

Effects of electromagnetic fields on human health

Analysis by [Dr. Joseph Mercola](#)

✓ Fact Checked

STORY AT-A-GLANCE

- › Peter Sullivan is the founder of Clear Light Ventures, an organization dedicated to raising awareness about the health effects of electromagnetic field (EMF) exposure
- › For years, Sullivan struggled with declining health; eliminating magnetic field exposure and cleaning up sources of dirty electricity helped enormously
- › Four main types of EMFs are electric fields from house wiring and corded appliances; magnetic fields from power lines, motors and transformers; radio frequencies from cellphones, smart meters, Wi-Fi and other wireless devices; and dirty electricity from transient voltage spikes
- › While you can measure all of these, there's no one single meter that can provide you information about all of these EMFs. For a comprehensive assessment of your exposures, you will need more than one meter
- › EMF exposure appears to be a significant contributor to autism, and many children improve when EMF exposures are addressed and minimized

Peter Sullivan, who has a master's degree in computer science with an emphasis on human-computer interaction, is the founder of [Clear Light Ventures](#), an organization dedicated to raising awareness about the health effects of electromagnetic field (EMF) exposure.

Before founding Clear Light Ventures in 2007, he worked for several different Silicon Valley companies, including Netflix, where he worked his way up from a troubleshooter

in customer support to a principal software designer at Netflix.

"My passion in the mid-'90s ... was personal technology ... I had all the gadgets," Sullivan says. "I even had some of the wearable tech in the mid-'90s ... I was writing papers about this at Stanford. I was getting exposure to these things way earlier than most people.

Also ... when I was working at Interwoven, I was next to a military base ... the Onizuka Air Force Station. Turns out there was a space radar under this blue cube. I was getting really hammered by the space radar ... I was doing everything right health-wise. I was eating well. I was exercising. Yet my health just kept declining.

I kept having issues with fatigue, etc. I would say the exposure that people are getting now, I was getting probably about 10 years ago. It took me a long time to figure it out ... We're all making this mistake and making assumptions ...

I said, 'I need to really be objective. I don't want to be that person who doesn't look at their own stuff.' I started including EMF in the environmental factors and the health factors that I was looking at ... I did it because I started feeling things. My brain was telling me, 'This is all great stuff. It's really fun,' and my body was saying, 'Oh my God. I don't like that' ...

I was getting a little bit of tinnitus or microwave hearing ... If you're in this camp where your flickering light is annoying you or noise is starting to [become] an issue, you don't like fan noise and these sorts of things ... you're probably getting into this realm, especially if you're having sleep disruption."

Searching for the root of his problems

In 2009, he got really diligent about assessing all of his exposures, including exposures to toxins, light, noise, air quality and so on. In the end, he discovered that electrical exposure, by far, was the biggest factor. He also discovered that the biggest loads on his

immune system were in his mouth. He had mercury fillings, a root canal and cavitations.

As these dental issues were addressed, his EMF sensitivity improved. "I don't feel pain [in response to EMF exposure] anymore," he says, but he can still sense that a high EMF environment is not ideal. At his worst, between 2009 and 2013, he'd feel the effects simply driving by a cellphone tower. "I'd feel it in my head," he says.

Additional help arrived in the form of building biologist Alex Stadtner, who founded Healthy Building Science Inc. Sullivan started working with him in 2009, learning about magnetic fields, electric fields and wireless radiation. Another instrumental teacher was Dr. Sam Milham, who wrote the book "**Dirty Electricity**."

"I started measuring things. That was, really, I think, the key tipping point for me — how to manage dirty electricity that was affecting me at night," Sullivan says. "[Milham] is fantastic. He's done some great work. I funded a study that he was working on in schools, which is interesting. He wanted to measure neurotransmitters in children ...

He measured a baseline of the kids in school, and then he measured it [after retrofitting the classroom] with a Stetzer meter and Stetzer filters ... He noticed that the neurotransmitters changed dramatically. The ones that changed the most were dopamine and phenethylamine (PEA). PEA is related to self-control.

If you're a teacher, you kind of want your kids to have a little bit of self-control. I think even a lot of adults are losing self-control right now, and I think dirty electricity is a very key factor."

Four primary types of EMFs

There are four primary types of EMF exposures:

1. AC electric fields at 60 Hz (the "E" component of EMF) from house wiring and corded appliances (especially ungrounded ones; cords that have only two prongs

rather than three)

2. AC magnetic fields at 60 Hz (the "M" component of EMF) from power lines, wiring errors on house wiring, current on grounding paths, and from motors and transformers ("point sources")
3. Radio frequencies (RF) from cellphones, smart meters, Wi-Fi and Bluetooth in just about everything these days
4. "Dirty electricity" from transient voltage spikes from 2 to 100 KHz

While you can measure all of these, there's no one single meter that can provide you information about all of these EMFs. For a comprehensive assessment of your exposure, you will need more than one meter.

To understand each of these a bit better, you can think of a magnetic field as field lines generated by an electromagnet. These fields go right through your body. An electric field can be thought of as invisible lighting, as electrons are trying to ground.

"A lot of things, like a normal light next to your bed, even when it's not on, you could think of it as electrons leaking off the power line," he says. Wireless radiation can be thought of as light at a lower frequency than you can see, but pulsing very rapidly. If you could see it, you would see it flickering. Lastly, dirty electricity can be thought of as pollution of all of these other fields.

Common sources of EMFs and what you can do about them

In Sullivan's experience, getting rid of magnetic fields such as transformers and power boxes and cleaning up dirty electricity have been most helpful. Your refrigerator is another common source of magnetic fields. Your choice here is to either turn the appliance off or move further away from it. With each doubling of the distance, you reduce your exposure by about 75%, Sullivan says, and this goes for electric and radiofrequency fields as well.

Like me, he recommends focusing on cleaning up your bedroom to make sure you sleep

well. In fact, one of the most common symptoms of excessive EMF exposure is sleep disruption. "I like to make sure people create space for themselves — kind of an electronic-free zone — around their beds," he says.

One of the most common sources of magnetic fields in a bedroom would be a **light-emitting diode** (LED) clock radio. If you have one of those, move it to the far end of the room, or better yet, use a battery-powered clock. I use a talking clock, designed for the blind, to avoid light interfering with my **melatonin production**.

Whatever you do, avoid using your **cellphone** as your alarm clock. You really do not want your cellphone anywhere near you when sleeping, unless it's either turned off or in airplane mode.

"I'm surprised how much a cellphone can impact you," Sullivan says. "A cellphone even on the other side of the house, when it's on, can really impact the bedroom environment. My wife and I would charge our phones about 50 feet from our bedroom. I've had times when my wife has left it on and I [felt it]. It had an impact when I was really sensitive ...

The other thing people have been bringing to the bedroom a lot lately is the fitness trackers and the sleep trackers. The Oura ring can go on airplane mode. Same with the Apple Watch ... But a lot of people have been doing the Fitbits.

There are some other trackers that don't even have an option. They're on 24/7. They say it's low-power Bluetooth, but some of these low-power Bluetooths are really high-powered, and they're right next to your skin and body. It's a big factor at night."

As for electric fields, the most common source is the lamp near your bed. "Even when it's not on, it can be leaking off a big electric field," Sullivan warns. The wiring in the wall, and a circuit breaker box on the other side of the wall are other common sources of electric fields.

Today, many homes are also outfitted with a **smart meter** which, if situated on the other side of the wall, can be a significant problem. In these cases, you'd need to move your bed, or switch to another room for sleeping.

"This is a quick protocol that Dr. Toril Jelter came up with here in California, mostly for autistic kids. What you do is you turn off the wireless sources in the house. You turn off a baby monitor if you have one ... Your cordless phone base station — the base station is constantly emitting, like a cell tower — you turn that off and your Wi-Fi. You just turn that off at night to start, ideally more.

At that point, you could still have dirty electricity ... in your wiring in the bedroom. You could play around with turning off one or more circuits in the bedroom. Sometimes it would be one circuit for the whole bedroom; sometimes you might have one for the lights around the bottom or the circuit around the bottom where you plug the outlets in ...

Go around and find those circuits. Maybe for a couple of weeks, turn those off and see how you sleep. Some people will find that they sleep better right away. That'll help you without spending any money. See how much this is impacting your body.

Again, that's a quick and dirty protocol without measuring. That may give you a nice 80% solution. Then if it feels like it works out well for you, then you can either buy a meter or work with a building biologist or environmental hygienist and all these other experts."

EMF and autism

Sullivan has been particularly passionate about helping the **autism** community understand the impact of EMF, as two of his own children were mildly on the spectrum. From his perspective, two primary culprits contributing to rising autism rates are **glyphosate** and EMF exposure.

"We treated [our children] biologically. I had a great doctor in this area. We started looking at toxins and toxic metals ... [EMF] was one of the last things I came to. I want parents to realize that, 'Don't fixate on one thing. Don't even fixate just on EMF.'"

I want you to look broadly at all these factors that are impacting health, that are increasing the rates of autism, child developmental issues and chronic health issues in general ... There a lot of fixation now on vaccine ingredients ... but people aren't looking at the 80,000 chemicals in commerce, including pollution, EMF issues and even lifestyle issues, like getting a certain amount of sun and other factors.

We're trying to get people to realize that it's not one thing ... It's [about] total load ... Our bodies are so resilient that by the time you see a symptom, you've really had multiple things fail ... We need to be focusing on infections ... mold, chemical toxins, some of the dental stuff we talked about, and food allergies as well. There's a lot going on.

I think the two factors that are most suspect from a rising perspective would be wireless and glyphosate ... We've had magnetic fields and electric fields for about 100 years. Why didn't we have autism? What changed in the mid-'80s was we went to DECT digital phones.

We went from these nice, smooth analog signals that our cells are used to dealing with to these pulsed square digital waves that can impact the calcium channels, the vibrational receptors on the outside of the cell. We also switched to power supplies that went from AC to DC ... called switching power supplies. They chop up the power in a way that creates little transients ... That's essentially dirty electricity.

Instead of having a nice, smooth sine wave, you're getting all these little spikes. Those are biologically active. Those are small from a power perspective...I think that's really the key factor ...

A cellphone in your pocket is a big risk factor for sperm damage, including DNA damage. There are about 30 or 40 studies on this ... In autism, part of the situation is de novo mutations, mutations that are uninherited. This is a gene that was not in the father or the mother, and now it's in the child. We're looking for one of these factors that could be causing a de novo mutation.

One of the suspects, of course, is [carrying your] cellphone in your pocket. Mostly, it comes from the father's side. So, the dads need to start taking some prenatal or prepregnancy responsibility for their side of the equation to make sure that their sperm is not damaged and mutated. That's a big factor."

Demanding safer technologies

Unfortunately, with the introduction and **rollout of 5G**, exposure is going to exponentially increase everywhere, including in your own home. Many will end up with transmitters on a utility pole directly outside their house. Eventually, extreme exposure is going to be unavoidable. The question then becomes, can we make the technology safer? Are there any practical solutions? Sullivan says yes, we can, and there are.

"You don't want to fight against these big industries. [Instead], focus on what you want," Sullivan says. "Wouldn't it be ideal if these things actually were as safe as we assumed?"

Step 1 is we're going to start quickly avoiding them, especially at night. But step 2 is ... safe technology has to become a market requirement. It has to be something that we demand, especially in schools and other environments where we can't control [the exposure]. We have to start asking for reduced exposure.

There's a product in the market right now called Eco-WiFi. It's a special Wi-Fi where the firmware has been adapted so that you can lower the beaconing frequency. The beaconing frequency is the thing that says, 'I'm here. I'm here. I'm here.' It does that about 10 times a second. That's the tut-tut-tut sound you

get from Wi-Fi.

Now, that can actually be dialed down to once per second. That doesn't slow your Wi-Fi down. It just slows your connection, fractionally slower, if at all. It's barely noticeable. Radiation can be reduced 90% by dialing that down to once per second, or even two or three times per second.

That's an easy thing to do. I just found out too that a company, Aruba, which I think is a Hewlett Packard company, has an adjustable setting for their beaconing system ...

We want to start reducing the exposures on our end, but also want to start having things that kind of turn on and off, almost like your screen blanks and turns off to save power. There needs to be some signaling and protocols that start reducing all these beaconing frequencies that are going back and forth."

More information

To learn more, be sure to check out Sullivan's site, [ClearLightVentures.com](https://clearlightventures.com).

*"I'm working on simplified instructions for parents with meters and meters that we recommend. Those are on my website," he says. "I have some **wireless safety cards** that we did, that we handed out to parents and organizations that give you some tips. [The handout] talks about the different symptoms and some of the basic science, so it makes this a bit more credible ...*

*I've also done a booklet for [those with] children on the autism spectrum ... called 'Simplifying Autism Improvement and Recovery' ... It goes along with my talk, '**Simplifying Autism Improvement and Recovery**' that is online. My most recent talk is '**Simplifying Autism: Removing Barriers**.'"*

Other helpful resources for those looking for more information include [WirelessEducation.org](https://wirelesseducation.org), where you can also find resources for schools, and Joel

Muskowitz's website, [SaferEMR.com](https://saferemr.com). Muskowitz is the director and principal investigator at the Center for Family and Community Health at the University of California, Berkeley. "He doesn't cherry pick things ... He's a great resource," Sullivan says.