

Nina Pierpont, MD, PhD, *Wind Turbine Syndrome: A Report on a Natural Experiment* (K-Selected Books, forthcoming)

# Wind Turbine Syndrome: A Report on a Natural Experiment

(Santa Fe, NM: K-Selected Books, forthcoming)

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## ABSTRACT (9-5-08 draft)

This report documents a consistent, often debilitating, complex of symptoms experienced by adults and children while living near large (1.5-3 MW) industrial wind turbines, examines patterns of individual susceptibility, and proposes pathophysiologic mechanisms. Symptoms include sleep disturbance, headache, tinnitus, ear pressure, dizziness, vertigo, nausea, visual blurring, tachycardia, irritability, problems with concentration and memory, and panic episodes associated with sensations of internal pulsation or quivering which arise while awake or asleep.

The study is a case series of 10 affected families, with 38 members age 0-75, living 305 m to 1.5 km (1000 to 4900 ft) from wind turbines erected since 2004. All competent and available adults and older teens completed a detailed clinical interview about their own and their children's symptoms, sensations, and medical conditions before turbines were erected near their homes, while living near operating turbines, and after leaving their homes or spending a prolonged period away.

Statistically significant risk factors for symptoms during exposure include pre-existing migraine disorder, motion sensitivity, or inner ear damage (pre-existing tinnitus, hearing loss, or industrial noise exposure). Symptoms are not statistically associated with pre-existing anxiety or other mental health disorders. The symptom complex resembles syndromes caused by vestibular dysfunction. People without known risk factors are also affected.

The proposed pathophysiology posits disturbance to balance and position sense due to low frequency noise or vibration stimulating receptors for the balance system (vestibular, somatosensory, or visceral sensory, as well as visual stimulation from moving shadows) in a discordant fashion. Vestibular neural signals are known to affect a variety of brain areas and functions, including memory, spatial processing, complex problem-solving, fear, autonomic effects, and aversive learning, providing a robust neural framework for the symptom associations in Wind Turbine Syndrome. Further research is needed to establish prevalence and to explore effects in special populations, including children. Current survey and noise studies suggest that safe setbacks will be measured in miles, not feet, and will be longer for larger turbines and in more varied topography.