it is a wonderful beverage. It has a tremendous amount of benefit in many other ways as well.

**Dr. Lyn Patrick 50:19**

Curcumin [is something] everybody has probably heard about. Turmeric contains curcumin as well as many other beneficial substances. You know all about this, Jill, because it's basically an anti-endotoxin.

**Dr. Jill 50:39**

Yes. I saw that and I've talked about that before. For any of you listening, LPS is the bacterial coatings in the gut that sneak over the blood and create massive inflammation, underlying obesity, heart disease, lots of mood disorders, sleep disorders, etc.

**Dr. Lyn Patrick 50:54**

Curcumin also assists in some of the metabolism and excretion of these toxicants. Curcumin has been shown to increase urine elimination of lead, urine elimination of mercury, and several other metals. Curcumin by itself, although it's not a chelator per se, does assist in getting some of these metals out of the body. You can buy turmeric root now and make a tea out of it or you can get curcumin in capsules. We don't have a dosage there and I'm not sure why. But a standard dosage is 450 milligrams a day or something like that.

**Dr. Lyn Patrick 51:36**

Alpha-lipoic acid, which is an antioxidant, [is something] the body makes, so it's not a drug. It's made in the body. There are different forms of alpha-lipoic acid. The R

form is a more stable form. R-ALA is how you would see it. The R-form alpha-lipoic acid has been shown to minimize damage from toxicant exposure from air pollution.

**Dr. Lyn Patrick** 52:08

So that's our little action plan. We don't have actual studies with house fire smoke. The studies have been done with wildfire or forest fire smoke and air pollution. But that's what we're dealing with—the combination of the two. We're dealing with wildfire smoke and air pollution. That's what the house fire smoke really is—air pollution.

**Dr. Louise Tolzmann** 52:39

I just want to go back to some of these things. The fish oil—I think it's exactly what Lyn said; you need to look at the EPA and the DHA on the label. Often, they'll advertise on the front total fats, total omega-3s, or something like that, and you'll see this really big number. But when you turn it to the back, you'll realize it has hardly any EPA and DHA in it. You really need to add those up. That's what you need—1.6 grams. Doing that makes it clear which ones are good and which ones aren't.

**Dr. Louise Tolzmann** 53:17

With fish oil, I am concerned about people getting exposed to toxicants because if it isn't a company that's well known or taking really good care to make sure they're pulling things out, then you are potentially getting stuff that is more toxic. But the vitamin C, the B vitamins, and the NAC are fairly inexpensive, very accessible, and easy to get. It's a little trickier now with NAC but... And green tea. Those are some amazing things to do to be able to start immediately. And the data and the research were really compelling. It's really compelling when you put people in a pollution chamber with a simple B vitamin versus no B vitamin.

**Dr. Lyn Patrick** 54:05

Jill, I'm not sure this is the exact exposure action plan that I gave you but it's very similar. We have action plans that have information about how to make your house secure and what filters to use as well.

**Dr. Jill** 54:24

This is great. I will be sure to distribute it and give you all credit, because it's

definitely needed. And that's what I've been trying to do: [Figure out] how to get the information out to the community.

**Dr. Lyn Patrick** 54:32

Yes, no credit is needed. Just share this and get it out there. I think the more we can come together as providers... This is going to be an ongoing discussion because, like Louise said in the Paradise Fire and many other fires, the EPA came in with dump trucks, dug all of the ash out of the home site, and took it. I don't know where they took it—to some big hole in the ground. That process is going to need to take place times 1,000.

**Dr. Jill** 55:08

Right. Exactly. I'm sitting right now, surrounded on four sides by sites that are acres and acres and acres and acres of nothing but rubble. Thank goodness I have many, many air filters around me. I'm doing great. And we have this building sealed—just like you said. I'm in a good spot here. But this is going to affect many. And my instinct is number one, like you said, this is not going to stop here. I'm very committed. I'm a guinea pig. You guys have said this too. That's how we live, right? Louise, your experience motivated you to really learn more. And I'm now going to be one of the biggest advocates for this stuff, hopefully out there just like you, teaching. This year at any conference, I'm like, "Let's talk about wildfires," because it's a really big deal.

**Dr. Jill** 55:54

I'm a practitioner. I've been doing functional medicine for 20 years and I did not really know a lot about the wildfires until they happened here. So thank you both for being on the cutting edge, for being such great researchers and resources and just all-around amazing, amazing colleagues and practitioners to bring this information and for taking the time on short notice. I am so grateful!

**Dr. Lyn Patrick** 56:15

Sure, absolutely. Let us know how we can continue to be helpful.

**Dr. Louise Tolzmann** 56:20

Yes, absolutely.



**Dr. Jill** 56:22

Thank you. Any last comments or bits of wisdom that we didn't cover?

**Dr. Lyn Patrick** 56:27

I guess one quick thing I want to say is that there was a study that was done in Seeley Lake, Montana. Seeley Lake is outside of Missoula. I believe in 2017, they had six weeks where the air quality index was 220. They went in and measured the lung function of a group of older adults. Then they went back and measured it three months, six months, nine months, twelve months, and two years later. What they found from just six weeks of exposure is that they continued to lose lung function. Their loss of lung function was accelerated in about a third of those folks, three times faster than everyone else in terms of their FEV or forced expiratory volume. So this is serious.

**Dr. Lyn Patrick** 57:34

We really need to take this seriously because that one exposure of six weeks... There were a bunch of wildfires in the West—in Montana and in Canada. Maybe it was 2018. Anyway, that exposure did damage. And none of those folks that I know of in the study had any kind of intervention. They didn't take vitamins; they didn't take supplements. I think we need to do more research with intervention and see if we can prevent that from happening.

**Dr. Jill** 58:03

It's so important. Five years ago, with my mold exposure, my lung function... First of all, I have this GSTP1 mutation in my lungs, which causes the mucosal lining in my lungs to not be able to process chemicals as well and to produce less glutathione. One thought, and I'd love to know if you use this, but I've been prescribing nebulized NAC and glutathione to some of those who have the topical symptoms. You could get it from a doctor who knows how to prescribe it. You can buy a nebulizer anywhere online; you can get a prescription or buy it yourself. You don't need a prescription. And then you can use N-acetylcysteine and/or glutathione inhaled. I found it to be really helpful. Would you recommend that during the fires? Is there any contraindication or issue with that?

**Dr. Lyn Patrick** 58:47

Not that I know of, no.

**Dr. Jill** 58:49

Awesome. Any comments [in this] last bit, Dr. Tolzmann?

**Dr. Louise Tolzmann** 58:54

No. I would just say for you that every time you're leaving your amazing sanctuary, you're in a respirator because you are being exposed [when] walking outside your house, walking your dog, walking to your car, to your home, or things like that. [This is one of the] ways of protecting [yourself].

**Dr. Jill** 59:11

Excellent. I'm going to get one. It's so funny because here I know about this and I'm not wearing... I've been wearing a mask, but not a respirator. I'm going to go get one. Thank you both from the bottom of my heart and on behalf of my community that's been affected for being here and for taking the time. This is priceless information. I will be sure to spread the word and share your resources. And I'm just grateful to the two of you for being the leaders in this discussion. Thank you so much!

**Dr. Louise Tolzmann** 59:35

You're welcome so much.

**Dr. Lyn Patrick** 59:36

Let us know honestly, Jill, how we can continue to be helpful.

**Dr. Louise Tolzmann** 59:39

Yes.

**Dr. Jill** 59:40

Thank you.