PREFACE

I wrote this report because I saw a medical problem which few clinicians were paying attention to or, for that matter, seemed to understand. Dr. Amanda Harry in the United Kingdom led the way in recognizing the cluster of symptoms people experience around wind turbines.[1] I, myself, began encountering the problem from numerous e-mails and telephone calls I received, beginning in 2004, shortly after wind developers turned up in my community and my husband and I began investigating industrial wind turbines.

The uniformity of the complaints quickly became apparent. It didn't take long to realize the potential for a relationship between these complaints, on the one hand, and *migraine, motion sickness, vertigo, noise and visual and gastrointestinal sensitivity, and anxiety* which, all together, form a coherent and interconnected neurologic complex in medical practice.

The breakthrough came in early 2006, when I interviewed a couple who were about to move out of their home because of their own and their children's symptoms. The interview supported the relationship between turbine-associated symptoms and migraine/motion sensitivity. Best of all, the interview introduced me to the curious phenomenon of vibration or pulsation felt in the chest. It was this element that piqued the interest of the National Academy of Sciences in its 2007 report to Congress, *Environmental Impacts of Wind-Energy Projects*. The authors wanted to learn more about this effect of low frequency noise.[2]

This study is my answer to their question.

As I have worked to understand these complaints, I have benefited from new research allowing us to better understand neurologic phenomena like spatial memory loss and fear reactions in people with balance problems—symptoms that often "bored and baffled" clinicians, as one of my referees put it.[3] Some wind developers and acousticians are even less charitable.

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[1] Harry, Amanda. February 2007. Wind turbines, noise, and health. 32 pp. http://www.windturbinenoisehealthhumanrights.com/wtnoise_health_2007_a_barry.pdf

[2] National Research Council. 2007. *Environmental Impacts of Wind-Energy Projects*. The National Academies Press, Washington, DC. 185 pp, p. 109.

[3] I review and discuss this research in the *Discussion* section, pp. xx.

> It's … worth noting that studies have shown that a person's attitude toward a sound—meaning whether it's a "wanted" or "unwanted" sound—depends a great deal on what they think and how they feel about the source of the sound. In other words, if someone has a negative attitude to wind turbines, or is worried about them, this will affect how they feel about the sound. However, if someone has a positive attitude toward wind energy, it's very unlikely that the sounds will bother them at all.[4]

> Their patients [the people living near wind turbines and reported on by Dr. Osborne and Dr. Harry] may well have been experiencing adverse symptoms, but we have to keep in mind that people who have failed, for whatever reason, in strong objections to a development, build up in themselves a level of unfulfilled expectations and consequent stress, which peaks after the failure and can overload their coping capabilities. This leads them to lay the blame on whatever straw they can clutch. This is especially so in group activities, where mutual support may turn to a mutual, interacting misery, which worsens the situation….The very low levels of low frequency noise and infrasound which occur from wind turbines will not normally cause problems. If problems have occurred, it is possibly for some other stress-related reason.[5]

> Brian Howe, a consulting engineer in acoustics for 20 years for HGC Engineering, said Ontario's guidelines for turbine noise are adequate and consistent with Health Canada studies. Most people near wind turbines aren't complaining about the noise, Howe said. In some cases, noise complaints could reflect higher anxiety levels from people who had unrealistic expectations of hearing virtually no sound, he said.[6]

Responses like these are a pity—because they're rubbish. There is nothing "psychosomatic" or malingering about it. Research clearly shows there are precise and definable neurologic connections that explain how sensory signals can derail normal psychological and cognitive function and, in fact, trigger physical symptoms. (It's worth pointing out that our understanding of brain function has progressed by leaps and bounds in the last 25 years, radically changing the landscape of psychology and psychiatry and,

[4] Noble Environmental Power, LLC. Wind fact sheet #5: Are modern wind turbines noisy? http://www.noblepower.com/faqs/documents/06-08-23NEP-SoundFromWindTurbines-FS5-G.pdf, p. 2.
[5] Leventhall, Geoff. 2004. Notes on low frequency noise from wind turbines with special reference to the Genesis Power Ltd. Proposal near Waiuku, NZ. Prepared for Genesis Power/Hegley Acoustic Consultants, June 4, p. 7.
[6] Rennie, Gary. 2009. Wind farm noise limits urged. The Windsor (Ontario, Canada) Star. February 24.

of course, neurology.[7] Much of the research on vestibular function, whereon I draw heavily, is even more recent, conducted within just the last 10-15 years.)

Leaving that bit of pop psychology behind us, let's move on to evidence-based science. In the world of medicine my study is properly called a "case series," defined as *a descriptive account of a series of individuals with the same new medical problem*. Let me be clear: a case series is a standard and valid form of medical research. New illnesses are often introduced with case series, whose role is to define an illness, suggest causation, and alert the medical and research profession to its existence. (This, simply put, is the purpose of this report.) After an illness is defined and awareness raised, it becomes more feasible to do larger, more expensive studies to explore etiology (causation), pathophysiology, and epidemiologic characteristics.

Case series do not typically have control groups. Nevertheless, I saw I needed a comparison group of similar, though unexposed, people to distinguish which symptoms were due to turbine exposure. The most similar unexposed people, of course, were my study subjects themselves prior to turbine exposure and after the end of exposure. I therefore set up a *before-during-after* study format, interviewing families who had already moved out of their homes due to symptoms, or who were planning to move and had already spent periods away from home during which turbine-associated symptoms abated.

This format served a three-fold purpose:

1) it ensured there was an "after" phase for each family
2) it guaranteed that at least one member of each family was severely affected, enough to need to move, and
3) it provided validation for participant statements, since one can hardly discount the gravity of symptoms that force a family to vacate its home or perform expensive renovations aimed solely at noise exclusion.

Which brings us to what is known in science as a "natural experiment." A natural experiment being *a circumstance wherein subjects are exposed to experimental conditions both inadvertently and ecologically (within their own homes and environment*s). Obviously it would be unethical to expose people deliberately to potentially harmful interventions. Hence natural experiments, while less controlled, have an important role in clarifying the impacts of potentially toxic, man-made exposures.

[7] See, for example, Schore, Allan N., 1994. *Affect Regulation and the Origin of the Self: The Neurobiology of Emotional Development.* Lawrence Earlbaum Associates, Hillsdale, NJ. 700 pp.

The ecological dimension in the phrase *natural experiment* is worth emphasizing, for the simple reason that many elements of an exposure may not be reproducible in a laboratory, such as round-the-clock exposure, exposure over months, or impacts on customary activities. For symptoms related to wind turbine sound, there are also technical difficulties in reproducing in a laboratory the types of sound, air pressure variation, and vibration that my subjects' observations suggest are involved. Failure to provoke the same symptoms in a laboratory setting may tell us more about the limitations of the laboratory situation than about the real-world effects.

To further create comparison groups, I collected information on all members in the ten families, not just the most affected. This widened the age range of subjects and gave me information on variably affected people who were all exposed to turbine noise capable of causing severe symptoms. I then used the natural variation within the study group to examine which elements of the *pre-exposure* medical history predicted which parts of the *during-exposure* symptom complex. By this method, the study begins to answer the intriguing question of why some individuals are affected more than others by living near wind turbines, and which individuals in the general population are at notable risk for symptoms. It also suggests pathophysiologic mechanisms.

It would be difficult to do a conventional epidemiologic study of the health effects of wind turbines, at least in the United States, even if one were blessed with substantial funding and institutional backing, as I was not. By "epidemiologic" I mean studies in which random or regular sampling is used (as, for example, assessing everyone within three miles of a set of turbines, or every fourth name in an alphabetical listing of everyone within three miles) or case and control populations identified. The difficulty comes from the legal and financial stone wall of the *gag clause*.

In the course of this study I repeatedly encountered these clauses in leases between wind developers and landowners, in "good neighbor" contracts between wind developers and neighbors to leaseholders, and in court decisions following citizen challenges to wind turbine development. Gag clauses prohibit people who receive payments from wind companies, or who have lost legal challenges, from saying anything negative about the turbines or developer. The prohibition includes matters of health. In an epidemiologic study based on interviews or questionnaires these clauses could easily distort answers or skew participation, invalidating a random sample.

Some people informed me, as well, that they didn't want to talk about their problems because they hoped to sell their homes in order to flee the turbines next door. (No better way to kill a real estate deal than to leak the news that one's home is toxic.) There is also the matter of relationships and family ties within small communities, where folks are often reluctant to reveal a problem because, let's say, the turbines on your cousin's land happen to be the source of it.

In this manner has the wind industry both shattered many rural communities and thwarted research like mine.

Despite what I see as the virtues of my approach, this study has clear limitations. One being that it was conducted entirely by clinical interview, over the telephone. This had the benefit of allowing me to have an international group of subjects. On the other hand it limited the type of data I could collect. As a result my ability to say that *a certain symptom during exposure is due to turbines* is confined to medical conditions that are diagnosable by medical history—the medical history being *all the information a patient tells the doctor about his illness, his past health and experiences, and habits.*

Non-clinicians should realize that, in medicine, many conditions (ailments) are diagnosed mostly by *medical history*. This includes migraine and other headaches, tinnitus, and sleep disturbance. For, of course, the doctor cannot tell objectively (by any sort of clinical test) if a patient has headache, tinnitus, or sleep disturbance, and much of what the physician figures out about the causes of these symptoms will come from the other questions he (she) asks of the patient. This is the part I could credibly do by telephone.

My study subjects also told me about other kinds of problems that seemed to worsen during exposure—including asthma, pneumonia, pleurisy, stroke, and changes in coagulation or blood sugar. I did not include these problems in Wind Turbine Syndrome, since my method of study did not allow me to determine whether in fact the wind turbines played a role in these conditions during exposure. These conditions would require other kinds of study over and above the clinical interview and case series. (I have included them in a separate section of the *Results* because I think they may need attention from the medical research community.)

This study also does not tell us how many people are affected within a certain distance of wind turbines. But it does offer a framework for what to pursue in such a study (meaning, the next phase: epidemiologic studies), such as what symptoms to study and what aspects of the exposure to measure.

Shifting, now, to the format of the book. I have written it as a (long) scientific article, beginning with an *Abstract* or brief summary, followed by an *Introduction* to the problem and background information, a description of the *Methods* used (including study sample selection), a presentation of the *Results* (which is the data secured during the study and its analysis), and a *Discussion* of the results with interpretation of their meaning in the context of current medical knowledge.

References are footnoted in the text and listed together at the end. I added a *Glossary* of medical and technical terms to make the book more intelligible to non-medical readers, and a list of *Abbreviations*.

There are two sets of *Tables*. The regular *Tables* (numbered 1 A-C, 2, and 3) are compilations of data found in the *Results* section. What I call the *Family Tables* are the raw narrative data of each individual subject's symptoms and statements, organized one person per table with separate columns for *before*, *during*, and *after* exposure and separate lines for each organ or functional system (e.g., sleep, headache, cognition, balance/equilibrium, ears/hearing, etc.).

The *Family Tables* are presented together at the end of the clinical text. They are the backbone, the substance, of my report. I deeply appreciate my subjects' willingness to be included herein.

The book is intended for physicians and other professionals and individuals who wish to better understand the wind turbine-associated symptom complex. This posed a dilemma: writing in the specialized language of clinical medicine and science is very different from the language one uses for lay readers. Yet my goal is to reach both audiences. I solved the problem by adding (at my editor's insistence) a more conversational, parallel text, which I christened *WTS for Non-Clinicians.*

The result is a book with two, tandem texts. They both say the same thing. One says it in the language of the clinician (*WTS for Clinicians*), the other in the everyday language of—well—my editor (*WTS for Non-Clinicians*).

The goal of *WTS for Clinicians* is scientific precision, including frequent expressions of my degree of certainty or uncertainty. Since the physics and the physiology I invoke are complex and not widely known among clinicians, I explain them in this text. Here, likewise, I quote and summarize numerous scientific articles, and I use numbers and statistics (albeit the simplest type known).

WTS for Non-Clinicians says it all over again, this time in English my mother-in-law would understand. To accomplish this I had to sacrifice a degree of scientific precision, since *plain English* and *scientific precision* don't always mix. I freely acknowledge that *WTS for Non-Clinicians* might set some clinicians' teeth on edge. For this I beg their indulgence.

A second disclaimer. Readers should understand that Wind Turbine Syndrome is not the same as Vibroacoustic Disease.[8] 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, inner 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 (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, it appears that even low frequency noise or vibration too weak to hear can still stimulate the human vestibular system, opening the door for the symptoms I call Wind Turbine Syndrome. I am happy to report, there is now direct experimental evidence of such vestibular sensitivity in normal humans.[9]

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.[10] The suspected agent is high amplitude (high power or 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 that may be worthy of further clinical investigation, especially with regard to asthma and lower respiratory infections.

Moving on, I have been asked if Wind Turbine Syndrome could be caused by magnetic or electric fields. I have no reason to think so. There has been extensive epidemiologic research since 1979 on magnetic fields and health, comparing people who live close to high power lines or work in electrical utilities or work in other industries where magnetic field exposure is likely to be high, to those who do not.[11] This substantial body of research has produced no good evidence that magnetic field exposure causes cancer in

[8] Castelo Branco NAA , Alves-Pereira M. 2004. Vibroacoustic disease. Noise Health 6(23): 3-20.
[9] Todd NPMc, Rosengren SM, Colebatch JG. 2008. Tuning and sensitivity of the human vestibular system to low-frequency vibration. Neuroscience Letters 444: 36-41.
[10] Castelo Branco NAA , Alves-Pereira M. 2004. Vibroacoustic disease. Noise Health 6(23): 3-20.
[11] Ahlbom IC, Cardis E, Green A, Linet M, Savitz D, Swerdlow A; INCIRP (International Commission for Non-Ionizing Radiation Protection) Standing Committee on Epidemiology. 2001. Review of the epidemiologic literature on EMF and health. Environ Health Perspect 109 (Suppl 6): 911-33.

children or adults, cardiac or psychiatric disease, dementia, or multiple sclerosis.[12,13] After three decades of research, there is still no experimental evidence for a physiologic mechanism for any of the proposed effects of magnetic fields.[14]

This makes it very hard to do epidemiologic studies, since researchers don't know what exposure to measure, or what exposure period (e.g., last week or five years ago) might be relevant.[15] An association has been shown between higher magnetic field exposure in utility workers and amyotrophic lateral sclerosis (ALS), a neurodegenerative disease, but this is most likely due to more frequent electric shocks in these settings, not to the magnetic fields.[16] Claims that voltage and frequency irregularities in household alternating currents (what some refer to as "dirty electricity") create a wide, non-specific swath of medical problems – from ADHD to rashes to diabetes to cancer – are completely unsubstantiated, and also have no plausible biologic mechanisms.[17]

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."

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.

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[12] Ahlbom IC et al. 2001.
[13] Johansen C. 2004. Electromagnetic fields and health effects – epidemiologic studies of cancer, diseases of the central nervous system and arrhythmia-related heart disease. Scand J Work Environ Health 30 Suppl 1: 1-30.
[14] Ahlbom IC et al. 2001.
[15] Ahlbom IC et al. 2001.
[16] Johansen C. 2004.
[17] I have asked Prof. Magda Havas, Environmental and Resource Studies, Trent University, Ontario, Canada to remove references to Wind Turbine Syndrome from her PowerPoint presentation on hypothesized wind turbine health effects, because these references are inaccurate.

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, or if different lines of research point to the same conclusions.

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 Ralph Katz (epidemiology) and Henry Horn (ecology) 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 Katz and Horn, for which I am most grateful. Barbara Frey (biomedical librarian) edited the manuscript and provided many essential references.

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 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.[18] The expanded paper is posted on the Wind Turbine Syndrome website.[19]

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. Likewise, 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

[18] Kamperman GW, James RR, Simple guidelines for siting wind turbines to prevent health risks. Noise-Con, July 28-31, 2008, Institute of Noise Control Engineering/USA.
[19] See "How loud is too loud?" www.windturbinesyndrome.com.

"conflict of interest." Meaning, their judgment is unduly influenced by money. "It's difficult to get a man to understand something when his salary depends upon his not understanding it," wryly observed Upton Sinclair.[20]

I have no conflicts of interest. This research was unfunded, and neither my small village property, my town, nor the Adirondack Park bordering my town is a likely candidate for a wind farm. Is a fondness for bats and other interesting, highly evolved animals a conflict of interest? I wouldn't think so. Admittedly, I am distressed to hear about bats dying of internal hemorrhage as they fly near wind turbines,[21] just as I am distressed to hear that people are forced from their homes or endure cognitive impairment of uncertain reversibility in order to remain in the only home they can afford. I have spoken and written earnestly and vigorously about wind developers because of their stubborn refusal to acknowledge health problems amply documented in this and other studies.[22] Such stonewalling would test the patience of a saint—and I am no saint.

My hope is that this report will balance the risk-benefit picture of wind turbines more realistically, and help those individuals, such as George Kamperman and Rick James, who are actively promoting noise control criteria that will prevent the health and home abandonment problems documented here.

Kamperman and James have convinced me that a single, one-size-fits-all setback distance may not be both protective and fair in all environments with all types of turbines. Even so, it is clear from this study and others that minimum protective distances need to be:

a) greater than the 1-1.5 km. (3280-4900 ft. or 0.62-0.93 mi.) at which there were severely affected subjects in this study
b) greater than the 1.6 km. (5250 ft. or 1 mi.) at which there were affected subjects in Dr. Harry's UK study
c) and, in mountainous terrain, greater than the 2-3.5 km. (1.24-2.2 mi.) at which there were symptomatic subjects in Professor Robyn Phipps's New Zealand study.[23]

[20] Sinclair, Upton. 1935. *I, Candidate for Governor: And How I Got Licked*.
[21] Baerwald EF, D'Amours GH, Klug BJ, Barclay RM. 2008. Barotrauma is a significant cause of bat fatalities at wind turbines. Curr Biol 18(16): R695-6. Due to air pressure shifts near moving turbine blades, blood vessels in bats' lungs and abdomen are disrupted, which produces fatal internal hemorrhage.
[22] In anticipation of wind industry blowback, I imagine it may once again publicize that it thinks *I think* wind turbines cause mad cow disease. I do not and never did. My reply to this canard – now a family joke – was published several years ago (www.windturbinesyndrome.com/?p=84). My previous reports and papers on Wind Turbine Syndrome and the wind industry can be found on www.windturbinesyndrome.com.
[23] See *Introduction*, p. x, for discussion and references.

Two kilometers, or 1.24 miles, remains the baseline, shortest setback from residences (and hospitals, schools, nursing homes, etc.) that communities should consider. In mountainous terrain, 2 miles (3.2 km) is probably a better guideline. Setbacks may well need to be longer than these minima, as guided by the noise criteria developed by Kamperman and James.

The shorter setbacks currently in use in the USA and elsewhere—1000 to 1500 ft. (305-457 m.)—are a convenience and financial advantage for wind developers and participating landowners. They have no basis in research on safety and health, and they do not make clinical sense.

For those who read this report and recognize their own symptoms, the appropriate medical specialist to consult would be a neurotologist (or otoneurologist), who is an otolaryngologist (ears, nose, and throat doctor) who specializes in balance, the inner ear, and its neurological connections. When I sent this report out for critical review, these were the physicians who recognized a remarkably similar symptom complex from cases familiar to them—such as certain inner ear pathologies.

To those of you living near turbines and recognizing your own symptoms within these pages: you are not crazy and not fabricating them. Your symptoms are clinically valid—and unnecessary. While wind developers rush headlong into yet more projects, you unfortunates will have to exercise patience as the medical profession catches up with what is ailing you. Meanwhile, my advice is: speak out. In *The Tyranny of Noise*, Robert Alex Baron calls for an end to "our passive acceptance of industry's acoustic waste products."[24]

This will happen only when the suffering refuse to be silenced.

By the time I finished interviewing (February 2008) and moved on to data analysis, six of the ten families in this study had moved out of their homes because of turbine-associated symptoms. Three months later (May 2008), when the first draft was complete and I contacted the families for their approval and permission to publish the information about them, two more had moved out because of their turbine-associated symptoms—bringing the total to eight of the ten. The ninth family could not afford to move, but had done extensive renovations in an effort to keep the noise out. (Renovations, ironically, that made the house worse to live in, since they could no longer heat it properly.) As of this writing, family number ten is struggling to remain in their home.

[24] Baron, Robert Alex. 1970. *The Tyranny of Noise: The World's Most Prevalent Pollution, Who Causes It, How It's Hurting You, and How to Fight It*. St. Martin's Press, New York, p. 12.

Behold ten families whose lives have been turned upside down because of the wind industry's acoustic waste products.

Finally, ask yourself why a country doctor practicing in the poorest county in New York State did this study, and not the Centers for Disease Control or some other relevant government agency. It's a fair question and a troubling one. I ask it myself.

It is well known that wind developers target impoverished communities for their wind farms. This explains the "poorest county" part of my question, and likewise why wind turbines quickly became a looming issue in my life four years ago. But it leaves unanswered the part about, Why did I write this report, and not the government?

To answer that would of necessity catapult this report (and me) into the treacherous territory of public policy. One would like to think science is not beholden (craven?) to public policy, but that would be naïve, would it not? Moreover, while the scientist in me would like to imagine that I can write this report and remain above the hurly burly of public policy, I know this, too, is naïve. Wind Turbine Syndrome is an industrial plague. It is man-made and easily fixed. Proper setbacks are the best cure I know of; they do the job just fine. If I could scrawl this on a prescription pad and hand it to my subjects in this report, I would do so. No brilliant scientist needs to discover a new antibiotic or vaccine or sleeping pill to treat it.

Setbacks, however, are not considered matters of public health, but matters of public policy—what is called "politics." And right there is the rub. In the global rush to wind energy there is almost no voice heard for public health repercussions. Where it is heard—at town meetings, on the Internet, in Letters to the Editor, in courtrooms—it is routinely ridiculed. I speak from experience.

Wind energy is being promoted by every state and national government I know of, under intense pressure (lobbying) by wind development companies generally owned or otherwise capitalized by powerful investment banks which in turn take large tax write-offs and reap large government subsidies for their wind farm projects. These companies then turn around and sell carbon credits (green credits). Perhaps this helps explain why no provision is made for clinical caution?

And perhaps this goes some way toward explaining why a pediatrician in rural NYS and a general practitioner in Cornwall, England—along with a handful of rank-and-file physicians elsewhere in the UK and Australia and who knows where else—are the ones funding this research and writing these reports.

Then so be it.

Nina Pierpont, MD, PhD

Malone, NY

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