Episode 154: Understanding and Mitigating EMFs in the Home With Peter Sierck From EMFRF

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Katie: Hello and welcome to "The Healthy Moms Podcast." I'm Katie from wellnessmama.com and I am super psyched about today's interview because this is a topic I am really interested in and wanting to learn more about, which is all the research related to EMFs and RFs and all these things that we encounter. And I'm here with Peter Sierck who is an industrial hygienist and a building biologist. He has 30 years of experience doing this kind of work, doing electromagnetic field surveys, and designing low EMF buildings and homes, and also on shielding methods. I get a lot of questions about this and I'm certainly not an expert, and I'm so excited to have Peter here to shed some light on this. Peter, welcome.

Peter: Thank you.

Katie: I think this is such an important topic and I think it's one most people don't even realize as such an important topic. So, I want to start from the beginning. I know you have a huge knowledge-base on this, but for those of us starting more from a lower level not fully understanding it. Can you just explain to us in a very general way, what are EMFs and how do we encounter them?

Peter: Sure, certainly. EMF stands for electromagnetic fields. So, as the term says, we are dealing with electric fields and magnetic fields. Now, most people think that it's all one thing that you take one tool and you measure, and you get your answer, but there are actually many different types of electromagnetic field. So, for example, sunlight and heat, and so on, are also part of electromagnetic fields, but what we're really relating to when we talk about EMFs in general is electromagnetic fields being emitted from sources such as power lines or cellular wireless equipment. So, what I usually do is I differentiate EMFs into... Let me say that differently. A simple way to look at it is to look at electromagnetic fields coming from wired systems and from wireless systems.

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So, when we think about wired systems, think about a high-tension transmission line, the power transformer in your backyard. Your internal wiring, your circuit breaker panel, your electrical outlet, the switches, the lights, anything you plug in. This is what we call low frequency EMF. Electric fields and magnetic fields are being emitted from the electrical wiring system. And so, that is one section of electromagnetic fields. And then the other term we commonly use is RF or radio frequencies. When we refer to that is, we're talking about fields being emitted from wireless transmission because basically what we do is we send energy either through a wire so that our light works inside our home or we send it wirelessly. So, for example that we can have our telephone conversation wirelessly, so that all happens was energy and this energy can create electromagnetic fields.

Katie: That makes sense. And so, I think, the question I have to make sure I'm understanding correctly. So, there can be EMFs emitted even from like a wired device or something like wires even then within your home, is that correct? Because I know…I think, most people understand that, for instance, cellphones put off a signal or a Wi-Fi network puts off a signal, but you're saying that those can come from a wired area as well?

Peter: Oh, yeah, and the first attention on electromagnetic field really had to do with high-tension power lines, and the initial studies which came out which showed a higher incident of childhood leukemia and cancer associated with power lines. So, what they were looking at that point of time is the magnetic field portion. Let's say it this way. If you have a wire and a current is flowing in the wire, as the current is flowing through that wire, it creates a magnetic field and that magnetic field becomes larger with more current flow and if something is properly wired, we actually have a cancellation effect because we have a hot and a neutral, and the fields are opposite each other. So, if the two wires are very close together, then we have opposite fields which cancel themselves out so that there is no significant magnetic field.

However, if you look at a high-tension power line, you will see that those wires, these conductors are not very close together. They're actually way apart, and therefore they create large magnetic fields. Now, that's why they are one source of high magnetic fields. So, now the wires are getting into your house and as long as the wiring is done correctly, there are very minor or minute, or neglectable magnetic fields inside the building. However, a study done by the Department of Health Services in California, where they looked at schools and they wanted to find out what is the exposure to school children, and what are the sources of the magnetic fields in the school. What they found out is that most of the time, it's not the high-tension power line, but it's actually a wiring error in the electrical system which can cause higher magnetic fields inside the building than actually the power line on the outside.

Katie: That's really scary. Does that happen in homes as well? How would someone know if it was a wiring problem like that?

Peter: It does happen also inside the home and that same statistical analysis is true for homes. That means, more likely the high field is created by a wiring error than from a high-tension power line. So, how do you fix that? How do you find out? Well, unfortunately, there's no easy obvious way to see that because your electrical system is still going to work perfectly. That means the lights are on, refrigerator's running, your laundry machine is going, all of that is going, but what will happen is that a larger magnetic field will be present throughout the residence. So, how do you identify that? The only really way is to do a magnetic field survey. That means to get yourself either a meter, nowadays these meters have become relatively inexpensive for about $200 to $300. One can buy a decent magnetic field meter and then conduct some readings inside the house.

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So, for example, we surveyed thousands and thousands of homes. So, in a home not close to a high-tension power line and with no electrical wiring errors, the magnetic field in the building should be between 0.1 and 0.5 milligauss. So, if one walks around with a meter and finds that the levels are higher than that, there's a likelihood that there are wiring errors. So, what we usually do is we go to the electric panel at that point of time and we start flipping circuit breakers, and we eventually identify the circuit breakers which are actually causing the problem. And then, we get an electrician out there and say, "Hey, there are some wiring errors in here. You need to fix them." And that will reduce the magnetic field problem.

Katie: That makes sense. What's the difference…can you explain a little more between an EMF and just an RF? For anyone who doesn't understand that distinction.

Peter: Yeah, I mean, all of them are electromagnetic fields, but for simplicity sake, the industry has made a difference between EMF and RF. So, usually, when we refer to EMF, we're referring to the wired system, the stuff which is inside the houses due to electrical wiring, and RF is related to radio frequency, so that means transmission over the air. And what has happened in our industry or in our society in the last few years is that everything goes wireless from your computer to your cellphone, to your Wi-Fi, to your smart meter. Nowadays, all the appliances we're going to purchase in the future, in the next few years are going to have chips in them which are emitting wireless RF radiation because they are designed to work as a smart integrate system. That means that your smart meter is able to talk to your refrigerator, to your laundry machine, to your dishwasher, to any and all electrical appliances so that they actually communicate with each other and that causes high RF levels inside buildings. And the main source actually, unfortunately are Wi-Fi routers and cordless phones.

Katie: Which, yeah, I'm guessing most people listening have those. I'm glad you mentioned smart meters too because I've seen a lot of conflicting and controversial information about smart meters and how, like certain sources say, "They're absolutely horrible and there's nothing you can do about them." And others saying, "There's actually types in that some are more dangerous than others." What do you think about smart meters and is there any way to make them safer or to shield from them if someone has a smart meter and their electric company isn't going to change it?

Peter: Yeah, so this has been a hot topic for quite a few years now with the rollout of the smart meters. So, with other words, those are electric utility meters which are measuring the electrical consumption and rather having the utility technician coming by and reading off of the meter. This will be electronically, wirelessly transmitted to the next cell tower and from the next cell tower to the utility company who then can see how much electricity is being used and at what time, and so on and so on.

So, therefore, they are similar to a cellphone. They transmit data wirelessly. Now, the utility companies tell us that they only transmit data once a day or twice a day. Unfortunately, the way that technology is setup it creates also what we call, A Beacon signal. It's just asking, are you still there? Hello, hello? And so, that happens quite a few times. When we did some research, we found it happens about two to five times a minute. So, with other words, these blips and this little burst of RF energy are constant...not constantly, but intermittently happen throughout the day.

Now, to the health effect, what I found by going actually out in the field and conducting measurements specifically for the frequency submitted from these smart meters. I found that it really depends on the

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location. So, I'm going to give an example. For example, if the electric meter is located on a wall, on the garage, further away from the living quarters and the bedrooms. We can barely detect the signal anymore in the bedrooms or the living quarters because there's so much distance in between and they're a lot and number of walls in between which actually have a shielding and reduction effect. So, then at that point of time, it may be a moot point and the smart meter may not do anything to yourself inside your house.

However, if the neighbor's house is close to that particular smart meter on the other side of the fence and those are their bedrooms and they may get more of an exposure than yourself on the meter. On the other hand, I've seen buildings where the electrical panel and the smart meter is located directly on the, may a bedroom wall. So, then you have very little distance between it and you only have one wall between it, and so significant fields can be found inside. Can you shield it? Absolutely. An RF shielding material which could be a copper wire mesh. It could be attached to the inside wall of that particular bedroom and then covered up with some more drywall or other fabrics, or there are also some shielding paints out there which can be applied to it.

Katie: That's good to know because I know a lot of people were going to encounter things like that, where they have this already in their home. Most of us don't start from scratch, we move into a home. So, that's good to know there are shielding materials and I had even thought about in our own home right now doing like on the wall where I know that this smart meter is doing some kind of shielding material and then doing like a shiplap, like the wood, over it which is super popular right now. It will be easier than drywall at least for me, but that's good to know. So, what are some types of shielding materials that you guys would use in your work for instance?

Peter: Well, there's a number of different materials out there through our distribution facilities. We try to use the best materials on the market to get the best effect because if you are going through the process and applying a shielding material, it is not just as simple as hanging a picture. You do have to apply the material then you have to ground the material, so you need an electrician with it and then you most likely have to cover it up again because you don't want to be exposed to a copper wire mesh or a black paint.

So, our recommendations are usually either my preferred method is to use a copper wire mesh which is coming from a company in Germany. It's called, Cuprotect, and they are now available on the market. They have the highest shielding efficiency coefficient at all. There are other materials out there. For example, there are coatings with outward paints which have electively conductive materials in them and you paint your wall with that particular material. Usually two coats, the paint runs about $150 to $200 a gallon. So, it's not something inexpensive, and then obviously, you may want to need additional coats on top because you may not want to live in a black room or in a black wall. So, in general, it's electively conductive materials which need to be grounded and that provides a shielding.

Katie: Got it. What if there's, for instance, like a window? I know a lot of people will have a window on an outdoor wall that may have a smart meter, is there anything we can do for windows because you obviously probably wouldn't want to paint over a window?

Peter: That's a very good thought, yeah. Obviously, windows are a challenge and it depends on the window in itself. Let's put this in perspective. So, if you have a single-pane window, an older style window, that particular piece of glass will have some shielding effect, but it will not be as shielding efficient as a simple wood frame construction wall. So, that would be an opening in our envelope, in our shielding envelop. If you are using

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double-pane windows, then you already get a much better shielding effect because you got two layers of glass in between. And nowadays, what the modern windows, which we are encouraged to use are low-E windows which are preventing solar heating on the interior. And these windows, most of them have a metallic coating on the surface. So, it's not only energy efficient, but it's also RF efficient which means it has a very high RF shielding ratio. So, these kind of windows are a real alternative to normal windows, but let's assume you have a single-pane window and you need to address RF issues. There are shielding films for windows, window films available. There are different kinds out there on the market. So, what you want to look for is one which has a metal coating on it and they also have an RF reduction effect and they can be obtained by some of the EMF supply houses.

Katie: Got it. What about things like EMF filters or like dirty electricity filters. I see a lot of these type of products that can be used like plugged into a wall outlet. Do those products, do you think, like, reduce the EMFs from wiring or do you see a place for those in reduction of EMFs?

Peter: It is a item which has been sold extensively in the United States as an alternative against, "dirty electricity." I have my reservations to it because number one, they are not eliminating all of them, and number two, it's like a bandage approach because a lot of the dirty electricity is actually created inside our building by devices we actually plug into the wall. So, from my research I would say, if somebody feels that they make a significant difference to their well-being, then do it. From my point of view, from a testing and measurement, and assessment point, I would rather go after the original source of it and address it that way rather than plugging something in the wall.

Katie: That's a great point and you mentioned, so, smart phones and things like wireless networks which most people have these days. So, let's talk about those. How big of a deal are things like having cellphones and Wi-Fi networks on in our house all the time and if they're a big deal, what can we do about them?

Peter: Okay. Well, obviously, we're not going to go back in the TP and have smoke signs to communicate to each other, all right. So, the cellphone is here to stay, and the network is here to stay. So, what we need to do is we need to find a common-sense approach to that. So, first of all, the argument is always, well, if you have a cellphone, then you don't need to worry about Wi-Fi and cell towers, and so on. That's not quite true. Let me give you an analogy. If you have a cell tower on the outside of your building. That cell tower is working 24 hours a day, 365 days a year, your cellphone. So with other words, you have no control over it. With your cellphone you have control. You can turn it on. You can turn it off. You can put it further away from you. You can hold it directly to your ear or you can use an earpiece to talk to. So, you can use texting versus actually talking. So, with other words, you have a multitude of different mechanisms on how you can reduce your exposure or limit it, or conscientiously do it.

Okay, now, with Wi-Fi systems, what we frequently see is that we get a call because somebody sees the installation of new cell towers on the outside, on the block, on the street and we come in with our testing devices to actually measure what the emissions are from those cell towers. And frequently what we find is that the Wi-Fi is a much larger source on the inside than the emissions from the cell tower because the devices are just placed everywhere around. I've seen them on a computer desk, right, on your work station, in the kid's bedroom, next to the bedroom, they should not be close to where somebody is spending a lot of time. Let's give you an example on what I did for example in my house.

Well, the first option obviously is to say, "Okay, I don't want wireless." Therefore, I eliminate the RF and

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therefore, everything is wired and plugged in. That works, but with today's society, we have a lot of devices which you can't even plug in anymore. So, we need some kind of a wireless device. So, for example…let me back up first. So, number one is distance. So, if we can create some distance between that wireless device or we can add on some shielding to it to reduce the exposure to us, so that the functionality is not impeded. We can still use it, but we reduce our exposure then I think that is an acceptable method. So, what I did in my house is I took the router away, away from the living room where the installer placed it and I put it in the attic space of my garage.

So, what I've now created is safe zones and operable zones. So, for example, all the bedrooms where we're sleeping in, I'm sorry, but we're not getting any Wi-Fi signal in there because these bedrooms are there to sleep, to recuperate, to regain your energy and to wake up in the morning with energy and not being bombarded with RF. And then, the areas which are close to the garage, for example, the living room, the office, and so on, we have reception. We have wireless reception and so it can be used. So, my point is distance. Put it somewhere away from the occupied spaces, but you still want the functionality, so you have to play around a little bit on where to place this or if you don't have the option to move it further away, there are shielding materials, there are Wi-Fi shields, Wi-Fi router, enclosure boxes, and so on, where you basically put shielding materials around the outside of that Wi-Fi to reduce the exposure.

Katie: Got it. Those are great tips and to make sure, I'm doing it right in our own home. So, we do, we have our Wi-Fi network located in a laundry room which is on a side of our house where there's no bedrooms or anything like that and it's closer to the office. But also, we have a timer so that the Wi-Fi is off while we're sleeping because from my understanding, if the network is turned off and the power source is removed, then you're not emitting so that's like a way to reduce your exposure by pretty much half because you're sleeping. And I've also heard with cellphones, if you put your phone in airplane mode while you're sleeping, it's not emitting anything. Would you agree with both of those? Are those good steps for people to do?

Peter: Absolutely, you hit it right on. So, it's always a good idea to put a...it is a good idea to put a timer on your Wi-Fi device, so it will turn off at night. You just have to be aware when it turns back on, it's going to take a minute or two, or three to boot itself up, and the same is true with your cellphone. Yes, if you put it on to the airplane mode, then nothing will be emitted at that point of time. So, those are very good advice you gave us there.

Katie: That's good news. I was hoping it was going to work and I know if that's the advice I give to parents as well, like, if you're going to let your child play on your phone, choose games that don't require internet and to put the phone on airplane mode before you hand it to them, which not only protects the child from EMFs it also keeps them from accidentally calling 911 with your phone which we had happen. So, parenting tip there. So, what are some other resources of EMFs in the home that people may not think of, or things like LED light bulbs can those be a source or what are some other sources we can encounter in just our home environment?

Peter: Okay. Since you were talking about kids just a minute ago. I would say, game boxes. What we found is that many of the game boxes either the Microsoft or the other brand, PlayStation, their Wi-Fi is not turned off when you turn the unit off. So, with other words, you turn the unit off and RF emissions are still coming out of the unit which was really flabbergasting to us, but you need to actually believe it or not to unplug them, to actually get the Wi-Fi turned off on this box, on this game consoles. That's the word I was looking for, game consoles.

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Well, if you're talking about some other source of EMF we're not aware of and which we like to implement in existing buildings and also new construction is the following. And we talked about magnetic fields from electrical wiring inside the house. Well, there's one factor most people are not aware of. My training was back in Europe, and in Europe a lot of attention is paid on electric fields. Very little in the United States pays anyone attention to electric fields. Let me just explain that a little bit. So, I mentioned that when a current flows on a conductor that a magnetic field is being created and if the two conductors are very close together then that field is very small or minute. However, once an electric conductor is under a voltage with otherwise it's hot, it's wired, it's energized, then electric field is emitted from both wires and that's called, an "Electric field." And that electric field go penetrates through the walls and actually extends out of the wall where we have our electrical wiring into this space.

In Europe, they eliminate a lot of...they pay a lot of attention on to the elimination of the electric fields in bedrooms because what they have found is that when people have sleep disturbance, lack of concentration, and so on, that if one addressed or eliminates the electric field problem, that a significant increase in the well-being is achieved. So, make a long story short, what I'm saying is the current building practices in the United States, we install Romex cable inside walls in residential buildings, which has no shielding to it. In commercial buildings, all electrical wiring has to be put in a metal conduit and that metal conduit will eliminate electric fields, will shield them away. So, here in the United States, we're stuck with the fact that in bedrooms we have a large electric field. So, how can you deal with that? How can you eliminate that?

Well, if you're a new construction, make sure that you install the electrical wiring in a metal conduit and it's called MX cable, an armored cable, or different terms. It's basically a metal shield around that wire. In an existing building, what could you do? For example, applying a shielding paint to that wall surface where the head board is and then have that grounded and that will eliminate the electric fields coming out of it.

Katie: That's all great advice for sure. So, you've mentioned grounding and I want you to explain this in like an electrical sense because there is the idea in the health circles of the practice of grounding which is basically just going outside barefoot and coming in contact with the earth which is said to have like good effects on the body. And I'm curious your scientific opinion of that and also explain grounding how it's a different method used when you're talking about EMF mitigation.

Peter: Okay. Well, first of all, I agree that grounding ourselves as human beings to the earth is a very important part. So, walking barefoot, walking on the outside, walking over the lawn. Using shoes which have leather soles which can actually conduct the electricity out into the ground. So, very beneficial, very important for human beings and well-being.

I personally have a different opinion about the devices which are being sold, the grounding devices where, for example, humans are attached themselves to a grounding strap. And then, ground themselves to the electrical grounding system or sleep on a grounding mat and that grounding mat is then connected to the grounding device for your electrical system. And that requires a little bit more of a scientific physics conversation about electric fields and grounding. Electric fields always want to go to ground. With other words, they take the shortest pathway to ground. So, if I have a Romex wire inside that wall and I paint a shielding paint which is grounded on the inside on to the wall, then the field as its coming out hits the conductive paint and gets grounded out. With other words, the field goes into the earth.

What can happen if you use grounding straps on people or grounding straps on mattresses underneath a

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mattress that the electric field actually wants to go there. That means, you have an electric field source like a Romex cable and now you ground yourself to the electric ground. So now you become the shortest pathways, you're actually attracting the electric fields. So, in my opinion, there's a lot of misuse about grounding mats, they can have a beneficial effect if you know all the physical parameters, that means you know where the fields are coming from and it's installed correctly. Otherwise, you are actually attracting the fields to your body.

Katie: That's a really good point and probably one that most people don't consider, but I'm glad to hear that just being outside in nature barefoot is a good way to accomplish that because as a mom, I encourage my kids all the time to go run outside barefoot and I have other parents say like, "Aren't you worried about them being barefoot," and I'm like, "No." I'm glad to hear from a scientist that that's a good thing to do for kids especially.

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Katie: Are there any other ways we can reduce our electrical exposure like maybe not through grounding devices other than just being outside or is that really the best way?

Peter: No, I think to be in awareness, just general awareness, and proper placement. Proper placement is the most important part in my book. With other words, we have areas which we can control and we have areas we can't control. So, if you look at outside a building, you have no control. There may be a power line outside. There may be a transformer outside. There may be cell sites out there, cell towers outside. There may be radio and TV broadcast towers on the outside. You really don't have any impact. You have no control over that, but what we can control is our indoor environment. So, that's why I think it's important to become aware and actually think about what we're going to do with electrical devices. For example, you know, where do I put my

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bed where I sleep? Because the sleeping phase is an important phase. And during the day time we're in an outgoing mode. We are working. We are acting in the world. We are in the outgoing mode.

So, something is different than at night time. At night time, we're in a receiving mode. We're actually sleeping and regaining energy. So, that's why in our book, the areas where we spend a lot of time such as a bedroom. Normally, we spend about, what? Eight hours a day, that's one-third of your lifetime in one location. So, what we should do is we should make sure that we have a beneficial environment in these kinds of rooms. So to reduce the amount of electronic and electrical devices in the bedroom. So, just look around. Do we need a TV in the bedroom? Do we need a Wi-Fi in our bedroom? Do we need to have all the cellphones in our bedroom? Do we need to have a lot of power cords in and around our bed? Do we need electric alarm clocks? Wouldn't it be better to use a battery-operated alarm clock? Would it be, maybe, helpful to have a survey to evaluate what we are exposed to in the bedrooms? So, those are all mechanisms we could use.

There are a lot of inexpensive devices, consumer devices nowadays where people can purchase an RF meter or a magnetic field meter, or an electric field meter and go, and look around. Obviously, it takes a little bit of training to understand what is normal and what's not normal, but that's just part of the life experience to learn that and be able to get a handle on your environment.

Katie: Awesome. I know I've experimented with this a little bit, I have a couple kinds of meters. I think I have a TriField and then I have one...I can't remember the name, but it has like a circle thing that tests like several different frequencies, but I don't actually know if they're great ones to have. Can you, kind of, give an idea of what to look for in a meter? And also, I know you do this. Your company evaluates homes. So, can you also explain…that would obviously be the best way to make sure you're doing it right, but explain those different options for testing.

Peter: Yeah. So, basically, there are two options. One is to hire a professional, somebody who has experienced and can assess and evaluate an indoor environment. So, for example, that's something we do as a company and we conduct measurements for residential home owners, for renters, for corporations, for institutions. We also help in the design of low EMF buildings. Right now, we even have a contract with a large corporation who is building a substation in a city and they want to limit the exposure of EMF to the surrounding areas where people live and work.

So, the concept is making its way through more of the in the industry and even in the commercial building industry. So, what we do is obviously we have professional equipment. Professional equipment gets calibrated and it's fairly expensive to give you an example. When we conduct a RF, radio frequency surveys, what we do is we take a spectrum analyzer. And the spectrum analyzer is a device which can actually identify all the different type of radio frequency sources. That means, I can see if there's a Wi-Fi on, if there's a cordless phone in the building. I can see how much of the RF is coming from the outside, from the cell towers, how much is really allocated to TV and broadcast transmission radar, and so on, but a device like that, you know, cost like $25,000, $30,000. So, that's not something which a regular homeowner's going to have in their pocket, but they provide a different level of information and expertise.

There are devices now coming back to the consumer, other devices out there which a consumer can purchase. Yes, they can. For example, a meter for magnetic and electric fields for wired stuff, it's probably in the range of about $200 or $300. A RF meter is something where you can today purchase in the range of $300, $400, $500.

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The challenge for the person doing these kind of…purchasing these instruments is actually to learn how to actually operate them and when you get a reading, what does this reading actually mean? Is this something of concern or not? So, there's a lot of experimenting with it and I've seen also the negative effects of consumers using some of these devices. Actually purchasing something and then this device has a green light, a yellow light and the red light, and that red light comes on and, oh my god, this house is bad and it's killing us. And when we come out and find out that the instrument is not very accurate, and that this red light comes on in a very low level. What you would normally encounter in any residential building. So, it can also cause a little bit of confusion or hysteria if not properly put into perspective.

Katie: That's really good to know and I'd like to also talk a little bit about...because you mentioned in passing, like if you're starting from scratch and you're building a home, and I do get questions from readers who are planning that or questions related to just different building materials. So, I know this is something that you do and something that I would definitely hire you for if I was going to build a home myself. So, I wanted…like, talk a little bit about that. What are some of the things you're looking at when someone is starting from scratch and what would be some of the considerations that someone would want to look at when they were building to make sure they were creating an EMF safe environment?

Peter: That is a very good question. I like that. Obviously, the best chances you have when you start from scratch, with other words, if you are able to build your own home, where would you start? Well, first of all, you need a plot of land, right? So, once you have a property, you want to start with a fairly clean slate. So, what I recommend to doing so is when you look at properties to actually conduct some measurements. So, to obtain, what are the overall magnetic field background levels on that particular property and what are the RF, radio frequency background levels on that particular property.

So, then we have a baseline. We know what is present in this environment in the first place. And then, you can adjust your building strategy accordingly. So, for example, let's say you find out that there are already high radio frequency levels out in that particular area. So, then you would incorporate RF shielding into your building envelop. That means when you build your exterior walls and your roof, you would install a shielding membrane either on the inside of the building or on the outside of the building, so that you eliminate the high RF fields in the first place by the construction purposes. You probably would use a different type of window than…so for example, a high energy efficient window which has a metal coating on it, so that you reduce that in the first place. So, by looking at the baseline level, we can then determine what may be necessary to implement into the building.

All right, let's assume that we have a fairly low EMF and RF site, then we have to think about how does electricity comes back into our place. So, that would mean where do we bring the electricity in from the street, from the road, is this going to be overhead or is this going to be underground? Preferably, underground because that creates less fields than an overhead line from bringing it in to the building. So, then the next question or the next pivotal point is where are we going to put the electrical panel on that particular building? And in my opinion, that should be as far away from living spaces or bedrooms as possible. So, ideal would be a garage situation, right?

And then, when we actually do the electrical installation, or we design the electrical installation with the electrical contractor, we want to look at where are the bedrooms in this particular house, where are the areas or the living rooms, and the offices? Against which walls are actually the head board of the bed is going to be? And in those areas, I wouldn't want to have large electric runs. What do we mean by that? Obviously, from the

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electric panel, wires are going inside the walls, inside ceiling, inside flooring and so on. Traversing throughout the building, providing electricity, electrical outlets all over the place and lights, and light switches, and so on. So, you want to conscientiously actually route these electrical wires in walls, in areas where you don't create a lot of exposures to areas where you spend a lot of time.

So, that's again, a design perspective. So, once that's done, we know what the electrical wiring out looks like, then we obviously have to interact with our interior design features, are we planning to have a lot of recessed lighting? If that is something which wants to be installed and we need to think about what kind of recessed lights we're going to use. Let me give you an example. Let's say you have a two-story building and you want to have lots of recessed lighting which is very calm and modern right now. On the ceiling in the first floor, that would mean that's the ground floor for the second floor, the ceiling in the first floor level. Now, a lot of these recessed lights actually have electrical transformers at the end of them and these transformers create large magnetic fields. So, you may create high magnetic fields on the floor of the second bedroom inadvertently by just installing recessed canned lights. So, one would need to look at, okay, what kind of other light cans are out there if I want to have the recessed lights. Can I eliminate that? Can I put these transformers somewhere else?

The next step is smart house technology, and that becomes more and more prevalent that we want to have a little remote control which turns everything on and off and lights and sprinklers and everything else. So, the more we bring electronic devices in there, the more we have the potential of creating higher EMF fields. And then, one needs to look also at the audio visual system, security systems, are they going to be wireless, are they going to be wired, how are they actually operating. So, there are a lot of components which go into that. For example, when we go back to the installation of wiring, would it be a good idea to install the electrical…our wiring, our Romex cable in to metal conduits. Yes, it would be because that eliminates the electric fields. Well, that increases the cost, does it? Yes, it does.

So, maybe we don't necessarily need to install in all walls, but maybe in the walls where the beds go, in that particular area, or can we just implement installation of a copper wire mesh shielding on to the head walls while we're doing the construction. Then, we don't need to put our electrical wiring in shielded conduit. We can just apply the shielding material to the wall and ground it into the electrical system, and so that it has the edited benefit of eliminating the electric fields as well as radio frequencies down the line as more and more towers are being installed.

So, what I'm trying to say here, it's a multi-faceted approach and it requires really the interaction between the architect, the builder, the home owner and the interior designers because it's not...doesn't do a lot of good if we are designing low EMF and RF wall systems. And then, the interior design or the usage of the building requires that we have a lot of electronic devices which are emitting a lot of EMF and RF. So, that's where an evaluation needs to occur with a client and what is absolutely necessary, what do I need, what do I want in my house and what can I let go and what kind of technical options do we have to create that without the radiation exposure?

Katie: That makes perfect sense. Thank you for that and I want to make sure I respect your time, but I have a couple more questions that readers had sent in. I want to make sure I ask you, and one is about metal roofing. Someone said that there can be issues with metal roofing because it can conduct, is that the case, and if so, is there anything someone can do about it?

Peter: Yeah, metal roofs can become an antenna, but once you connect that metal roof to a proper ground, all

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of that gets diverted into the air doesn't come in to the building. You actually have a shielding envelop at that point of time. So, there are pros and cons to a metal roof once it's properly grounded and bonded. It actually provides a shielding effect against radio frequencies.

Katie: Interesting. So, it definitely can be done safely. That's just something you'd want to work with someone like you to make sure it was done correctly that you weren't creating a bigger problem, is that right?

Peter: Yeah.

Katie: Okay, perfect. And lastly, I want to make sure I respect your time, but there's all this information right now about the new 5G technology that's coming out for phones and that there's going to be these 5G things everywhere. And so, I'd love to get your take from the scientific side, is this going to be a bigger problem? Do we need to worry and what can we do about it?

Peter: Okay, yes, it is a big topic also in our professional industry. In my professional opinion, it's a little bit overrated or at this point of time. Here's my point on it. At this point of time, different entities, research facilities looking at developing actually the 5G technology, what does it mean? That means that they need to be able to use more information because we're using more and more data. We're not just making the cellphone anymore. We're watching a video, a life on our smartphones, and that requires a broader band data transmission. So, that's really what they're working on is shoveling more data through the wireless spectrum. And so, they are looking at different technologies and what has gained a lot of attention is that some of the researchers are going in to higher frequencies. They're talking about 30, 50, 70 gigahertz range. Well, the higher the frequencies become, the less penetrating the waves become. With other words, if I have a concrete building and I have a cell antenna out there which works in the supposedly 5G range, let's say, 50 gigahertz or 70 gigahertz. It will not penetrate very easily through that concrete wall.

So, therefore, the assumption is and that's what creates the fear is that…and we're thinking that we need a ton of more cell sites all over the place because the distance is going to be relatively short that they actually perform and work very well. So, that's a major concern. The increase of the number of cell sites on the outside. My take on that is, I don't think that the utilities or the cell providers will go that route because that is very expensive. So, my assumption is that they're going to stick with the lower frequencies which we are already using, which is 900 megahertz, 1,800 megahertz, 21 megahertz, 24 megahertz, 26 megahertz, and so on. And that other bands will be opened up in the lower frequency bands. So, with other words, my opinion is, let's wait and see what happens and let's not fall off the deep end here before the technology is actually installed.

Katie: It seems like a good commonsense approach, and I love that so much about the work that you're doing because I think there is so much misinformation out there. It can seem like a very scary topic and I think that you are the voice of reason saying, "Yes, these things can be a problem, but they're also fixable problems and let's take a deep breath." This is an area I'm interested in researching more and more because I saw when I was traveling last year in Switzerland, people who were extremely EMF sensitive. They call it electrosmog there and who, in the presence of a cellphone would actually have, like, grand mal seizures. So, it really like opened my eyes to the fact that these things do affect us physically and I think that you offer great solutions for being able to protect our children and protect ourselves without like you said, building a TP and communicating via smoke signal. So, I appreciate that so much about your work. Obviously, everything will be in the show notes and including links for people to find you and find out about consulting, but can you just talk

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a little bit briefly about your company and how they can find you?

Peter: Sure. Well, first of all, thank you for having me on your show. It's a pleasure. Our goal is to inform people, make them aware, and show them the options they have to actually create lower EMF environments in their home, in their office, wherever they live. Yes, so we are a company located in the San Diego area and we are an environmental testing company and my specialty is EMF and RF. And so, we have a ton of equipment, professional equipment where we go out onto client's buildings and we investigate. We assess what the EMF and RF levels are. Once we have a good understanding of what are some of the culprits, we look at how can we solve that and there will be situations where there's very little you can do and then…but most of the time, there are always options and if one is willing, and has some financial resources then a lot of the fields can be eliminated with technology which is out and available. And we work with our clients through the entire process and then, at the end we kind of conduct verification measurements. Well, it's available for phone consultations. For example, if somebody wants to build a low EMF building, we interact with the client, the architect, and their contractors, and provide them with guidelines because we can't obviously fly out all the time to different parts of the country, but a lot of stuff can be done over the phone or even then in a video conference.

Katie: That's wonderful. Thank you, Peter, so much for your time and being here and for being such a voice of reason on this topic. I think we might have followup questions, so I'll make sure to loop back with you for maybe a round two if we get a lot of interest, but thank you so much for your time and being here and for sharing your wisdom with us.

Peter: My pleasure. Thank you.

Katie: And thanks to all of you for listening and I will see you next time on "The Healthy Moms Podcast."

If you're enjoying these interviews, would you please take two minutes to leave a rating or review on iTunes for me? Doing this helps more people to find the podcast, which means even more moms and families could benefit from the information. I really appreciate your time, and thanks as always for listening.

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