

Wind turbine sound and health effects

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PES: What do you see as the most significant conclusions arising from the work the panel conducted on this issue?

Robert McCunney: Before I was invited to participate in this project - and I think I was invited primarily as a result of my experience in occupational noise-induced hearing loss - I really had no fixed idea one way or another about whether there were any health implications. I was willing, like everybody, to take a fresh look at the literature. Usually in occupational or environmental medicine it is important to identify the exposure, what the agent of some concern is.

In this case, it seemed to me that the agent was either sound or vibration or both and my conclusions were very similar to what you see in the white paper. The first fundamental message is that we were unable to demonstrate that there was any evidence in the literature of potential adverse health effects, either directly measured or theoretically of concern.

The second finding is that the sound that may arise from the operation of wind turbines is really no different than the sound that comes from other environmental sources, whether it is construction, transportation, aviation and so forth. The reason I bring that up is that one of the concerns raised by people who feel there may be health effects is that the frequency distribution of sound from wind turbines is different, that there may be more low frequency sound and infrasound and those frequencies may have an adverse effect on human health as a result of vibration.

Frankly, we weren't able to find that. The bottom line is that some people may be annoyed by the sounds made by wind turbines.

PES: You have significant experience in occupational and environmental health. Have these sorts of issues been addressed by industries previously?

RM: The differing factor between the wind industry and other industries is the dramatic difference in the magnitude of the sound. In industry one can encounter sound levels from 80 to 90 decibels and higher. Sound generated by wind turbines is rarely above 50 and usually less than 40. The decibel reading is logarithmic in the sense that every 10-decibel increase is essentially a doubling of the intensity of the sound. As you go from 80 to 70, the sound is reduced in half and from 70 to 60 it's reduced another half. So you can imagine that as you get down to 40 and 50 decibels, the sound levels are so low with respect to risk of damage to hearing and any other effects, that it is hard to directly compare them to industrial sources.

PES: Much of the evidence that has been presented regarding health impacts of wind turbines is anecdotal. How important is scientific scrutiny of these claims and how important is it that the research be peer reviewed?

RM: I've been in the field of occupational and environmental medicine for 30 years and I think it's essential to look at peer-reviewed literature. I've published and I've served as a peer reviewer, and it's a process in the dissemination of scientific information that helps improve the quality

of the material. It is very difficult to get a sense of how valid unpublished literature is from the public domain.

Our approach was to look at peer-reviewed literature by: a) focusing on wind turbines and health effects and b) focusing on the exposures from wind turbines such as infrasound and low frequency sound.

We did make an effort to look at unpublished literature from the public domain. It's a lot easier to say that one's search through the literature has been exhaustive if one focuses on peer-reviewed literature because it is indexed in the National Library of Medicine database. That way we know we don't miss anything of importance. If we say we are going to look at the unpublished literature, how do you know you have been comprehensive? As a result, we cannot guarantee a comprehensive search of unpublished material.

PES: What do you say to critics who make an issue of the fact that this white paper was commissioned and paid for by the wind energy industry?

RM: The first thing is to acknowledge their criticisms. Yes, the project was funded by industry. Other than one contact person at AWEA, I went about my work independently. No one told me what to say or what conclusions to draw. People should critique the paper on its own merits. Every reference we reviewed and discussed is cited. People can review the references and draw different conclusions if they'd like.

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PES: What did the panel find in terms of the validity of Wind Turbine Syndrome, as postulated by Dr. Nina Pierpont?

RM: First, there is nothing unique about symptoms that have been described as reflective of so-called wind turbine syndrome. It seems to be panoply of symptoms associated with annoyance to noise.

Secondly, the work that has been published, upon which the conclusions of wind turbine syndrome have been drawn, is limited. In determining whether there is a causality connection between a) some exposure and b) some disease, there are certain studies that carry more weight than others.

Without getting into too much detail, what Dr. Pierpont did is what is called a case series. One problem with a case series is there is no control group.

Unless the study group can be compared to a control group it is almost impossible to discuss the significance of the results. Furthermore, a major limitation in the Pierpont work is that people were self-selected, meaning they came forward

thinking they had symptoms due to wind turbines. There's a concept in epidemiology called selection bias, meaning that people who think they are affected by a putative hazard, whatever that may be, come and participate in the study and that skews the results.

So not only do you have a case series without a control group, you also have selection bias. Case series have value in generating hypotheses to test in more elaborate studies but they do not provide firm conclusions about cause and effect links.

PES: Are there areas where further research is warranted? What should the next steps be?

RM: It is always wise to understand exposure data. Let's say, for example, that you and I ran a factory that made lead solder. Do we conduct a research study to see if the workers have an increased risk of cancer? Not necessarily.

What you do first is see whether the lead levels are high and compare the lead levels that you detect in your factory to other studies in which lead levels have been evaluated in terms of health effects. Usually in occupational and environmental settings like this, the first thing is to address the exposure. It makes sense to periodically measure what noise levels may be in the area to provide reassurance to people. But that doesn't mean a full-blown study where people fill out questionnaires, submit blood samples and undergo other diagnostic studies is warranted.

Until one can demonstrate that the sound and/or vibration exposures that can be attributed to wind turbines are sufficiently high to elicit concern, I would not recommend a study. That recommendation may change, however, if new information becomes available, and at that point, we may need to re-evaluate the prior recommendation. But at this point the consensus was that further research is not necessary. ■

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