

The following is a transcript of the presentation given by Herb Coussons, MD, at the 9-12-17 Special Joint Meeting of the Brown County (Wisconsin) Human Services Committee and the Brown County Board of Health regarding wind turbine health concerns (Note: Time notation is keyed to the meeting video found at: <https://www.youtube.com/watch?v=8bpc-pYMu48>)

## Transcript of Presentation by Herb Coussons, MD

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Hello. My name is Herb Coussons. I practice here in Green Bay. I graduated from medical school in 1992, so I've been in practice about 25 years. I've been in the Green Bay area a little over fifteen years. I am an OB/GYN and I practice primary care. Some of you in the audience may know me, some may be patients. You know that I take my work seriously. I spend enough time with patients to educate them, to understand their disease, and for me to listen to them and understand their complaints.

I had some patients that lived in the Shirley Wind area, and, I'm seeing now, six. Several years ago I also saw a patient from the Fond du Lac area, which is a little further south. And so I was curious about this problem of these non-specific complaints like Dr. McCunney mentioned, dizziness, headaches, ringing ears, motion sickness-type symptoms, and some had developed some hypertensive symptoms. So I began to read and study on this topic. This has been now, five, six, seven years ago.

I will say that I also have no financial interests or disclaimers, links to industry. This is purely my experience, my reading of the literature, and local patients. I would also say that I'm a pilot and I spend a fair amount of my time reading aviation literature because I'm an airline-rated pilot. I've been flying for about 25 years, which is also a passion of mine.

So, this is the problem as I see it. As some of the previous speakers said, wind turbines are located close to people. This is due to, really, the inherent economic advantages of the wind industry needing to produce power close to the consumption and also to get it close to the grid. These economic forces and the cost of wind energy have made it so that they're sited close to residential areas.

I've been in California. I've seen wind developments out there. I've been all through central Illinois and down in Indiana, and of course locally. It's really irrefutable that the audible noise, which can be produced by wind turbines, causes sleep disturbance. My impression is that noise is noise. It's a scientific phenomenon. It's a wavelength, with a frequency, and strength or sound pressure.

We look to other industry, as Dr. McCunney said in the 70s or earlier, noise is studied. So it's not necessarily a new phenomenon that noise may disturb people. The World

Health Organization has been mentioned several times here, has guidelines limiting nighttime noise to 40 decibels.

Since the inception of wind energy it was discovered that people began to complain. There were complaints about sleep disturbances and discussion on this as early as 1979, in my reading. The disruption and complaints, for a variety of adverse health effects, and there started to be studies published as early as early 1980s. One of the very first ones was from North Carolina, and I quote from this study, "The greater part of the impulse acoustic energy responsible for the annoyance was the very low frequency noise, and the observed peak was generally below the normal audible limit of 20 Hz". This was published in 1985.

It's also important to note that infrasound and low frequency noise can also be classified, as a whole, as vibration. We've all experienced sub-woofers and people pulling up next to you, and you don't hear the lyrics but you feel or hear the pounding. That's the low frequency, or even below the audible range, that is more perceived than heard.

This study was presented, these studies, these early findings were presented to the American Wind Energy Association conference in 1987. An unrelated investigation that began in 1979, there was a very longitudinal study, and data has been published from this study all the way at least through the late 2000s, 2007-8. The researchers are Dr. Branco and Dr. Mariana Alves-Pereira. They started to look at vibration well before it was a medical diagnosis, and published on these whole-body pathologies that they described as vibro-acoustic disease. They published on this for nearly three decades now, both animal and human research. We'll talk more about that in a little bit.

Sometimes wind turbine syndrome is mentioned, and this was one of the very first kind of published things linking noise, which could be industrial or could be other sources, but linking it to wind turbines. Dr. Nina Pierpont wrote a book on an observation in her practice and titled this "wind turbine syndrome".

I want to make a point that a syndrome is really this unrelated group of symptoms that no one understands the cause. I think we know now that disease would be a step further where we identify pathology and some kind of causal link. This has been one of the problems with wind turbine studies, is that larger controlled settings limit the ability to draw this cause and effect. But knowing that sound is sound, we want to look at other literature to say similar sound leads to cause and effect.

This is a study that came from that vibro-acoustic disorder that I was talking about. So I would say it's no longer a syndrome. I hope you can read it, this is the abstract of the study, I hope you can read the highlighted text, but I'll read it for you just to be sure. It's a whole body systemic pathology characterized by abnormal proliferation of extra-

cellular matrices caused by excessive exposure to low frequency noise. Low frequency noise exposure causes thickening of cardiovascular structures, indeed pericardial thickening with no inflammatory process. What we're describing here is like, actual tissue changes in the body that were diagnosed on autopsies from people who suffered from excessive vibration.

I double-checked my math. I've never met Dr. Rand before and he's an acoustic scientist, so I wanted to double-check it. How do we measure wavelength? We all look in a textbook and we see sound waves or light waves and those waves have a frequency with which they impact us, how closely they're coming. So think of pulses of energy, OK? We talk about hertz, and that's the frequency, but you have to know the speed, so like the speed of light would determine the wavelength, you could measure the wavelength of these impulses. So when we're talking about sub-1 hertz, like .2 hertz, we're talking about waves that are 1700 meters long, OK? So to put that in perspective, you look at a wavelength in the textbook and you think of these as tiny, like harmless impulses of energy, when in reality these are very long powerful waves, OK, 1700 meters, meters or yards, so 1700 yards. These are very low frequency vibrations. They're not noise in the sense of when we think of audible.

This is another study that was an extension of this in 2007. I'll read it, it came from the aeronautical literature which is where I discovered it, that there were actual impacts on cardiac structures, trachea, lungs, kidneys, in both these patients who had vibro-acoustic disorder and ILFN-exposed animals. The agent of disease that was listed is infrasound, listed as 0-20 hertz, low frequency noise being 20-500, ILFN 0-500, and these are all classified in one group called vibro-acoustic disease using the whole wavelength range.

Dr. McCunney also mentioned ICD-10. ICD-10 started in October 2016, so it's been exactly a year. ICD-9 was the previous classification of disease, or somewhere around 10,000 diagnoses codes. ICD-10 was an expansion of that to about 50,000 diagnoses codes, and these are new diagnoses codes. You actually can be diagnosed with vertigo from infrasound, now. T 75.2, and there's actually about nine or ten more digits listed there, is the effects of vibration. And then that's further broken down and we have T 75.23, and there's a series of other letters and numbers that go after that, whether it's an initial episode, a subsequent evaluation, or an ongoing problem. So, it's actually a medical diagnosis now. It's not something that's theorized.

Other kind of supporting evidence, we have these nauseogenicity studies from the 80s that define the frequency of low frequency noise that cause nauseousness, and these same frequencies are the ones that Dr. Rand measured in the wind development in Shirley, both up and downwind up to six miles away.

So, can sound that we don't hear actually harm us? Who reads the news? This is a recent news article, US Reveals Details of Alleged Sonic Attacks on Diplomats in Cuba. Anyone familiar with this? Great! What's interesting is because this is the US government and it's an embassy in a foreign country, we don't know the details. I'm not necessarily claiming that this is the same thing, but I do want to show you some information because I was really curious about, did they measure the wavelength? What was the sound that harmed these individuals? And the more I read about it, kind of the scarier it got. What we don't know is, was it intentional or was it a listening device that went crazy and it was an accident. We don't know the sound levels, whether it was necessarily high frequency or low frequency. The point is, that it was out of the audible human range, the human hearing range. And this is what the news reports on this – medical experts told ABC news that some US officials were exposed to a sonic device in Havana that caused serious health problems and physical symptoms. Sound waves above and below the range of human hearing can cause permanent damage. According to the Mayo Clinic – these are all quotes that news sources related to this in Cuba – but according to Mayo Clinic, mild traumatic brain injury can cause temporary dysfunction of brain cells. More serious traumatic brain injury can result in bruising, torn tissues, bleeding, and other physical damage to the brain that can result in long-term complications or death. Symptoms can be immediate or appear days or weeks later – a critical point – and range from loss of consciousness, confusion, sensory problems, memory loss, headaches, nauseousness. And the diagnosis in these individuals, sixteen people were removed from the embassy and brought home, and the diagnosis in these sixteen people included mild traumatic brain injury - due to sound they couldn't hear - permanent hearing loss - some of these are irreversible - and other such symptoms such as loss of balance, severe headaches, cognitive disruption and brain swelling, according to the American Foreign Service Association. This is what they're telling us. We don't know what they're not telling us.

So, I think it's not a far stretch to say that sound can cause health problems, and noise outside of the audible range can cause health problems. So, what is the response? Well, despite the growing chorus of complaints and adverse health reports on the public record, other scientific evidence and studies that industrial wind turbines are the cause, the wind industry has steadfastly chosen to either ignore them or push them down in a different way, accelerating, really, the growth and siting of industrial wind farms near residents.

This process, interestingly to me, when you look at changes in wind turbines over the years, has been marked by a variety of design changes and operational changes all really intended to mitigate noise. If there was not a problem with noise, why make changes? I don't quite understand that logic. In fact, I really believe that the changes are sort of an admission that noise is a problem from large wind turbines. These are

supposed to make improvements, but if they're safe, and noise really isn't a consequence, why make changes?

As further evidence mounted to support the studies that we've mentioned, the wind industry sought to confound the issue with panels of experts to produce literature reviews that don't really prove that industrial wind turbines are safe. So, I would agree with some of the statements that have been made, such as, we can't really say that there's harm, but likewise we can't really say that they're safe either. We don't know that. I don't know of any literature that points to the safety of wind turbines, and that's a key factor.

I think that there's also enough information now, in fact I know there is, I'll tell you a little story about it in a minute, but I think there's enough information that it would be very hard to design studies to put people in harm's way of wind turbines. A similar example of this would be the tobacco industry. There really is no definitive study, there is a lot of data, but there's no definitive study that says that smoking cigarettes causes cancer. And the reason why is, once the information was out there that there is a link, no one is going to put humans in harm's way to test them to see, does it cause cancer. Are we going to give the agent to someone when there's enough information out there to say that there's potential harm?

I'm an obstetrician, and another example of this is prenatal care. Patients bring me information and say, "Is this medication I'm taking safe?" I don't know. The drugs in pregnancy are categorized, A,B,C,D, X. X is absolutely known to cause harm because some women were pregnant, they took the drug, they had adverse outcomes and it was at a high enough incidence that we said, yes, there's probably a link and animal studies showed there was a link, and we don't do that. Accutane would be an example of that. There are other drugs that are B, C, and D, but there are very few, if none anymore, category A drugs. And the reason why is, who's going to design the study that says, we're going to give this new drug to a group of pregnant women, we're going to give a placebo to this group, and we're going to see who has the messed up children. You're really not going to do that. You're never going to get that study passed. I think the same thing is going to happen from the wind industry, that here's enough studies out there that it's going to be near to impossible to design safety studies. So there may be a lack of evidence of direct cause and harm, but I also think there's an equal lack of safety information.

So, this is also another multi-author study and I think that, I didn't highlight this one, I'm sorry, reports in scientific literature, people experiencing motion sickness-like symptoms attributed to low frequency sound and infrasound. In the last several years there's been an increasing number of such reports with respect to wind turbines, and what I want to point out is this group of authors quoted the information in Shirley to make part of their point.

So, Shirley, which is what we're here to talk about, not just necessarily the wind industry, is the problem in the back yard. Shirley is the one that is probably the most studied, with Dr. Rand's research, Dr. James' research, and now, not a few, but this is a sample, and it runs off the bottom of the page, it's about three pages long, this is not isolated to one, to two, or three people or families. This is 89 individuals who've come forward with public records and affidavits of health problems. This is a fairly sparse population density in south Brown County. I've driven through there, I've lived out there, I've driven through there multiple times, and it's not like De Pere or Howard. This is a rural area and when you have 89 people complaining, publicly available complaints, this is not a small problem.

Two homes now sit empty. A third one was abandoned, but it was subsequently foreclosed on and sold with no disclosure that there was actually people who moved out for a problem. If I did that, and sold my home, and failed to disclose that I had a problem with that, I think the owners could come back and have some recourse against me. This home was subsequently sold to a family who was unaware of any of the issues. As I've mentioned before, I've seen six of these patients, and if you look at the publicly available records, I've read over a hundred pages of complaints from these people that live in this area.

So where are the randomized control trials? We've already talked about that, I've mentioned that I don't think there will be any randomized control trials. I started to be curious about this. I wanted to start collecting data from these people, so I went through the IRB process, and the question that I got from the review board was, why are we doing this? It seems like there's enough information and it seems like there is potential risk. So, I actually had to produce some literature to say, this is why, because there's controversy and people will argue against it. And they said, OK, there's probably some validity in doing surveys on these people and collecting data on them and categorizing that data. So I want to point out this, its safety and advocacy.

I spend another part of my time teaching surgery and doing consulting for hospitals around the United States. As part of that I became an expert in minimally invasive surgery, particularly in GYN, but I also spend time with general surgeons and neurologists. As part of that, there's one vendor in the market right now, Intuitive Surgical, robotic surgery. You guys probably hear all the advertisements from Aurora and Bellin and everybody else about robotic surgery. Well, there's two more vendors coming. When those vendors come to the FDA with a new device, they can't say, "We get the job done better". They can't say that. The study has to be designed to show equivalency in outcomes, and most importantly, the endpoint in safety. So they have to show that they're as safe as or safer than. If, by the way, they get enough data to say that we also are superior in our outcomes, they can make that claim, but they can't make the claim, initially, nor design their studies for FDA approval, until they prove

safety. And that's why I made the point, we might say that there's no direct link but we don't have anything to say that there's safety of wind turbines.

We've talked about IRB and human subject protection. So what do we have as study designs? These are the ones that we have. What we don't have are randomized control trials and meta-analysis. You guys have kind of been inundated with what are multivariate analyses, what are regression curves, what do statistics kind of show and prove, and a meta-analysis is when you have many, many studies and you pool them together. An example of a meta-analysis would be breast cancer. We have lots of information on estrogen risks, let's say with breast cancer, and we take like, twenty-four studies each with thousands of women in them and now we have 24,000 women in a study. So that would be a meta-analysis. Getting a randomized control trial on wind turbines would be difficult to control and it would be difficult to get enough of those that you wouldn't prove the meta-analysis.

So what do we do? I would say that when there are ethical concerns raised in research, I mentioned smoking and lung cancer, at some point you don't actually get the studies. You make the decision on the best evidence that's out there. I think there's enough evidence of people with complaints around wind turbines that are health complaints. I will say that Dr. McCunney's talk on the Canadian Health study, subjective end points are good. Of the patients that I've seen, two have developed hypertension and I have elevated cortisol levels on one of them. So, of the subjective information, I am seeing that.

The other one here specifically related to wind turbines was published in Ontario. This one says, "Now that we have so many indicators pointing to infrasound as a potential agent of adverse health effects, it is critical to re-examine the approach to this aspect of wind turbine operation, revise our regulations, and immediately implement protective public health measures based on precautionary principle." I will say that in Shirley, at least my knowledge of the zoning and their use permit to build the turbines, the limitation is 50 decibels of audible noise in the Shirley development. In Massachusetts, where Dr. McCunney lives, I know there are zoning rules that say eight to ten decibels, ten decibels above ambient noise at the property line, eight decibels at the house. Ambient noise has been recorded in Shirley, particularly at about 25 decibels. So, in Shirley we would be limited to about 33-35 decibels, and I know that there are some sound recordings out there that are pushing 50 already. That really kind of goes above using 40 or even Dr. McCunney's number of 46 decibels for sleep disturbance and noise disturbance.

We have other examples of shutdown of turbines - Falmouth was mentioned, there's examples in Portugal, and recently there was a large monetary settlement with people who complained of health effects in Cork, Ireland. I'm sure some of this will come up in Q & A based on what I've seen of the questions.

So, in summary, I think we have three decades of reports of adverse symptoms in people living in or near wind turbine developments, research has shown that low frequency noise leads to sleep disturbance, headaches, nauseousness, and now, likely, other long term illnesses such as tissue proliferation in this vibro-acoustic disease. Sleep disturbance alone leads to adverse health effects. The range of low frequency noise known to cause illness has been measured in Shirley. Vibro-acoustic disease is now recognized as a disease in ICD-10 and has led to autopsy-proven diseases of the cardiovascular, neurologic, and even carcinogenic consequences. And there are now over ninety worldwide professionals in research in medicine that have signed onto some documents that say they believe that there are actually adverse health effects related to the wind industry. And Shirley is one of the most studied and documented industrial wind turbine developments and has measured ILFN in affected families in Brown County.

I thank you for your attention and sticking through all of us.