

DRAFT

The book, in fact, is intended for physicians and other professionals and individuals who wish to better understand the wind turbine-associated symptom complex.

Wind Turbine Syndrome is not the same as Vibroacoustic Disease.<sup>6</sup> I say this because the two are often equated in the popular media. The proposed mechanisms are different, and the noise amplitudes are probably different as well. Wind Turbine Syndrome, I propose, is mediated by the vestibular system – by disturbed sensory input to eyes, ears, and stretch and pressure receptors in a variety of body locations. These feed-back neurologically onto a person's sense of position and motion in space, which is in turn connected in multiple ways to brain functions as disparate as spatial memory and anxiety. Several lines of evidence suggest that the amplitude (i.e., power or intensity) of low frequency noise and vibration needed to create these effects may be even lower than the auditory threshold at the same low frequencies. Re-stating this, one does not have to be able to hear the low frequency noise and vibration to experience the vestibular effects described as Wind Turbine Syndrome.

Vibroacoustic Disease, on the other hand, is hypothesized to be caused by direct tissue damage to a variety of organs, creating thickening of supporting structures and other pathological changes. It is caused by high amplitude (high power or high intensity) low frequency noise. Given my research protocol, described above, my study is of course unable to demonstrate whether wind turbine exposure causes the types of pathologies found in Vibroacoustic Disease, although there are similarities worthy of further clinical investigation, especially with regard to asthma and lower respiratory infections.

A few words about peer review. Peer review is quite simple, contrary to the mystique it has acquired among wind developers (most of whom probably have a fanciful idea of what it is). Peer review *consists of sending a scholarly manuscript to experts in that particular field of knowledge, who are asked to judge whether it merits publication.* Simple as that. The identity of reviewers (also called “referees”) can be either known to the author (this is often the case with book manuscripts, where authors are routinely asked by the editor to submit a list of possible referees) or kept confidential.

If the referees (usually consisting of two or three) manage to convince the editor that the manuscript is not worthy of publication, the editor contacts the author and rejects the manuscript. If, on the other hand, the referees feel the manuscript merits publication subject to certain revisions and perhaps additions, the editor will forward their reports to the author and ask for a response. “Are you willing to make these changes? Do you agree with these criticisms? If not, give me compelling reasons why not.”

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<sup>6</sup> Castelo Branco NAA , Alves-Pereira M. 2004. Vibroacoustic disease. *Noise Health* 6(23): 3-20.

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The author then revises the manuscript accordingly, except where she feels her referees are wrong – and manages so to convince the editor. Once the editor feels the author has addressed criticisms and suggestions adequately, he (she) proceeds with publication.

Lastly, referees do not have to agree with the author's arguments or conclusions. This is worth emphasizing. Their purpose is merely to certify that a) the manuscript conforms to conventional standards of scholarly or clinical research appropriate for the discipline, and, perhaps most important, b) the manuscript is a significant contribution to knowledge.

In the case of this book, a variety of scientists and physicians, all professors at medical schools or university departments of biology, read and commented on the manuscript and recommended it as an important contribution to knowledge and as conforming to the canons of clinical and scientific research. Moreover, they did in fact suggest revisions, even substantial revisions and additions – all of which I made. Some gave me written reports to include in the book itself. Others offered to review the book after it was published.

With that said, the litmus test of scientific validity is not peer review (which, after all, is not infallible, as the history of science amply demonstrates). Peer review is an important first step in judging scientific or scholarly merit, however the ultimate test is whether other scientists can follow the author's research protocol and get the same results.

That, of course, remains to be seen with this report.

I thank Dr. Joel Lehrer in particular for providing me with new information regarding vestibular function, contributions echoed by Drs. Owen Black and Abraham Shulman (all in otolaryngology/neurotology). I thank Professors Henry Horn (ecology) and Ralph Katz (epidemiology) for discussion of scientific method and presentation. Dr. Jerome Haller (neurology) and Professor Robert May (theoretical ecology and epidemiology, past president of the Royal Society of London) read the manuscript and provided commentary to be included in the book, as did Dr. Lehrer and Professors Horn and Katz, for which I am most grateful. Barbara Frey (biomedical librarian) edited the manuscript. Other readers read and discussed the manuscript with me and advised on routes of publication. These included Professor Carey Balaban (neuroscience), Dr. Rolf Jacob (psychiatry/neurotology interface), Dr. John Modlin (pediatrics/infectious diseases), and Dr. Anne Gadomski (pediatrics/public health). I thank them all, as well as

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Christina Ransom and William McCall, librarians of the Champlain Valley Physician's Hospital in Plattsburgh, NY, and the FYI Hospital Library Circuit Rider Program.

George Kamperman and Rick James, INCE (Institute of Noise Control Engineering) certified noise control engineers, edited the sections describing noise measurement and modeling. They also analyzed noise studies done at the homes of several affected families, while developing standards and protocols for the assessment and control of noise from industrial wind turbines. Kamperman and James presented their standards and rationale at the Noise-Con 2008 meeting of the Institute of Noise Control Engineering (USA) in July 2008, then expanded their paper with a detailed discussion of noise measurement protocols and a model wind turbine ordinance.<sup>7</sup> The expanded paper is posted on the Wind Turbine Syndrome website.<sup>8</sup>

Some are surprised that I chose to publish this study as a book rather than an article. My reason is straightforward: it's too long for a medical or scientific journal. The problem is the incompressible yet indispensable narrative data – people's accounts of their sensations, experiences, symptoms, and history. It would be impossible to present these accounts in a 3000 or 7000-word article, yet they are essential as evidence for qualitative changes around turbines. For example, to support a summary statement like, "The noise from wind turbines has a different and disturbing quality, even when it does not seem loud," I must present the descriptions given by multiple study participants. To describe a symptom new to medicine, such as the feeling of internal vibration or pulsation, I again need the words of multiple participants. Because I could not do testing to examine thinking and memory abilities, for example, I need to recount the subjects' own evidence, consisting of their descriptions of things they used to do easily but now cannot do, or of loss and recovery in their children's school functioning.

Many of my reviewers suggested ways to split the study into shorter papers – a segment on migraine, a segment on tinnitus, a segment on methodology, for example. However, I feel that keeping the entire study in one piece makes for a more powerful and intelligible document, allowing readers to appreciate the intertwined nature of individual symptoms and the way they fit with new neural models of vestibular function.

As for the reception I anticipate for this report, I don't flatter myself that it will be greeted with loud hosannas from the wind industry. Keep in mind that wind developers have what is called in science a

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<sup>7</sup> Kamperman GW, James RR, "Simple guidelines for siting wind turbines to prevent health risks," at the annual conference of the Institute of Noise Control Engineering/USA, Noise-Con, July 28-31, 2008.

<sup>8</sup> See "How loud is too loud?" [www.windturbinesyndrome.com](http://www.windturbinesyndrome.com).