

Wind turbine sound ‘needs research’

January 28, 2010



[original link <http://www.nhs.uk/news/2010/01January/Pages/Wind-turbine-sound-and-health.aspx>]

“The noise caused by wind farms can make some people ill”, reported *The Daily Telegraph*. [link: <http://www.telegraph.co.uk/earth/earthnews/7085086/Wind-farms-can-cause-noise-problems-finds-study.html>] It said experts have dismissed the idea of a "wind turbine syndrome" as a special cause of headaches, nausea and panic attacks, but have acknowledged that the irritation caused by the noise can affect certain individuals.

The story [in the Telegraph] is based on an industry commissioned review [the AWEA/CanWEA Review] of the current research on the possible health effects of wind turbine noise. It [the Review] found that the sound (including subaudible sound) is not unique, and does not pose a risk to human health. Although the sound may cause ‘annoyance’ for some people, this in itself is not an adverse health effect.

This research is unlikely to resolve the controversy over the potential health effects from wind turbines. This is mainly because the research on which the review was based is not sufficient to prove or disprove that there are health effects. The review itself also had some methodological shortcomings, and the reviewing group did not include an epidemiologist, usually a given for assessing potential environmental health hazards.

Further research on this issue is needed. Ideally this would involve comparing people exposed to wind turbine noise with well-matched control subjects who have not had that exposure. These studies should also carefully evaluate the psychological harms of noise exposure.

Where did the story come from?

The news report is centred around a review by a panel of independent experts looking into the issue of Wind Turbine Syndrome. Their review, called “Wind Turbine Sound and Health Effects”, was presented at a meeting of the Institute of Acoustics Wind

Turbine Noise in Cardiff on Wednesday January 27. The presentation was made by one of the experts on the panel, Dr Geoff Leventhall, a UK-based noise and vibration consultant.

Dr Leventhall carried out the review with Dr David Colby, an associate professor at the University of Western Ontario, and other independent experts in medicine, public health, audiology and acoustics. The panel aimed to “provide an authoritative reference document for legislators, regulators, and anyone who wants to make sense of the conflicting information about wind turbine sound”. The review was commissioned by the American Wind Energy Association and the Canadian Wind Energy Association.

What kind of research was this?

This was a non-systematic literature review of the available literature on the perceived health effects of wind turbines.

What did the research involve?

The panel of experts began their literature review by searching the scientific database PubMed for studies under the heading “Wind Turbines and Health Effects” and “vibroacoustic disease”. They provide an extensive reference list of peer-reviewed and non-peer-reviewed sources.

The researchers reviewed the studies that looked at infrasound (a low frequency sound wave that cannot usually be heard) sounds that can be heard, and the vibration produced by wind turbines. The researchers were looking for answers to the following questions:

- How do wind turbine operations affect human hearing?
- How do wind turbines produce sound, and how is it measured and tested?
- What type of exposure to wind turbines is more likely to be perceived by humans (low-frequency sound, infrasound or vibration)?
- What are the potential adverse effects and health implications of sound exposure?

The researchers say that infrasound is defined as acoustic oscillations with frequencies below audible sound levels (about 16 Hz). Low-frequency sound, they say, is typically considered as sound that can be heard in the 10 Hz to 200 Hz range, but it is not closely defined.

They also considered how to define 'annoyance', which is a subjective response to many types of sounds, which varies among people. They acknowledge that constant low frequency sounds can be a frustrating experience for people, but say it is not considered an adverse health effect or disease. They say that annoyance from airports, road traffic, etc. cannot be predicted easily with a sound level meter.

The researchers give an overview of the evidence on the effects of noise exposure in general. They also give detailed descriptions of the research they found on the effects of wind turbine noise. They say these case series, though important for raising suspicion of harm, cannot show causation. For this, repeated case-control studies or cohort studies are needed.

What were the basic results?

The researchers describe the effect of various sounds on 'annoyance'. They say that as sound gets louder, more people who hear it will become distressed until nearly everybody is affected. But this will occur to varying degrees. They say it is not clear why some people continue to be adversely affected by sound when it reverts to a low level. This occurs at all frequencies, although there seems to be more subjective variability at the lower frequencies.

The 'nocebo' effect is discussed, which is the opposite of the 'placebo' effect. This is where an adverse outcome, a worsening of mental or physical health is based on fear or belief in adverse effects.

The researchers also describe the studies they identified that looked at 'wind turbine syndrome', where symptoms are said to include sleep disturbance, headache, ringing in the ears, ear pressure, dizziness, nausea, visual blurring, fast heart beats, irritability, poor concentration, memory, panic attacks, internal pulsation, and quivering. They say that the syndrome has no physiological or pathological mechanism behind it, but is an example of the well-known stress effects of exposure to noise, as displayed by a small proportion of the population.

How did the researchers interpret the results?

The panel reached agreement on three key points:

- There is no evidence that the sounds emitted by wind turbines have any direct adverse physiological effects.
- The ground-borne vibrations from wind turbines are too weak to be detected by, or to affect, humans.

- The sounds emitted by wind turbines are not unique. There is no reason to believe, based on the levels and frequencies of the sounds and the panel's experience with sound exposures in occupational settings, that the sounds from wind turbines could plausibly have direct adverse health consequences.

They conclude that the collective symptoms in some people exposed to wind turbines are more likely to be associated with annoyance at the low sound levels from wind turbines, rather than directly caused by them.

Conclusion

This is a non-systematic review of literature. There are several points to be made about this research:

- There is no clear description of the methods the researchers used to search for available research, nor how they rated the quality of the research they found. Therefore, it is not possible to say that all relevant research was identified, or comment on the reliability of the research that was included.
- This review panel was commissioned by an industry group, and included a variety of academic perspectives, but not an epidemiologist. Someone with this specific skill set should be included when environmental health hazards are assessed.
- The link between psychological distress and physical symptoms has not been explored by this report. The acknowledgment that some people exposed to wind turbine noise suffer annoyance suggests that monitoring and maximum permitted levels need to be considered carefully in areas where turbines are planned.

Overall, this review will probably not resolve this controversy as there was a lack of high-level evidence on which to base any solid conclusions. What is now needed are studies that compare people exposed to turbine noise with well-matched control subjects who have not had that exposure. These studies should also carefully evaluate the psychological harms of noise exposure.