

Wind turbines: will Makara and Ohariu provide evidence of risks to human health?

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There is evidence that wind turbines can damage human health, though this is denied by the wind turbine industry which pushes the message that wind farms are not only environmentally friendly but also safe. Everyone however wants more research, which raises the possibility that Wellington residents living near the new Makara and Ohariu wind farms could unwillingly become an experimental population.

Relevant and documented research about the health risks has been carried out in Portugal. I have been unable to discover any papers that dispute any of this evidence. But there is agreement that more research is required to determine the parameters of the relationships between the size of the wind turbines, their numbers, their distance from residences, and the speed of development of medical symptoms in people living nearby.

Because this research has not yet been carried out, Wellington residents living near the new wind farms - the West Wind project at Makara will be completed this year, and the Mill Creek project in the nearby Ohariu Valley has been given resource consent - could find themselves providing the data.

Makara residents are already concerned about issues relating to noise emissions from the wind turbines and monitoring of the noise - as was reported, in surprising detail, to the Wellington City Council in March by the West Wind Community Liaison Group. (Report 2 and appendix.)

There's no doubt that using the wind is an environmentally sensible way to generate electricity. But the evidence of health risks is now specific, beginning with identification of what has become known as Vibroacoustic Disease.

In September 1987 an unusual autopsy was carried out in Portugal. The autopsy was unusual for three reasons.

Firstly, it was undertaken at the wish of the dead man, Filipe Pedro. He had been an aircraft technician at OGMA, an aircraft manufacturing, repair and rework facility owned and operated by the Portuguese Air Force, and had been diagnosed In 1981 with late-onset epilepsy. His will specified that an autopsy should occur.

Secondly, the autopsy was undertaken by a qualified person. Dr. Nuno A. A. Castelo Branco, who, in addition to his Medical Degree was qualified as a Medical Specialist in Surgical Pathology (1978) by the Civilian Hospitals of Lisbon. He also held a Degree of Aerospace Pathology Specialist from the Armed Forces Institute of Pathology in

Washington, D.C. and a Degree in Aerospace Medicine from Brooks Air Force Base in San Antonio, Texas. At the time of the autopsy, he was Medical Director of OGMA and served on the Scientific Board of the Center for Human Performance, Alverca, Portugal. He had retired from the Portuguese Air Force with the rank of Colonel.

Thirdly, the autopsy produced unexpected results. The cause of death (at age 58) was found to be cardiac tamponade caused by a small infarct. The heart disclosed 11 small scars of previous silent ischemic events. Cardiac valves seemed swollen and the pericardium surrounding the heart was greatly thickened. Coronary arteries were thickened, but not by the usual, and expected, atherosclerotic plaques. Instead, a continuous thickening of the intima lined all vessel walls. Microscopic studies later revealed that much of the thickening was due to abnormal proliferation of collagen fibers. Two tumors were found, a Grawitz in the kidney, and a grade 1 microcystic astrocytoma in the right parietal region of the brain. (Ref: *Noise and Health* 2004, 6;23, 3-20.)

Following the unexpected autopsy findings, there's been further research. Some of the milestones:

1. In 1999 the name "Vibroacoustic Disease" (VAD) was adopted for the disease which the autopsy discovered. The journal *Aviation, Space & Environmental Medicine* dedicated a supplemental issue to this new pathological entity.
2. The researchers working on VAD became known as the VAD Team.
3. Much research focused on the aircraft technicians at OGMA and it was determined that the fundamental agent of disease to which they were exposed was infra-sound and low-frequency noise (ILFN).
4. The VAD Team found that the ILFN frequencies (from below the threshold of human hearing to around 500 Hz) were generated by many sources. The most suitable measurement involves determining the distribution of acoustic energy throughout the 1/3rd octave bands (paper presented at the *Twelfth International Congress on Sound and Vibration*, Lisbon, July 2005, authored by Mariana Alves-Pereira and others).
5. The VAD Team found that individuals responded differently to the same levels of acoustic energy, and also postulated that within individuals, different body organs will respond differently.
6. The VAD Team found three clinical stages of VAD for 140 OGMA aircraft technicians working the standard eight hours a day, five days a week, with symptoms categorised as:

Stage I - Mild slight mood swings, indigestion & heartburn,
(1-4 years), mouth/throat infections, bronchitis.

Stage II - Moderate chest pain, definite mood swings, back pain, fatigue (4 - 10 years),
fungal, viral and parasitic skin infections, inflammation of stomach lining, pain and blood

in urine, conjunctivitis, allergies.

Stage III - Severe psychiatric disturbances, haemorrhages of nasal, digestive and conjunctival mucosa, varicose veins and haemorrhoids, duodenal ulcers, spastic colitis, decrease in visual acuity, headaches, severe joint pain, intense muscular pain, neurological disturbances.

The above table was published in *Progress in Biophysics and Molecular Biology*, 93 (1), p. 256 - 279, January 2007 under the title “Biological effects of infra sound and low-frequency noise explained by mechanotransduction,” Alves-Pereira M. / Castelo Branco, N. A. A.

7. In August 2004 at the *33rd International Congress and Exposition on Noise Control Engineering* in Prague, a case was reported as follows: “Although VAD was initially diagnosed in LFN-exposed workers, a growing number of individuals are being diagnosed with VAD due to environmental LFN exposure. The issue of LFN-induced pathology can no longer remain restricted to the domain of Occupational Health, but must be included in Public Health concerns.

“VAD has been diagnosed in a family whose home is exposed to environmental LFN. These are not the first documented cases of environmentally-induced VAD. The results presented herein bring the issue of LFN-induced pathology into the realm of Public Health concerns.” - ref: “*Vibroacoustic Disease in a Ten Year Old Male*”, authored by N. A. A. Castelo Branco and others.

8. At OGMA from 1980 to 1989, 21 aircraft technicians received “compulsory early disability retirement”. In 1989, based on the 1987 autopsy, OGMA instituted a screening and monitoring protocol for all LFN-exposed personnel. “If and when LFN-exposed workers developed very thickened cardiac structures, and/or shifts in the P3 endogenous component to frontal positions, and/or difficult to control and unstable (labile) blood pressure, then they were removed from the LFN-rich work environment and placed at another, non-LFN-rich workstation. From 1989-1996 there were zero compulsory early disability retirements among LFN-exposed personnel.” (Castelo Branco et al., 1996).

9. In September 2007, at the *Second International Meeting on Wind Turbine Noise* at Lyon in France, a paper was presented titled “In-Home Wind Turbine Noise is Conducive to Wind Turbine Syndrome”, authored by Mariana Alves-Pereira, of ERISA-Lusofona University, Lisbon, Portugal, and Nuno A. A. Castelo Branco of the Center for Human Performance, Alverca, Portugal. This paper compared the development of VAD in a home affected by industrial environmental LFN with another home affected by LFN from wind turbines which had been erected in the vicinity. The Abstract to the paper states:

“ILFN levels contaminating the home of Case 2 (the wind turbine case) are sufficient to cause VAD. The family (occupying the house) has already received standard diagnostic tests to monitor clinical evolution of VAD. Safe distances between wind turbines and residences have not yet been scientifically established despite statements by other authors claiming to possess this knowledge. Acceptance, as fact, of statements or assertions not

supported by valid scientific data, defeats all principles on which true scientific endeavour is founded. Widespread statements claiming no harm is caused by in-home ILFN produced by wind turbine rotating blades are fallacies that cannot, in good conscience, continue to be perpetuated. In-home ILFN generated by wind turbine blades can lead to severe health problems, specifically, VAD.

“Real and efficient zoning for wind turbines must be scientifically determined, and quickly adopted, in order to completely and responsibly protect Public Health.”

10. The August 2008 document “*Response of the VAD Team to reports submitted regarding possible health effects of a wind farm in Wellington New Zealand (Project Mill Creek)*” at paragraph 13 states: “None of the environmental cases studied by the VAD Team (all pro bono) have been procured by members of this team, nor are they part of any environmental study. Instead, individual citizens have gathered evidence regarding ILFN on their own and, subsequently, end up contacting members of the VAD Team. With the family who lives near four wind turbines in Portugal, medical follow-up is ongoing, though a court injunction has terminated the operation of one of the four wind turbines since June 2008.”

To summarise:

- o VAD is a cumulative disease - the greater the exposure to ILFN, in terms of both acoustic energy and time, or both, the faster the development of VAD;
- o In a residential environment, the exposure can be larger than in a working environment of eight hours a day, five days a week;
- o Provided the onset of VAD is identified early at Stage I, (see paragraph 6 above) the separation of the individual from the ILFN environment will avoid further progress of VAD and probably result in a return to health;
- o The absence of trained medical staff in using echocardiograms to identify thickening of the pericardium, and associated tissue may be a difficulty with diagnoses in New Zealand;
- o The message for those living at Makara, the Ohariu Valley and anywhere near Long Gully (west of Brooklyn, where a third wind farm is proposed) is very clear. Anyone living within 3 kilometers of one or more wind turbines should monitor themselves and anyone else in the same residence. If any early signs of VAD occur, immediate medical advice should be sought. Don't forget to check pets and household animals.

Postscript.

Dr. Nina Pierpont, M.D., Ph.D., ” a country doctor who enjoys medicine immensely,” has been studying the effects of US wind turbines on people living close to them. She has published a book on “Wind turbine syndrome”, which is available from her website, where you can also read peer reviews of her research.

In 2006 Dr Pierpont gave evidence to the New York State Legislature on wind turbine syndrome.

Nick Jennings is a past president of the Federated Mountain Clubs of New Zealand and of the Newtown Residents Association. He gave evidence on these research findings at the resource consent hearing for the Mill Creek wind farm.