Introduction to Parkinsonu2019s environmental risks

Said another way, 87% Americans with Parkinson's disease do not have any underlying known genetic cause for the disease. So that's a powerful argument in favor of the idea that this is an environmental related entity.

That this disease is caused by something that aside from our genetics, because it's increasing so dramatically. And in fact, there is no other neurodegenerative condition that is increasing.

If you live near a golf course, you have dramatically increased your risk for getting Parkinson's disease. That is the subject of a new study just published in the Journal of the American Medical Association.

One of authors is Dr. Ray Dorsey. He's been on the Empower Neurologist Program before with us, and he's the author of new book, The Parkinson Plan, that talks about the environmental risks posed by our modern world as it relates to Parkinson disease, he has got a lot to share with this.

Let me tell you a little bit more about Dr Dorsee. Dr. Ray Dorsey is the Director of the Center for the Brain and the Environment at Atria Health and Research Institute.

The center's mission is to identify the root causes of brain diseases, everything from autism to Alzheimer's, so that we can prevent them. With his colleagues, he has written Ending Parkinson's Disease, which we've talked about on the program before.

And the new book, as mentioned, is The Parkinson Plan, Which Details a New Path to Preventing and Treating This Terrible Disease. Ray previously directed the Center for Health and Technology at the University of Rochester, where he chaired the International Huntington Study Group, led the Movement Disorders Division at Johns Hopkins, and consulted for McKinsey and Company.

In 2015, the White House recognized Ray as a champion for change for Parkinson's disease. He's really made it clear that our environment is dramatically responsible for the incredible rise that we're seeing in Parkinson incidence.

Golf courses, pesticides, and Parkinsonu2019s risk

So let's get right to our interview today. Well, Dr. Ray Dorsey, it's a pleasure to have you back on the program. My pleasure be with you, David. Thanks very much for having me.

And the purpose of our time together is, of course, to talk about your new book, The Parkinson's Plan, which is excellent. I read it, I think, at least three times in preparation for today.

It's certainly an area that I've been interested in for decades as to why this is happening. But I'd like to start off by recognizing that you have a publication that appeared just two weeks ago in the Journal of the American Medical Association that looked at the risk of Parkinson's based upon where a person lived in terms of proximity to a golf course.

So let's begin with that, talk about how that study was designed, what you looked at, and more importantly, then what were the findings. Yeah, so the work here, the credit all goes to Dr.

Brittany Krizanowski, a geographer, if you can believe it, at the Bayer Neurological Institute and her colleagues in Rochester, Minnesota, Drs. Savica and colleagues who've been following epidemiology of Parkinson's disease for quite some time.

And they found that individuals who live within one mile of a golf course have a 120% increased risk of developing Parkinson's disease compared to people who lived six miles or more away.

So the closer you live to the golf courses, the higher your risk for Parkinson disease, and not just a little bit higher, twice as high. And then it begs the question, why?

And as you know, pesticides, many pesticides are nerve toxins. That's how they kill insects, for example. And golf courses are huge consumers of pesticides, you know, per acre far more, maybe 50 times more than farming.

And it's likely that some of these pesticides are either inhaled or contaminate the drinking water for individuals who live near the golf course. Well, And of course, this is written prior to this study being released that in the 1990s, the New York state attorney published something called toxic fairways that really brought this information to public awareness, indicating that somewhere around two tons of pesticides are used per golf course per year.

And then another finding in your recent report was it had to do with sourcing of water. If that water was sourced near the golf courses, that was even associated with a higher risk of Parkinson's.

Again, getting back to what you, I think, have been really clear about is that this is a disease of modern man. It's not, by and large, a genetic issue that's related to our environment.

Yeah, so chemicals in our food, water, and air are fueling the rise of chronic diseases. Parkinson's is a poster child for that for chronic disease. And Parkinson is unlike seizures, unlike strokes, like migraines, which have been described for centuries, if not millennia, you can even find biblical accounts of them.

Parkins is is new disease, its major description, as you know, was by Dr. James Parkinson, a British surgeon 61. Here it is. Essays on the shaking policies.

This was given to a colleague of mine back in 1971 from Merck, a drug company. But anyway, I've kept it. It kind of looks like the real thing, but you're right.

So James Parkinson observed lots of this disease in London, which as your book talks about was incredibly polluted even back then. Yeah, and so what was he describing?

He was describing among, well, one, his first case actually was a gardener. So there weren't obviously synthetic pesticides in them, but plants produce their own pesticides.

Plants don't like to get eaten by insects. I wonder whether that his for her first was in a man who was gardeners, was working with chrysanthemums, which produce a class of pesticides called pyrethrins, to Parkinson's disease.

But his other cases weren't gardeners, and so were unlikely to have significant exposure to naturally occurring pesticides, but they were breathing very polluted air.

Air quality in 1800 London was what New Yorkers experienced two or three summers ago when the Canadian wildfires turned the skies over the Big Apple orange, an equivalent to what people in Delhi and India breathe on a daily basis.

So I think he's describing perhaps the chronic effects of high levels of air pollution. Just from the Gulf study, we have suggestions that chemicals in our air or water pesticides are also contributing to the disease.

We'll get to that in a bit. I want to talk quite a little bit about air pollution, these PM2.

TCE, PERC, and industrial solvent exposure

5 particles that are really in the news quite bit and just the whole notion of wildfire and what a risk that poses to our general health and certainly our brain health as well.

But you spend a lot of time in book talking about toxins that maybe people are not so familiar with. Nonetheless, we have great risk for being exposed to them.

Things like trichloroethylene and PERC, which I think were used quite a bit in dry cleaning and used as solvents to clean machinery, et cetera. So give us a little overview of these two toxins and really with the nuance that, well, were not out of the woods yet in terms of our exposure.

Yeah, so as we wrote in the book, I think trichloroethylene, or TCE, this is what triclorophthalene looks like. So most of your listeners know that chemicals are made of atoms.

And so water, for example, is made up of three atoms, two hydrogens and one oxygen. Trichlorethylene is make of six atoms two carbons in black, a hydrogen atom in white, and three chlorines in blue.

Hence, it's named trikloroethene. It's got a cousin named perchlorothelene, which has one additional chlorine atom. Unfortunately, almost all of us have been exposed to this.

If you dry clean your clothes, you're likely exposed per chlorethylene, which is used by about 60% of dry-cleaners in the United States. And TCE was in everything from typewriter correction fluid.

David and I are old left-member typewriters. When you made a mistake, we had a little thing to correct it, and that had this chemical in it. It was also in use of decaffeinated coffee.

Used to be used as a dry cleaner. widely uses a degreaser and it's contaminated over half of superfund sites. The most toxic sites in the United States are contaminated with TCE, including Camp Lejeune, the Marine base in North Carolina where a million Marines and civilians drank Tce and their drinking water bathed and cooked in it for a period of 25 years.

And those Marines had a 70% increased risk of developing Parkinson's disease 30 years later. And the thing to note about those Marines who were exposed to TC in their drinking water is that they were almost by definition healthy, right?

They're young, they're only 20 on average, some were teenagers, and you're on a Marine base for a short period of time. They were only there for two years on an average of 25 months, yet 33 years later they had a 70% increased risk of developing Parkinson's.

And that cohort's young, the still average age is only 16. As you know, as this cohort ages, it's likely more and more cases of Parkinson's will emerge.

In the book, we talk about chemicals in our indoor air and our water and TCs in water, but it is also an indoor area because if you live above a dry cleaner, for example, these chemicals can evaporate and go into your home.

and you can breathe them in your home and not even realize it. I live now in New York City and I walk past dry cleaners that have apartments above them.

And I get concerned about those. So these are called volatile organic compounds, VOCs, and they're volatile, meaning that they evaporate quite readily and enter the air that people then breathe, as you say, who are in proximity to these dry cleaning establishments.

Yes, and so you can either get exposed to them in your environment, up to 30% on ground, while the United States is contaminated with TCE. And many people get their water from wells, for example, which aren't regulated by the Safe Drinking Water Act and thus could be contaminated and not be unaware.

Or like radon, but you know, people know evaporates from the ground and enters your home and can cause lung cancer. Many people have had their homes tested for radion.

And then the nice thing about this is it's readily remediable, just like you can put a radon remediation system in your house, which sucks the air from underneath your foundation and vents it above your roof.

You can do the same thing to prevent it. And as much as I care about TCE and Parkinson's disease, its real problem is that it causes cancer. According to the EPA, the World Health Organization, and the Department of Health and Human Services, TSE is a known carcinogen.

which is a fancy word way of just saying it causes cancer, especially liver cancer kidney cancer not Hodgkin's lymphoma, likely breast prostate myeloma and even potentially all the things related to Camp Lejeune, for example, that you really see.

You see all these class accentuates. Um, What is happening with Parkinson's incidence in America and globally? I mean, and I'd like you to couch this response in a way that argues against the fact that this is a purely genetic issue.

If mom had it, I'm like together, otherwise I am okay. Yeah. So when Dr. Parkinson described the condition in the book you just showed, he described six people with the disease in 1817. In 2017, two centuries later, the Global Burden of Disease Study estimated six million people had it.

So you went from something that was rare, six case reports, a case series of six, to six millions. And then last year, The Global Burn of the Disease study estimated that 11.8 million had.

Their estimate essentially doubled in the span of five years. And if you look between 1990 and 2021, a near quadrupling of the number of people with Parkinson's disease.

Now there are limited high quality studies of new cases of Parkinson disease to incidence, but what evidence there is suggests that this is growing much faster than it would be explained by aging alone.

So for example, the prevalence of Parkinsies is going after you adjust for age, holding age constant growing by 60%. and is growing much faster, and genetics don't play a huge role in the disease.

There have been two big studies on this. One is called PD Generation. Some of your listeners might have even participated, led by the Parkinson's Foundation, tested over 10,000 individuals who have Parkinson disease who signed up to participate in a study of the genetics of Parkinson And they found of these 10,000 that 12.5%, only one out of every eight had either a genetic cause or genetic risk factor for the disease.

Said another way, 87% Americans with Parkinson's disease do not have any underlying known genetic cause for the disease. 87 percent of Americans do have no known underlying genetic causes.

So that's a powerful argument in favor of the idea that this is an environmental related entity. that this disease is caused by something that, aside from our genetics, because it's increasing so dramatically.

And in fact, there is no other neurodegenerative condition that's increase at this pace, no matter, even if we look at Alzheimer's, other nerve degenerative conditions, this is the one that is exploding.

Now, you mentioned PERC and you mention trichloroethylene, now these dry cleaning related, and certainly, I think there's a page where you have a chart showing all the people in their occupations who have potential to be exposed to these chemicals, but they were not outlawed until 2024, correct?

Or banned until 2024? Yes. That's to mean that one in 12 workers in the United Kingdom, one and 12, just think about that. In 1970, it's estimated 10 million Americans worked with a chemical.

If you degreased metal in any way, if you were a mechanic, you worked on an assembly line, a printer, or a painter, then you may have been exposed to TCE.

Parkinsonu2019s incidence and the genetic argument

We wrote a case series of seven individuals who were likely exposed with TSE and developed Parkinson's disease. Only one of them a rocket scientist actually knew of the exposure at the time it happened.

So it's not like, you know, mostly we're just unaware that they're exposed to it. If you're unaware of your exposure, it is hard to tie it to Parkinson's disease.

And like the Marines at Camp Lejeune, when they were 20 years old, they didn't know they are drinking TCE and their water. So I get really, really concerned about the man-made nature of it.

And the beauty is if we ban it, that ban has been frozen. I just emailed colleagues today to find out what the latest status of that, but that on TCE and perchloroethylene has frozen, if that band goes into effect, future generations will not bear the burden of Parkinson's disease that we're bearing today.

So there is a move to keep the ban from happening despite all of the science demonstrating how threatening these chemicals are? Yeah, so I'm not an expert in the policy, but the bail was put into place late in 2024. And evidently, there's some window that there was a lawsuit and a window of like 60 days, which allowed that ban to be frozen.

I have not heard what has happened since then. Before I got on your podcast, I sent an email to my colleagues to find out the latest. If we ban it, we prevent cancer.

and gasoline because our children have lower levels, 95% lower than you and I had as kids when we were kids and are smarter because of it. We can do the same thing.

we can prevent Parkinson's, we could prevent cancer, congenital heart disease, miscarriage, or just low birthrate babies by just getting rid of some of these chemicals in our environment.

Let's shift a little bit laterally then to Paraquat. I mean, I think many of us remember ParaQuat that was sprayed on marijuana fields way back when. But Para Quat is similarly linked to increasing risk for Parkinson's, is it not?

Yes. So ParaQat, it's a weed killer. It's widely used on corn, soybeans, cotton, and grapes. Its sprayed fields today. It's so toxic because it's been used to commit homicide and suicide.

Over 50 countries, including China, have banned it. In epidemiological studies, studies involving farmers, for example, the risk of Parkinson's disease is 150% higher among farmers exposed to Paraquat than others.

Laboratory studies by multiple investigators around the world have demonstrated that ParaQuat leads to loss of the dopamine-producing nerve cells in Parkinson disease and reproduces the features of Parkins disease in laboratory animals.

Turns out that reporting by Kerry Gillum, an outstanding investigative journalist for The Lead and The Guardian, looked at documents that were filed as part of lawsuits from farmers who developed Parkinson's disease after working with Paraquat.

And it turned out the manufacturer of ParaQuat, according to her reporting, had exposed laboratory animals rats mice and rabbits to paraquat and they developed features of Parkinson's including tremors in the 1960s 30 years before academic scientists had reached the same conclusion that Paraquats reproduces features at Parkinson and laboratory animals according to reporting from the Guardian the company knew the the Same thing and didn't withdraw their product.

They didn' make it safer They continue to market under a according and Miss Gillum a freedom to sell campaign weed killer are still sprayed on fields in the United States and just about every state in The Union.

I think along with it likely potentially seeds of future cases of Parkinson's. Uh, I, think, uh, without question, and I

that the EPA continued its validation of its use in 2021 and in their report stated, you write this in your book, one sip can kill talking about how toxic it is.

And yet we go ahead and approve it. What do we need? If you just Google EPA plus one sip can kill, you can see the website for Paraquat from the United States Environmental Protection Agency and it says one SIP can Kill.

It talks about an eight-year-old boy whose older brother had put excess ParaQuat into a can, a soda can just to, for storage presumably, and the eight year old drank it thinking he's drinking soda and he dies.

And yet that's allowed to be put on our food crops. Yeah, and you know, research done by Consumer Reports, by the Environmental Working Group finds pesticides in name brand foods that we're consuming every day, foods we feed to our children.

I want to go a little deeper if we can. I know we have a lot of viewers who'd like the science part of this. And I think I'd to look at mechanistically what these drugs seem to be doing.

A good entree for that would be, can we unpack the MPTP story and how that all unfolded and led us to understand the role of mitochondrial dysfunction as it relates to ultimately manifesting as Parkinson's?

Well, hi everyone. Dr. David Perlmutter here. We hope you're enjoying this content. And if you would do so, go ahead and hit the like button. If you are not already a subscriber to our channel, please consider doing so.

Uh, we're really grateful to have you as part of our community. So let's get right back to the presentation. Yes. As most of you listeners know, Parkinson's disease has generally been found in older individuals.

Paraquat and pesticide toxicity

Um, but in the 1980s in Northern California and Sunnyvale, California, young adults, 20s, 30s maybe 40s were showing up in emergency rooms and a neurologist named Dr.

Bill Langston who's still with us was called to investigate and these people looked like they had Parkinson's but they were young and this had developed over a short period of time and it turned out that these individuals had been using a street form a street form of heroin that was contaminated with a chemical called MPTP.

And as you know, David, our brain is only about 2% of our body mass, but 20% percent of energy consumption is from the brain. The big cells that generate the energy consumptions are neurons or nerve cells.

And nerve cells have huge metabolic needs. And so they're chock full of mitochondria. Mitochondria are just like jelly bean size things, not jelly beans size, they look like Jelly Beans, that take sugar and produce energy out of them.

That's what neurons are full, especially the ones in the parts of brain affected in Parkinson's, the substantia nigra. Well, it turns out that MPTP damages the mitochondrion.

There are mitochondrial toxicants. And so that's how it was producing acute forms of Parkinsonism among these individuals in Northern California. Well, it turns out Paraquat has a structural, its chemical structure is very similar, if not nearly identical to that for MPTP.

And it turned out that Paraqua and TCE and PCE, and other toxins linked to Parkinson's, all damage the mitochondria. Some even damage the same complex, same part of the respiratory chain as MPTP.

So I think we have a clear uniform mechanism that these chemicals, not all chemicals is the chemicals that damage to energy producing parts of cells. Neurons are chock full of these mitochondria and are very sensitive to chemicals damage them.

So the dopaminergic neurons in the substantia nigra that fail, that are destroyed in Parkinson's, those neurons selectively take up MPTP, and then intracellularly it's converted to another mediate, which is MPP+, which then threatens the mitochondria.

So essentially, it hits like a slow cyanide. Cyanide is a mitochondrial toxin, but in this case, death to these mitochondria that are really very, very active, producing the dopamine that is so necessary for normal motor activity.

And as such, in the area of the brain, the substantia nigra, this is a sudden failure induced by this street drug, which provided an incredible model then for research.

Didn't they start using MPTP in primates and rodents to study Parkinson's? Yeah. So if you put a laboratory animal, you've put in mice in the lab and let it age, it doesn't spontaneously develop Parkinson's.

It doesn' spontaneously developed Alzheimer's, the only way that animal is going to develop Parkinsons is either if manipulate its genes or you expose it to chemicals.

And the chemical that one of the chemicals that's used to create an animal model of Parkinson is MPTP, which damages the mitochondria. There are other pesticides that are used.

Uh, there are chemicals, including some pesticides, that also used to generate animal models. And the reason we have animal model is one, to understand the pathology and pathophysiology of the disease, and two, screen potential new therapies against them.

So it's not because scientists like to produce Parkinson's in animals, but there's a reason for this. But again, these animals don't spontaneously naturally develop Parkinson disease.

You either have to manipulate their genes or expose them to chemicals. That's what we've been doing to humans. So we can say then that by and large Parkinson's is an acquired mitochondropathy.

It's an required mitochondrial disease. And your thesis that seems incredibly valid is that this is as a result of toxic exposure by in large, aside from that very small number of individuals who have mitochondria gene issues or the LRRK mutation, which affects, well actually affects how microglia are able to transfer mitochondria from one to the next to help those mitochondrial cells that are having issues with respect to their function.

We've known this for a hundred years. Sir William Gowers wrote in the late 1800s that only 15% of people with Parkinson's disease have a family history of disease.

Most of your listeners who have family members with Parkinsons, they're the only one in their family to have Parkinson. So we know that the genetic contributions to Parkinson are modest.

MPTP and mitochondrial dysfunction

We know from twin studies that environmental chemicals are the predominant, the environment's predominate cause of the disease. And now we have three ones, pesticides, certain pesticides.

Paraquat being the poster child, industrial solvents, trichloroethylene and perchlorothelene, and air pollution, all of which are addressable, which can suggest that we can create a world without Parkinson's disease or one where Parkinson disease is incredibly rare instead of incredibly common by cleaning up our food, water, Dr.

Dorsey, studies suggest that having type 2 diabetes variably increases your risk for Parkinson's as much as 42 to 48%. Why might that be? Yeah, so I don't know.

So I'll give you a couple of hypotheses. One, it seems pretty clear that, having diabetes and high blood glucose is bad for almost all brain diseases.

and that it likely is an important modifier of the disease. I don't think in of itself diabetes doesn't in itself cause Parkinson's disease, but it could be a modifier and make the symptoms progress more rapidly, for example.

Recently, just in the last few months, I've been reading, and as you know I'm not an epidemiologist, so I didn't come to… I spent my first decade of my life doing research around Huntington's Disease.

a century of purely genetic disorder before having the gift of a sabbatical and coming to read the work of Dr. Caroline Tanner and finding out about the environmental causes of Parkinson's.

It turns out that certain pesticides increase your risk for diabetes and increase you risk of Parkinsons disease. So I wonder, I don't know if some of the relationship is driven by a common toxicant that predisposes people to get diabetes, and predispose people get Parkinson disease, that's why.

We know, for example, that in Parkinson's disease, prostate cancer seems to be a higher risk. People with Parkinson appear to have a high risk of prostate.

Cancer again, I don't think Parkinson is causing prostate, cancer or prostate answer causing Parkinson. I think a chemical TCE is linked to both those conditions and could be the common cause for why Parkinson's and prostate cancer is more common in Parkinson disease.

I wonder but do not know whether certain pesticides are increasing risk for Parkinson and increasing the risk of diabetes. I would offer up another consideration, that is changes in the microbiome.

We know that diabetes is associated with some pretty significant changes, in microbiomes, predictably, and that this may be yet another unifying factor.

I don't know if we'll have time to talk about the gut-brain connection, as it relates to the theories on Lewy body, et cetera. But having said that, The other thing is that we do note that in the substantia nigra there's an evidence of activated microglial cells because their metabolism has been compromised.

This is the whole field of what's called immunometabolism whereby these micro glial cell are dependent from their mitochondrial function perspective, again back to the mitochondria, to remain supportive in their M2 configuration versus when their metabolism is compromised, as we see in diabetes, getting to the M1 or threatening enotype, which we do see clustered around the neurons in the substantia nigra in it was certainly around the MPTP patients after they have died years later too.

So one wonders about that. Let's move over to, we talked about earlier, the particulate matter in the atmosphere, air pollution, indoor and outdoor. And you dedicated quite a bit of the book talking about how What a threat this represents and i think this is really and you mentioned earlier today you know the idea that when the skies of new york became orange during the wildfires that were coming from canada.

That are exposure these pm two point five based on climate change seems to be increasing. and that these particles in and of themselves are threatening, but they carry along with them various hitchhikers that are brain threatening.

So let's talk a little bit about these PM2.5s as it relates to inducing a risk for Parkinson's. Sure, so anyone who's been to Los Angeles has seen smog, and you might be wondering, what am I actually seeing when I see smoga?

I wonder the same thing. And it turns out you're seeing little pieces of dirt and soot that were suspended in the air. name those little pieces of dirt and sew it the name particulate matter.

And then most of them are large enough that we cough out or sneeze them out. We know we have hairs in our nose, we had mucus membranes that are designed not to let anything that would breathe in get into our bodies.

But some are so small, one-thirtieth the width of our hair, that they're called PM 2.5, which just means they are

2,500 microns large. They're one thousandth of a millimeter in diameter, or two one thousands of the millimeter diameter.

Some are small that can penetrate the nerves called the olfactory nerves, responsible for smell that hangs up in our upper nasal passages and enter the brain.

So some of these particular matters are so small that they can enter the nerve that's responsible for smell and go back to the brain. And as you alluded to, these things are like a Trojan horse.

Instead of bringing troops into Athens, they're bringing toxic heavy metals into the brains, likely. These metals include lead from lead to gasoline, iron from breaks, platinum from catalytic converters.

probably better than I do, that people with Alzheimer's and Parkinson's have high levels of metals in their brain and no one's really been able to explain why.

And these heavy metals may be contributing to misfolding of proteins, alpha-synuclein in Parkinson disease, beta-amyloid in Alzheimer disease.

Diabetes, metabolism, and Parkinsonu2019s

We also know that in the pathology of both Parkinson and Alzheimer, one of the first places you see the methodology or place that you've seen most commonly is an olfactory bulb, the smell center of And we also know that one of the earliest features of both Parkinson's and Alzheimer's disease is a loss of smell.

And there have been increasing research just in the last two, three years linking air pollution in many studies, not all, in may studies air pollutions in Parkinson disease and really, really increasing robust evidence linking pollution to Alzheimer disease.

And so if you want to avoid living a short, unhealthy life, don't breathe polluted air. Well, you know, with all the fires that we've been seeing lately and increasing with time, I always make the point that this isn't a campfire.

It's not time to bust out the marshmallows. Wildfire is a lot of toxic stuff, especially when it's gone through buildings, residential areas. There's all kinds of horrible things being launched in the atmosphere that rides along with these particles that you then breathe.

And, you know, like you say, we see higher levels in the Alzheimer's and Parkinson's brain that may be causative, but also maybe reflective of an increased permeability in first place of the blood brain barrier, allowing these things in, carrying in all kinds of stuff.

So I guess we can get to the Parkinson 25 because I know on that list of things that you made so clear that are very important, Like washing our vegetables, changing our diets, not becoming diabetic, drinking decaf coffee, going for the organic wine, et cetera.

Drinking caffeinated coffee. Caffeinated, yes. We don't want to decaf, especially with TCE. And you talk about using an air purifier. I thought that was really quite interesting because that's indoor.

It's a really important point. People think, well, I'm indoors, that pollution is outdoors. But let's talk Hey, everyone, I wanted to let you know we're going to get right back to our program in just a moment.

But this podcast is being sponsored by like an air like and air makes an incredible home air purifier. It's the one that we use. This has a HEPA 14 filter to really help us dramatically reduce our exposure to these dangerous PM two point five particles.

as well as help us get rid of the volatile organic chemicals, the VOCs that are also brain-threatening and health-threatening. So, excited to let you all know that you can get a discount on your Lichen Air air purifier by using a

promo code DRPROMUTTER10.

That's DR PROMUTER 10 at the time of checkout for your lichen air air-purifier. Let's get right back to the podcast. Yeah, so indoor air pollution has multiple different sources.

Some are just coming from what's outside and coming inside. And the nice thing about air purifiers is that they're really good at filtering out a lot of this particulate matter and chemicals that can be evaporating into your home.

So just like radon. TCE can enter your home like radon. Air purifiers might help reduce exposure to some of the volatile organic chemicals, but are really good at addressing particulate matter.

It's relatively easy to do. They're about $100 to $200. Not expensive. I mean, they're not cheap, or they are not cost prohibitive for many families, for some they and they can decrease your risk of getting many of these diseases.

It turns out that air pollution is more disabling than high blood pressure. disability in the world. So if you want to, if, you live in an area with high levels of air pollution, I strongly recommend that people get an air purifier to decrease their exposure.

I agree. We have one in our bedroom and it actually monitors the levels at PM2.5. And the other day I wanted to challenge it and I lit incense and this thing went crazy.

It went from zero PM 2.50 to 500. and ramped itself up in terms of trying to purify the air in our room, which it did do once it was running for a little while.

So you were kind enough in your book to go through this list of 25 things we should be paying attention to. This is really important information, how we can lower our risk for this disease, for which there's no meaningful treatment.

Yes, we have treatment for the symptoms, the tremor, etc., the constipation, etc. But in terms of treating the underlying fire as opposed to just treating this smoke, there really is nothing as of yet.

Though, having said that, I mean, we're all aware of the publication last year in the New England Journal that demonstrated how effective a particular GLP-1 agonist drug a target's metabolism was in slowing down the progression of park.

Air pollution, wildfire smoke, and PM2.5

But that said, wash your produce even if it's organic. If it is organic, why do we need to wash it? Unfortunately, organic doesn't necessarily mean that it pesticide-free.

Studies done by the Consumer Reports have found that there are pesticides residues on organic produce and in some cases on safe levels. of pesticide residue on organic produce.

So what I do is I wash all my produce, I tend to buy organic wherever possible and I washed it with water and then I use a vegetable wash essentially like just like we wash our bodies with.

Water and soap because some pesticides dissolve in fat and those fat soluble or fat loving pesticides might be more important to causing Parkinson's than And so I use water in a vegetable wash.

You know, I get like a four dollar bottle from the grocery store. Other studies have looked at salt. Others have said look at vinegar as other ways to decrease your risk to pesticides in your diet.

Okay, number two. I don't know if we'll have time to go through all these, but change your diets. What sort of diet do you think is best as it relates to Parkinson's?

So the research suggests that eating Mediterranean diet, high in fruits and vegetables, low in animal products

might lower your risk of ever getting Parkinson's and might slow the rate of progression.

I tend to think, and you know far more about diet than I do, David, but I get concerned about what in the animal products. In the book, we talk about cows eating grass or pineapple chop that's been sprayed with pesticide that is fat-loving and then concentrating that pesticides in their milk, milk making its way onto the grocery stores in Hawaii, and that pesticides being found in high consumers of milk in in why along with loss of those doping-producing nerve cells.

So I get worried about pesticides and other chemicals getting concentrated as they make their way up the food chain. And therefore, if you're eating more and more animal products at the top of that food change, you might be getting exposed to more more of these environmental toxins.

You call out wine and I think you alluded to that earlier talking about how aggressive grapes need to be sprayed. So you say drink wine without enjoy wine, without pesticides.

What should we be looking for? So one of my colleagues, Dr. Alexis Albas, is a neurologist and epidemiologist, and he did this beautiful study in France, in the south of France.

And he showed a near-perfect correlation with pesticide use on French vineyards and rates of Parkinson's disease. Near- perfect correlation between pesticides use in south France and Parkinson disease, And then basically the consumer reports of france, Kate Trossier, I can't speak French.

looked at tested French wines and found pesticide residues in nearly every bottle of wine that they tested. Organic wines had lower residus than conventional wines, but had more wines.

And so the idea about drinking organic wines is just decreasing your exposure to chemicals even in products like wine, which you, I think a priori would not be thinking would be a source of pesticides.

Number six, you made a friend with me and that is drink caffeinated coffee. I'm all in. So there are some humors and lighter ones in there. It appears that caffeine decreases your risk of Parkinson's and we're not sure why.

Caffeine may protect dopaminergic neurons from the effects of toxins. but appears to be specific to caffeine and not to coffee. So if you're enjoying your caffeinated coffee, you can continue to enjoy it, recognizing that caffeine has other side effects, headaches and anxiety.

But if your enjoying you caffeine, this is a reason to continue do so. There are other things in coffee too, like chlorogenic acid and certain polyphenols that we know are uh, metabolically favorable for your body in general.

And it gets back to your, I think diabetes kind of comment as it relates to don't become diabetic and enhancing metabolism, even of the brain's immune system, the microglial cells, helping them be supportive as opposed to destructive, um, farm safely.

What does that mean? So, well, just like the golfers, we know that farmers are at higher risk for Parkinson's disease. There are three studies that link green space workers like landscapers to an increased risk of Parkinson disease, and there are ways we can protect farmers from the harmful effects of these chemicals.

It turns out that protective gloves and respirators, for example, might lower your risk and reduce your exposure to these toxic pesticides. and decrease the likelihood of developing Parkinson's disease if you wear the appropriate protective gear.

Unfortunately, many people don't. Many people are unaware of it. And many who aren't provided this gear, and sometimes the gear can be expensive and, sometimes, the year can, you know, uncomfortable, especially if Next is dry clean carefully.

I mean, everybody has to dry-clean something, I guess, from time to time. And we'll talk about what you mean by

carefully, but I've seen dry cleaner's advertise completely organic things that are used to clean your clothes.

So what does it mean? So, I would avoid trichloroethylene and perchlorophiline like the plague. I think its effects on cancer and prepartencies are incredible and very concerning.

And so I've mentioned 60-70%, my understanding is that dry cleaners in the United States still use perchlorethylene And I tell people to avoid that. There are green dry cleaners that use usually petroleum based products rather than these chemicals to do so.

California has banned PCE and dry cleaner are facing it out. Other European nations have taken much stronger regulations around trichloroethylene and perchlorethylenone.

So if you're going to dry-clean, I would find a green Dry Cleaner. I just found one in New York City for my wife and me. For men, it turns out your shirts are generally laundered, so they're not dry cleaned, less concerning.

And if you do dry clean, It's important to air out of your clothes before you bring them inside, maybe even air them out outside before bringing them in your car.

Studies have shown that if bring your dry cleaning into your cars, you're breathing these chemicals on your way home. I just think it's a really high price to pay so our clothes don't shrink.

What do you say to our golfers? I get concerned, you know, I'm not making friends. Some of my friends, they're neurologists, and as you notice, neurologist like to golf.

Reducing exposure with practical prevention steps

So I, get concern. And again, is there a need that we need to use two tons of pesticides on golf courses? Can we use safer pesticides instead of the more toxic ones?

can we used lower amounts? Can we protect landscapers when they are sprayed? I think all these things are really achievable. I these are things that people can do in their own community.

Why not just ask your golf course, what pesticides are you using? Are they linked to Parkinson's? And can we use less of them? There are just lots and lots of things we can in our community to reduce our risk for everyone.

It appears like secondhand smoke, right? It's not the smoker who is at higher risk, but people who live near where the pesticides are sprayed. There was another great study done by my colleagues, Kimberly, Paul, and Beata Ritz at UCLA, I think in 2024, 2023, that showed that simply living or working near were paraquat that weed killer is sprayed is associated with a doubling of your risk of Parkinson's disease.

So these are high prices to pay and these involuntary exposures that people are Well, you've listed some thou shalt nots. What about things that we can be doing?

You talked about sleep and exercise. Let's talk about exercise, why is that a protection for us as it relates to Parkinson's? Yeah, so there's just increasing evidence.

You know, since you and I went to medical school, probably the biggest therapeutic advance for Parkinson disease this century is the recognition that exercise is really beneficial for people with Parkinson Disease.

Sir William Gowers, who said that only 15% of people had a family history of the disease, was right that those things have been replicated. He said people should live lives a quiet and peaceful life, and I don't think he was right on that one, though.

Increasing evidence suggests, including research by my colleague Dr. Bas Blum, that exercise releases growth factors in the brain. and therefore may protect the remaining nerve cells or mitigate the effects of exposure to toxic

chemicals.

I tell people with Parkinson's to exercise at least an hour a day if they can, and that if I had Parkinson, I would exercise two hours a days. There's a study that suggests vigorous exercise, three and a half to four hours per week, equivalent of jogging or swimming, can reduce your, is associated with a 20% reduction in your risk of getting Parkinson.

if you want to live a full, productive, independent life well into your 60s, 70s and 80s 90s beyond exercise now. Well, you actually have a lot of case studies in the book that of people who once they were diagnosed, were able to accomplish some incredible feats of physical activity.

I think you had a marathon runner and And then there was a basketball player who actually was, uh, who got Parkinson's at a relatively young age, but yet still played that next season when things weren't going well with respect.

He wasn't able to jump shot or something like that. Yeah. Brian Grant, um, NBA basketball players formed the Brian grant foundation, you know, hats off to him and all those people who not only bear the burden of Parkinson disease, make the burn less for others.

I mean, what a great gift. And it turned out that he was a three-year-old boy at Camp Lejeune when his father was in the Marine, was training there, and he exposed, in all likelihood, to TCE.

His father dies of esophageal cancer linked to the chemical. He's younger brother nearly dies while on the base, but he gets better as soon as they leave the Base.

And then 33 years after his exposure as a 3- year- old boy, he's diagnosed with Parkinson's disease. But in his last seasons of the NBA playing for the Los Angeles Lakers, you notice he couldn't jump in this case, untreated.

I mean, Muhammad Ali still fought when he had the tremor. And other people like Michael J. Fox has written three books, starred in two TV shows. We talked, I don't know, in the book, that Rich Clifford walked in space after he was diagnosed.

Parkinson's disease. People have served in the US House of Representatives and the U. S. Senate. We've had cabinet members, we had the head of the Catholic Church, all with Parkinson or Parkinson-related diseases.

Well, that was actually a very interesting story when you talked about the Pope and his Parkinson. That he, as a younger man, was working in mining manganese, right?

Yeah, so one of my hobbies is trying to figure out why people get Parkinson's, because once you figure the cause of a disease, you can one, prevent it, and two, cure it.

Once you've figured out the causes of the disease you, one prevent and, two cure. So why did Pope John Paul II, why would a pope get a Parkinson disease?

And it turned out, he's Polish, during World War II Germany occupied Poland and forced everyone basically into a labor camp or worse. and he was working a labor camp at a mine and his job was to mine in Poland.

I can't pronounce the Polish name of the mine. And I looked at that mine, and it turned out that that line had a high concentration of manganese. He evidently worked fairly deep into the mine.

And manganese, as you know, is a metal, a toxic metal that's associated with a form of Parkinsonism that is generally resistant to treatment. My suspicion, I don't know for certain, that the cause of Pope John Paul's second Parkinson's was exposure to mangenese when he was mining as a young man before he had entered the clergy during World War II.

One question that I've been puzzled by for a long time and hoping you have some insight and I don't mean to put you on the spot, but I'm going to anyway.

We know that Alzheimer's two to one women to men and pretty much the opposite is true as it relates to Parkinson's. Any speculation as to why men are far more likely to get Parkinson compared to women?

Yeah, so in almost every part of the world, men are 50% more likely to get Parkinson's. And there's animal studies that suggest that male laboratory animals are more susceptible to the effects of chemicals than female laboratory animal.

I tend to think it has to do more with sociology than biology. It turns out that there are some studies in Japan and Taiwan, I believe, that show that the rates of Parkinson's are equal between men and women.

In some cases, women are more. And I look back and it turns that women in those countries did most of the farming and therefore were more likely to be exposed.

Exercise, empowerment, and preventing future cases

So in the United States, 75% of farmers are men, 97% pesticide applicators are So if you look at all the occupations that would be associated with an increased risk of Parkinson's disease, there are largely men in the United States and the Western world.

In the Eastern world, farming, for example, was predominantly done by women and may suggest why the differences are more muted, in some cases, women at higher risk.

So again, I think it's sociology rather than biology, but it could be both. Yeah, well, I want you, if you could, as we close, to really speak to our audience in terms of your life mission here, in their recognition that this doesn't have to be.

And just give them a sense of empowerment in making the changes that you so beautifully described in the book and what the impact can be of making those changes in term of risk.

Well, first of all, thank you for letting me be a guest for a second time on your show and giving voice to these important issues. And you have millions of people listening.

There's a clear reason why no one prepares, reads as much, thinks as when doing an interview as you do. So thank David. We're both neurologists. The end of the day, what's the best gift that we can give the future world?

I'll back up a little bit. So my son is a philosophy, studying philosophy and he goes, dad, do you know who David Parfit is? And I go, no. And he says, Dad, he's only the most influential philosopher in the second half of the 20th century.

So as a good father, I went and read Parfit's book, or book of biography about Parfitt. And it turned out Parffitt had this notion that we should care about people regardless of geography, that if we care our neighbor just as well as we'd care someone a thousand miles away, is this beautiful analogy that, if you had an infinitely long arm, you should comfort your neighbor and you comfort someone on the other side of the world.

He says, If we take care of people, regardless space, we shouldn't care about our contemporaries, but we should care about future generations. And I can't think of a better gift that we can give future generation than a world without Parkinson's disease.

We've inherited a word without polio, largely free of polo, right? And that's because of our predecessors doing the hard work to get rid of Polio. Finding out what the root cause is, finding that it was a virus, people didn't it think was the virus.

and then coming up with a vaccine to address it. We live in a world where HIV is decreasing, where it's likely that HIV may disappear as a major clinical entity in our lifetime if we continue to support HIV prevention efforts.

we can do the same thing for Parkinson's. You can turn it back into the medical textbooks and the historical books and just like Dr. Parkinson, we could dust off this old thing.

Bray came in and said, this is a dusty old thing from 30 or 40 years ago because we live in a world where Parkinson's is increasingly less common and we can accomplish that.

In Germany, the incidence of Parkinson where they're cleaning up their environment is going down. The incidence at Parkinson in the Netherlands appears to be going downhill.

If we clean up our air, as these countries have done, if we cleanup our food supply and get rid of toxic pesticides, And we get rid of chemicals that we are no longer linked to cancer and likely to Parkinson's disease.

We create a world where Parkinson disease is increasingly rare instead of increasingly common. And I can't think of a better gift as a neurologist that can give the future world than that.

Wow. Preventive neurology. That is, you know, what an idea. Well, Ray, thank you for joining us today on the program and thank Dr. Okum as well. You guys have done really a terrific service for all of us, bringing this to light.

It's sort of been in the background of neurology for so long and you've put it, you shine the light on it. And it's so important with widespread application as, well, not just Parkinson's, but you mentioned all the manifestations of living at Camp Lejeune.

If we clean up our act, I think we're going to be a lot better for it and recognize that these are not genetic issues. These are manmade issues that think you've been quoted as saying Parkinson's is a man-made disease.

And I you're spot on. So thank you for joining us today. It's been really great to connect with you again. Perfect. And just one last little seed, as much as I care about Parkinson's, we get rid of these chemicals, not only do we have cancer in Parkinson, but it's likely ALS, it is likely intellectual disabilities, is it likely brain cancers, likely Alzheimer's.

We can make all of theses diseases, which are now the world's leading source of disability, less common, spend less in society, suffer less, enjoy life more.

I can't think of a better thing that we should be doing as physicians. All right, my friend, talk soon. Thank you again for joining us. Well, again, thank you to Dr.

Ray Dorsey for spending time with us. This is really very important information and what valuable steps he has provided for us that will help us reduce our risk for this disease for which you really have no meaningful treatment with the exception of some management of symptoms ideas that have been out there for decades.

We really want to learn what we can do to prevent Parkinson's in the first place. Again, the book, I strongly urge you take a look at it. whether you have a family member or have Parkinson's yourself, or like me, you don't want to get it.

The Parkinson Plan by Dr. Ray Dorsey and by Michael Oken. I'm Dr David Perlmutter, and thank you for joining us today on The Empowering Neurologist. We will be back soon.

Bye for now.