Presentation to the Hammond (NY) Wind Committee

BY

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My name is Nina Pierpont. I am a physician in Malone, NY, and author of a book called *Wind Turbine Syndrome: a Report on a Natural Experiment*, published in December 2009.

My M.D. is from the Johns Hopkins University. My PhD, in population biology, is from Princeton University. Population biology has extensive overlap with epidemiology. In fact, one of my doctoral committee members, Robert May, is a prominent theoretical epidemiologist, who subsequently became president of the Royal Society of London and scientific advisor to the Queen of England. He pronounced my *Wind Turbine Syndrome* study to be "impressive, interesting, and important."

A PhD in science is a research degree. I was specifically trained to do research on free-living, uncontrolled animal populations, including methods for structuring observations to turn the observations into quantitative and analyzable data. I used this research training in my study of wind turbine health effects, to structure and analyze the information I gathered from affected people….

Wind turbine syndrome. ...A syndrome, medically, is a consistent collection of signs and symptoms. This is what I observed in people exposed to large, 1.5 to 3 MW wind turbines constructed since 2004. The first purpose of my study was to document the consistency of symptoms or problems among affected people, and to show, by a simple, practical method, that these symptoms are due to wind turbines. ...The second purpose was to examine why, given the same exposure, some people are more affected than others.

...I chose families who had at least one severely affected adult family member, and who had done two things: first, they had gone away from their homes and the wind turbines and seen their symptoms go away, and had come back and seen the symptoms return, generally several times. In epidemiology this is called a "case-crossover" design. It's very useful in situations like this one when both the exposure and the disease are transitory.

Second, I chose families who had spent or lost a lot of money to get away from the turbines, by selling their homes for reduced amounts, renting or buying a second home, renovating their homes in an attempt to keep out the noise, or outright abandoning their homes. I know of active legal cases in at least three states and two provinces in which the homeowner, after home abandonment, is suing either the wind turbine company or a state regulatory agency for recompense. In epidemiology, this is called a "revealed preference measure." The people who are suffering show by their actions that their health problem is worth more than the many thousands of dollars they have lost in trying to escape the exposure, and thus distinguishes their experiences from what might be dismissed as subjective or fakery.

My study had 38 subjects, in 10 families located in the US, Canada, the United Kingdom, Ireland, and Italy. I have interviewed further families in the US and Canada and have a larger case-crossover study paper in preparation.

The symptoms caused by turbine exposure are as follows:

1. Sleep disturbance, with a special kind of awakening in a state of high alarm. This applies to both adults and children. Severe sleep deprivation.
2. Headaches. Exacerbations of migraines, brought on by either noise or by light flicker. This refers to the strobe-like effect in rooms when turbine blade shadows repetitively pass over a window. People without a history of migraine also got severe headaches from turbine exposure.
3. Pressure and pain in ears and eyes. Tinnitus or ringing in the ears. Distortions of hearing. Buzzing inside the head.
4. Dizziness, vertigo, unsteadiness, and nausea, essentially seasickness on land.
5. Sensations of internal pulsation or movement, in the chest or abdomen, associated with panic-like episodes, in people who had no previous episodes of panic. These episodes occurred while awake or asleep, awakening the affected people from sleep.
6. Problems with memory and concentration. Irritability and loss of energy and motivation. School and behavior problems in children. Increased aggression in both adults and children.

In the book, I document these symptoms for all study subjects, in 66 pages of structured, before-during-after accounts divided for each subject into organ systems or functions, such as sleep, headache, cognition, mood, balance and equilibrium, ears and hearing, eyes and vision, cardiovascular, gastrointestinal, respiratory, etc.—before-during-after for each category. It is critical that I interviewed people as much about their past medical history as about their current symptoms, to distinguish which symptoms were actually due to the exposure, and to identify the subjects' risk factors for experiencing certain symptoms.

I then examined the relationships between medical factors before exposure and the tendency of subjects to have certain symptoms during the exposure, using simple and straightforward statistics. This was one of the reasons that I collected information on all family members, not just the most affected, so that I would have some equally exposed but less affected people in the sample, who had been gathered according to a consistent rule (collect data on all family members without regard to symptoms present or absent).

I found strong and statistically significant relationships:

1. Between the panic-internal pulsation symptoms and pre-existing motion sensitivity,
2. Between severe headaches during exposure and pre-existing migraine disorder, and
3. Between tinnitus during exposure and previous inner ear damage from noise or chemotherapy.

Equally as significant, I found no statistical association between pre-existing mental health disorder and the tendency to get panic-like episodes during exposure.

From these results I hypothesize about physiologic mechanisms for the effects, using an extensive review of the literature on low-frequency noise effects and on the neurophysiology of the balance system. This part, on *how* the wind turbines may be exerting their effects, is hypothetical. It is a proposal that inner ear specialists find it very interesting, but it is still hypothetical.

What is not hypothetical is that the turbines cause the symptoms (case-crossover design) and that the degree of illness caused is of such magnitude that people spend or forfeit many thousands of dollars to avoid the exposure (revealed preference data)….

Carl V. Phillips, a Harvard-trained PhD in public policy and epidemiology, states..., "The reports that I have read that claim there is no evidence that there is a problem seem to be based on a very simplistic understanding of epidemiology and self-serving definitions of what does and what does not count as evidence." ...He points out that "the conclusions of the reports don't even match their own analyses. The reports themselves actually concede that there are problems, and then somehow manage to reach the conclusion that there is no evidence that there are problems."

...The adults in the 10 families in my study are all practical, regular people. There are three fishermen, two teachers, two nurses, a physician, a home health aide, a farmer, a professional gardener, a computer programmer, a milk truck driver, and a number of homemakers. There were several retired disabled people. People like this don't disrupt their lives and spend or forfeit thousands of dollars for imaginary illness. Again, the "revealed preference measure" shows us what is not purely subjective or fakery in the accounts of illness.

With regard to my mechanistic proposals, these have been taken up by the cochlear physiology laboratory at Washington University in St. Louis, MO. Professors Alec Salt and Timothy Hullar have just published a paper in the journal *Hearing Research* regarding physiologic mechanisms by which the low-frequency noise affects the inner ear, both the cochlea (hearing organ) and the vestibular (balance) organs. One possible mechanism is by low-frequency noise inducing endolymphatic hydrops, or increased pressure and distortion of membrane positions and tension within the inner ear (as in Meniere's disease). There are also differences in the functioning of inner and outer hair cells in the cochlea that may prevent us from hearing low-frequency noise that is indeed having a physiological effect on the ear. Dr. Salt had already found effects of low-frequency noise on the inner ear experimentally, and explicitly incorporates references to wind turbine low-frequency noise and to my research in his paper. This being an area of active research and new findings, one cannot rely on the out-of-date assumption that if people can't hear a sound, it cannot have any other effect on them—one of the premises wind industry consultants rely on to assert that the low frequency noise produced by wind turbines is at too low a level to have any physiological effects. This premise is out of date.