

Submission to Falmouth Board of Health

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Dear Sir/Madam,

I am advised that your Board is considering ordering the closure of wind turbines in your district. I have provided information below which I trust you will find highly relevant to your deliberations.

Contents of submission

1. My expertise [page 2]
2. Name a disease or symptom... [page 3]
3. 17 reviews of the evidence now available [page 3]
4. Nina Pierpont and “wind turbine syndrome” [page 4]
5. “Vibroacoustic disease” [page 5]
6. The Bulletin of Science, Technology and Society [page 6]
7. Appendix 1: [page 9]
8. Appendix 2: [page 20]
9. Appendix 3. [Boss, 1999 separate file]

My expertise

I am a professor of public health at the University of Sydney’s School of Public Health. My primary discipline is sociology and I am an elected Fellow of the Academy of Social Sciences in Australia. My full curriculum vitae is here <http://tobacco.health.usyd.edu.au/assets/pdfs/publications/CV.pdf>. My work has been cited over 6100 times (see <http://scholar.google.com.au/citations?user=PDE8U4UAAAAJ&hl=en>) and I have received many national and international awards for my research.

I have long had a scholarly interest in risk communication. In particular, I am interested in significant, high-risk health problems which are under-rated by the public (eg: smoking), and in low-risk putative health problems which are over-rated by some members of the public causing them to worry, panic and sometimes express symptoms. It is my view, for reasons set out below, that concerns about the health effects of wind turbines fall into the latter category.

The research literature on this area is sometimes referred to as “modern health worries” [see: <http://www.ncbi.nlm.nih.gov/pubmed/11448708>] and examines in particular how sections of the community fear new technologies, sometimes to the point of making themselves “ill” with worry. I have a co-authored paper on the psychogenic and sociogenic aspects of “wind turbine syndrome” under peer review with an international journal and believe that many of the characteristics of epidemic mass hysteria described in an earlier review [Boss, 1999 attached] are likely to apply to the phenomenon of reported ill-effects from exposure to wind turbines.

Name a disease or symptom

Appendix 2 shows a list of 105 symptoms and diseases said to afflict humans, animals and even earthworms exposed to wind turbines. This list has been building steadily, and I would not be surprised to see virtually any disease appear on future updates. These claims have been made on websites published by community groups who are overtly anti-wind farms. It is important to understand that in the serious peer-reviewed scientific literature, there are no research papers corroborating any of these claims. The diffuse and sometimes bizarre nature of many of these claims, considered alongside the absence of any reputable research confirming such relationships in the peer reviewed literature, suggests that this is a phenomenon which is a prime candidate for being considered a contemporary example of psychogenic illness. I know of no agent that even causes even a small fraction of all the symptoms and diseases said to be caused by wind turbines in these websites.

17 reviews of the evidence now available

There are now 17 published reviews of the available evidence about whether exposure to wind turbines causes health problems and about whether infrasound can harm human health. Appendix 1 lists all those reviews, and provides extracts from each of those reports on the various broad claims that have been made about wind turbines and health. As will be seen, all of these reviews make strong statements that the evidence is very poor that wind turbines in themselves cause problems. What many of these reviews conclude is that :

- A small minority of exposed people claim to be adversely affected by wind turbines
- Pre-existing negative attitudes to wind turbines are more predictive of adverse health effects and annoyance than are objective measures of actual exposure
- Being able to see wind turbines is similarly predictive of annoyance
- Deriving income from hosting wind turbines on one's land may have a "protective effect" against annoyance and health symptoms [here, note that claims made by anti-wind farm groups that turbine hosts sign "gag" clauses which prevent them from complaining are simply false. I have seen several contracts from different firms and none say anything about "gags". Also, no contract would ever preclude a citizen from seeking to pursue a claim of negligence in common law. Such claims are either profoundly naïve or mendacious.

My conclusions Beliefs that wind turbines somehow do cause genuine health problems, and that objections raised by citizens should therefore be taken at face value are highly questionable. Social policy should never be based on mere claims about alleged dangers because of the possibility that such claims are

baseless and reflect extraneous agenda such as people simply not “liking” a development.

I would submit that the sheer weight of evidence as adjudicated now in 17 separate reviews (see Appendix 1) underlines that claims that wind turbines can adversely affect health are not evidence-based.

I now provide some background information on three “authorities” on wind turbines and health and one set of “research papers” often cited by anti-wind interest groups.

Nina Pierpont and Wind turbine syndrome

The term “wind turbine syndrome” was coined by a US general practitioner, Nina Pierpont. The term does not appear even once in the US National Library of Medicine’s massive PubMed database (<http://www.ncbi.nlm.nih.gov/pubmed/>), a fully searchable list of millions of published papers in the health and medical research fields.

Pierpont has become the global medical “guru” for a small movement virulently opposed to wind farms. She calls wind turbines “an industrial plague”. Plagues throughout history have killed millions, while exposure to wind turbines have so far killed no-one and seem likely instead to contribute to saving hundreds of millions of lives over future decades through their contribution to reducing greenhouse gases. Pierpont’s language gives us an immediate sense of her objectivity.

Her reputation as an authority on “wind turbine syndrome” is a 2009 [vanity press book](#) containing descriptions of the health problems of just 10 families (38 people, 21 adults) in five different countries who once lived near wind turbines and who are convinced the turbines made them ill. With approximately 130,000 turbines worldwide and uncounted 1,000s living around them, her sample borders on homeopathic strength representativeness.

So what are some of the problems with her research that any independent reviewer would raise? First, she says nothing about how the 10 families she interviewed were selected. She says “I chose a cluster of the most severely affected and most articulate subjects I could find”. Why choose “articulate” subjects and not randomly selected residents living near wind farms? More fundamentally, why did she not make any attempt to investigate controls (people living near turbines who do not report any illness or symptoms they attribute to turbines)?

Amazingly, she interviewed them all by phone, did not medically examine any of her subjects nor access their medical records. So her entire “study” is based on her aggravated informants’ accounts. Even here, she does not describe who among the 10 families she interviewed, nor consider for a moment questions of accuracy about others giving “proxy” reports about others in their family. This is

beyond sloppy.

Pierpont provides pages of information on her informants' claims about their health while living near turbines. She also provides summaries of the prevalence of various health problems in these families prior to the arrival of the turbines. These are revealing. A third of the adults had current or past mental illness and a quarter had pre-existing migraine and/or permanent hearing impairment. These rates are much higher than those in the general population. In other words, her subjects were a group who are unrepresentative of the general population.

“Vibro-acoustic disease”

Another “disease” known as “vibro-acoustic disease” said to be linked to exposure to wind farms has been promoted by a research group at Portugal’s Lusophona University (ranked academically at 5279 of 9805 universities throughout the world <http://academyrank.com/academy.php?name=Lusophone%20University%20of%20Humanities%20and%20Technologies>). One member of that team, Mariana Alves-Pereira, gave a live [video presentation](#) at a NHMRC forum on windturbines and health.

However, vibroacoustic disease is not a disease recognized in the [International Classification of Diseases](#), the international standard for classifying diseases. The UK’s [Health Protection Agency](#) reviewed the evidence on infrasound and concluded: “While those working in very high levels of audible noise may suffer some adverse consequences ... there is no evidence that infrasound at levels normally encountered in the environment will lead to the development of vibroacoustic disease. Further this disease itself has not gained clinical recognition... The available data do not suggest that exposure to infrasound below the hearing threshold levels is capable of causing adverse effects.”

Indeed, as I explain below, it looks like the main people who recognize vibroacoustic disease are Alves-Pereira’s Lisbon group who promote the concept through their own research. Alves-Pereira’s presentation to the NHMRC forum can be [viewed here](#), commencing at 1hr15m44s. She spent much of her time talking about a case study of one family in a house adjacent to a wind farm. Slide #100 shows an arrow pointing to the house concerned. As can be seen, there are many other houses in the area downwind of the turbines, but strangely, her research group apparently conducted no investigations of the residents in any of these. A young boy in the house was having problems of losing interest at school – an extremely common problem — and Alves-Pereira’s claim was that exposure to wind turbines was a plausible explanation. No other possible explanation was even considered.

To further press home her case, she talked of problems in “boxy” or “club” foot found in four of the householder’s thoroughbred horses kept at the property (slide #105). This problem too, she suggested might be connected with exposure to wind turbines. She carefully explained that of five young horses examined, four had boxy foot. The one that did not was acquired, not bred on the farm, and

one other acquired horse also had boxy foot. From that, the audience were presumably supposed to understand that hard evidence was thus available for wind farms causing equine feet deformities. This sort of causal attribution is frankly embarrassingly amateur and scientifically primitive. Boxy foot is a common problem in horses.

Curious to learn more about Alves-Pereira's research that the NHMRC had agreed to video in, I looked her work up on the [Web of Science](#), Thomson-Reuters' scientific citation website which indexes thousands of research journals and shows how many other researchers cite each paper. Just eight papers of hers appeared, and of these, five had never been cited. The three which had, had been cited 36 times. Of these, 29 (81%) were self-citations by her or her fellow authors.

Bulletin of Science, Technology and Society

You will doubtless receive submissions that cite a series of papers published in this allegedly "peer reviewed" journal. In August 2011, the [Bulletin of Science, Technology & Society](#) published an issue dedicated entirely to wind farms. The issue contained nine papers, and an [introduction](#) by the issue's editor. The Bulletin is a journal which has appeared erratically over the past few years. The journal was indexed between 1981-1995 by the [Web of Science](#), the international scientific indexing platform which "covers over 10,000 of the highest impact journals worldwide, including Open Access journals and over 110,000 conference proceedings." But after 1995 it was dropped from the list of journals being indexed, generally a sign that indexing services regard a journal as having fallen below an acceptable scientific standard. In the 14 years it was indexed, a citation search conducted on 10 October 2011 showed that it published 961 papers, with a total of just 345 [citations](#) - an average of 0.36 per paper - a derisory level of academic interest. As of today, Web of Science shows it has published only seven papers which have been cited 7 or more times, with the most cited paper in its history having been cited just 26 times. [PubMed](#), the indexing service of the US National Library of Medicine also does not index the journal.

Nonetheless, anti-windfarm websites described the journal as a "[leading scientific peer reviewed journal](#)" and the issue as "groundbreaking". In summary, this is a journal which cannot be described as low ranking in scientific research publishing. It is more accurately described as "unranking". It would be highly unlikely to attract papers from serious researchers.

However, if you Google '[Bulletin of Science, Technology & Society](#)' + wind + peer reviewed" you will find hundreds of links noting the "peer-reviewed" status of the papers. The 8 papers in the special issue were written by 12 authors. Of these, 7 had given papers at a [meeting](#) held in a Canadian country town motel in October 2010 titled "First International Symposium: The Global Wind Industry

and Adverse Health Effects: Loss of Social Justice?” The conference was an overtly anti-wind farm meeting.

In an attempt to understand the process of peer review that had been followed, in August 2011, I wrote to the editor the Bulletin’s issue on windfarms, asking the following questions:

1. Were you approached by those participating in that meeting to publish these papers? Or did the initiative come from you?
2. Did you personally edit this issue or were guest editors used? If so, can you please describe how they were selected?
3. Was there a charge made to the authors to publish their papers together like this?
4. It is plain that all the papers are openly negative about windfarms, which is curious given that there is a large body of research that demonstrates a very different picture. Did you put out a call for submissions or approach researchers working in this area to submit manuscripts?
5. Did you approach any authors who did not have affiliations with the anti-windfarm movement?
6. Were all the papers peer reviewed?
7. Did the authors propose their own reviewers and were these the reviewers used?
8. Can signed or deidentified copies of these reviews be made available to others on request?

Over several emails, the editor made the following comments:

“A third party mediated between the organizers of the symposium and myself. We are dealing with a very difficult situation in which there is no balanced approach to begin with. Deep pockets have controlled the research agenda and professional people with impeccable credentials did what they did in this case out of there (sic) own pocket.. As far as refereeing is concerned, never has any issue been so over refereed by people with impeccable credentials in anticipation of the kinds of concerns you voice.

I can assure you that this Bulletin is not a front for any special interest group and that I would not have dreamt of publishing this issue had it not been for the questionable conduct of the wind farm industry and government officials. The issue attempts to create a little bit of balance, and show that there are legitimate other voices coming from people with impeccable credentials who are not funded because of their views.”

This last statement that some researchers “are not funded because of their views” plays to crude populist notions of research grants being withheld from investigators who challenge accepted scientific consensus, rather than applicants being rejected because of poor research proposals. Such a statement could only be made by someone with very limited understanding of the importance which is traditionally placed on innovation and scientific scepticism in the advance of scientific understanding. Serious research applications submitted by competent

researchers judged as being capable of conducting the research described are competitive and frequently funded.

An indication of the abject quality of the papers in the wind issue of the Bulletin is as follows:

Krogh CME. Industrial wind turbine development and loss of social justice. *Bulletin of Science, Technology and Society* 2011;31(4):321-333.

This paper contains no “methods” section at all, so it fails to conform to the most basic requirement of scientific reporting: that it contain details of how the research reported was undertaken. This is a fundamental requirement because without it, readers have no way of assessing the adequacy and rigor of any investigation, and whether any results report and conclusions drawn are justified or not. Instead, the author – a retired pharmacist who PubMed shows has published one paper (in 1985) – says that she “began investigating reports of adverse health effects made by individuals living in the environs” of wind turbines in Ontario, Canada for “more than two years”. She calls this “research”.

Instead of describing any research, the author has written a paper which mixes up statements somehow apparently made to her by anonymous informants about negative effects of exposure to turbines with similar examples from other parts of the world, from websites and submission to enquiries. We are told nothing about the process by which her informants were interviewed, how they were selected and whether her “study” was approved by any institutional research ethics committee. This is not a paper that would be make first base as an example of serious scientific investigation about windfarms and health. Its findings contain not a single example of any informant reporting anything but adverse effects of exposure to windfarms, when it is widely acknowledged that a large majority of those so exposed report no adverse effects nor complain about turbines.

Another paper in the collection, by Alec Salt, has particularly excited wind farm opponents. It argues that that long term exposure to inaudible levels of infrasound may have health effects, because of tentative indications that, in guinea pigs, the outer hair cells in the ear may be stimulated by inaudible infrasound. This ignores that fact that every person, every day, is exposed to infrasound emanating from a wide variety of sources including one’s own heartbeat and respiration. People living near a beach (wave sounds), on rural properties nowhere near wind turbines (wind in air and in trees etc) and in the urban areas (traffic, conversation) are exposed to infrasound, often on a prolonged basis.

Appendix 1:

Summary of main conclusions reached in 17 reviews of the research literature on wind farms and health.

Compiled by Prof Simon Chapman, School of Public Health and Teresa Simonetti, Sydney University Medical School

7 March 2012

- 2012: Massachusetts Department of Environmental Protection.
Independent Expert Science Panel Releases Report on Potential Health Effects of Wind Turbines
<http://www.mass.gov/dep/public/press/0112wind.htm>
- 2012: Oregon Wind Energy Health Impact Assessment.
[http://public.health.oregon.gov/HealthyEnvironments/TrackingAssessment/HealthImpactAssessment/Documents/Oregon Wind Energy HIA Public comment.pdf](http://public.health.oregon.gov/HealthyEnvironments/TrackingAssessment/HealthImpactAssessment/Documents/Oregon%20Wind%20Energy%20HIA%20Public%20comment.pdf)
- Fiumicelli D. Windfarm noise dose-response: a literature review. Acoustics Bulletin 2011; Nov/Dec:26-34 [copies available from S Chapman
- 2011: Bolin K et al. Infrasound and low frequency noise from wind turbines: exposure and health effects. Environmental Res Let 2011;
<http://iopscience.iop.org/1748-9326/6/3/035103/>
- 2010: Knopper LD, Ollsen CA. Health effects and wind turbines: a review of the literature. Environmental Health 2010; 10:78
<http://www.ehjournal.net/content/10/1/78>

- 2010: UK Health Protection Agency Report on the health effects of infrasound
http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1265028759369
- 2010: NHMRC Rapid Review of the evidence
http://www.nhmrc.gov.au/files_nhmrc/publications/attachments/new0048_evidence_review_wind_turbines_and_health.pdf
- 2010: Chief Medical Officer of Health in Ontario
http://www.health.gov.on.ca/en/public/publications/ministry_reports/wind_turbine/wind_turbine.pdf
- 2010: UK Health Protection Agency. Environmental noise and health in the UK. A report by the Ad Hoc Expert Group on Noise and Health. (this report is about all environmental noise)
http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1279888026747
- 2009: Minnesota Department of Health. Environmental Health Division. Public Health Impacts of Wind Turbines.
<http://www.health.state.mn.us/divs/eh/hazardous/topics/windturbines.pdf>
- 2009: Canadian Wind Energy Association. *Addressing Concerns with Wind Turbines and Human Health*. CanWEA, Ottawa.
[http://www.canwea.ca/pdf/CanWEA - Addressing concerns with wind turbines and human health.pdf](http://www.canwea.ca/pdf/CanWEA_-_Addressing_concerns_with_wind_turbines_and_human_health.pdf)
- 2009: Colby et al. Wind Turbine Sound and Health Effects: An Expert Panel Review.
http://199.88.77.35/EFiles/docs/CD/PlanCom/10_0426_IT_100416160206.pdf
- 2008: Chatham-Kent Public Health Unit
<http://www.harvestingwindsupport.com/blog/wp-content/uploads/2011/03/Chatham-KentHealth-and-Wind-.pdf>
- 2007: National Research Council (USA): Impact of wind energy development on humans (Chapter 4: pp97-120) of: Environmental Impacts of Wind-Energy Projects.
http://www.vawind.org/assets/nrc/nrc_wind_report_050307.pdf
- 2005: Jakobsen J. Infrasound emission from wind turbines. *Jf Low Frequency Noise, Vibration and Active Control* 2005; 24(3):145-155
- 2004: Leventhall G. Low frequency noise and annoyance. *Noise & Health* 2004; 6(23):59-72 <http://tinyurl.com/4yc3oht>
- 2003: Eja Pedersen's Review for the Swedish EPA
<http://www.naturvardsverket.se/Documents/publikationer/620-5308-6.pdf>

Reviews of the evidence - extracted highlights

Direct health effects from noise and WTS

- “There are no direct pathological effects from wind farms and that any potential impact on humans can be minimised by following existing planning guidelines.” *Source: NHMRC 2010*

http://www.nhmrc.gov.au/files_nhmrc/publications/attachments/new0048_evidence_review_wind_turbines_and_health.pdf

- “There is no evidence that the audible or sub-audible sounds emitted by wind turbines have any direct adverse physiological effects.” *Source: Colby 2009 review*
http://199.88.77.35/EFiles/docs/CD/PlanCom/10_0426_IT_100416160206.pdf
- “... surveys of peer-reviewed scientific literature have consistently found no evidence linking wind turbines to human health concerns.” *Source: CanWEA*
<http://www.canwea.ca/pdf/CanWEA%20-%20Addressing%20concerns%20with%20wind%20turbines%20and%20human%20health.pdf>
- “There is insufficient evidence that the noise from wind turbines is directly... causing health problems or disease.” *Source: Massachusetts review*
http://www.mass.gov/dep/energy/wind/turbine_impact_study.pdf
- “There is no reason to believe, based on the levels and frequencies of the sounds and... sound exposures in occupational settings, that the sounds from wind turbines could plausibly have direct adverse health consequences.”
Source: Colby 2009 review
http://199.88.77.35/EFiles/docs/CD/PlanCom/10_0426_IT_100416160206.pdf
- “... while some people living near wind turbines report symptoms such as dizziness, headaches, and sleep disturbance, the scientific evidence available to date does not demonstrate a direct causal link between wind turbine noise and adverse health effects. The sound level from wind turbines at common residential setbacks is not sufficient to cause hearing impairment or other direct health effects...” *Source: Ontario CMOH Report*
http://www.health.gov.on.ca/en/public/publications/ministry_reports/wind_turbine/wind_turbine.pdf
- “... the audible noise created by a wind turbine, constructed at the approved setback distance does not pose a health impact concern.” *Source: Chatham-Kent Public Health Unit*
<http://www.harvestingwindsupport.com/blog/wp-content/uploads/2011/03/Chatham-KentHealth-and-Wind-.pdf>
- There is no evidence for a set of health effects, from exposure to wind turbines that could be characterized as a “Wind Turbine Syndrome.” *Source: Massachusetts review*
http://www.mass.gov/dep/energy/wind/turbine_impact_study.pdf
- “... there is not an association between noise from wind turbines and measures of psychological distress or mental health problems.” *Source: Massachusetts review*
http://www.mass.gov/dep/energy/wind/turbine_impact_study.pdf

- “Evidence that environmental noise damages mental health is... inconclusive.” *Source: Ad Hoc Expert Group on Noise and Health*
http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1279888026747
- “...no association was found between road traffic noise and overall psychological distress...” *Source: Ad Hoc Expert Group on Noise and Health*
http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1279888026747
- “To date, no peer reviewed scientific journal articles demonstrate a causal link between people living in proximity to modern wind turbines, the noise (audible, low frequency noise, or infrasound) they emit and resulting physiological health effects.” *Source: Knopper&Ollson review*
<http://www.ehjournal.net/content/pdf/1476-069X-10-78.pdf>
- “... there is no scientific evidence that noise at levels created by wind turbines could cause health problems other than annoyance...” *Source: Eja Pedersen 2003 Review*
<http://www.naturvardsverket.se/Documents/publikationer/620-5308-6.pdf>
- “None of the... evidence reviewed suggests an association between noise from wind turbines and pain and stiffness, diabetes, high blood pressure, tinnitus, hearing impairment, cardiovascular disease, and headache/migraine.” *Source: Massachusetts review*
http://www.mass.gov/dep/energy/wind/turbine_impact_study.pdf
- “...there are no evidences that noise from wind turbines could cause cardiovascular and psycho-physiological effects.” *Source: Eja Pedersen 2003 Review*
<http://www.naturvardsverket.se/Documents/publikationer/620-5308-6.pdf>
- “...there was no evidence that environmental noise was related to raised blood pressure...” *Source: Ad Hoc Expert Group on Noise and Health*
http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1279888026747
- “The health impact of the noise created by wind turbines has been studied and debated for decades with no definitive evidence supporting harm to the human ear.” *Source: Chatham-Kent Public Health Unit*
<http://www.harvestingwindsupport.com/blog/wp-content/uploads/2011/03/Chatham-KentHealth-and-Wind-.pdf>
- “The electromagnetic fields produced by the generation and export of electricity from a wind farm do not pose a threat to public health...” *Source: NHMRC 2010*
http://www.nhmrc.gov.au/_files_nhmrc/publications/attachments/new0048_evidence_review_wind_turbines_and_health.pdf

- “... no consistent associations were found between wind turbine noise exposure and symptom reporting, e.g. chronic disease, headaches, tinnitus and undue tiredness.” *Source: Bolin et al 2011 Review*
http://iopscience.iop.org/1748-9326/6/3/035103/pdf/1748-9326_6_3_035103.pdf
- “... low level frequency noise or infrasound emitted by wind turbines is minimal and of no consequence... Further, numerous reports have concluded that there is no evidence of health effects arising from infrasound or low frequency noise generated by wind turbines.” *Source: NHMRC 2010*
http://www.nhmrc.gov.au/files/nhmrc/publications/attachments/new0048_evidence_review_wind_turbines_and_health.pdf
- “... renewable energy generation is associated with few adverse health effects compared with the well documented health burdens of polluting forms of electricity generation...” *Source: NHMRC 2010*
http://www.nhmrc.gov.au/files/nhmrc/publications/attachments/new0048_evidence_review_wind_turbines_and_health.pdf
- “Although opposition to wind farms on aesthetic grounds is a legitimate point of view, opposition to wind farms on the basis of potential adverse health consequences is not justified by the evidence.” *Source: Chatham-Kent Public Health Unit* <http://www.harvestingwindsupport.com/blog/wp-content/uploads/2011/03/Chatham-KentHealth-and-Wind-.pdf>
- “What is apparent is that numerous websites have been constructed by individuals or groups to support or oppose the development of wind turbine projects, or media sites reporting on the debate. Often these websites state the perceived impacts on, or benefits to, human health to support the position of the individual or group hosting the website. The majority of information posted on these websites cannot be traced back to a scientific, peer-reviewed source and is typically anecdotal in nature. In some cases, the information contained on and propagated by internet websites and the media is not supported, or is even refuted, by scientific research. This serves to spread misconceptions about the potential impacts of wind energy on human health...” *Source: Knopper&Ollson review*
<http://www.ehjournal.net/content/pdf/1476-069X-10-78.pdf>

Annoyance

- “... wind turbine noise is comparatively lower than road traffic, trains, construction activities, and industrial noise.” *Source: Chatham-Kent Public Health Unit* <http://www.harvestingwindsupport.com/blog/wp-content/uploads/2011/03/Chatham-KentHealth-and-Wind-.pdf>
- “The perception of noise depends in part on the individual - on a person’s hearing acuity and upon his or her subjective tolerance for or dislike of a particular type of noise. For example, a persistent “whoosh” might be a

soothing sound to some people even as it annoys others.”*Source: NRC 2007*
http://www.vawind.org/assets/nrc/nrc_wind_report_050307.pdf

- “... some people might find [wind turbine noise annoying. It has been suggested that annoyance may be a reaction to the characteristic “swishing” or fluctuating nature of wind turbine sound rather than to the intensity of sound.” *Source: Ontario CMOH Report*
http://www.health.gov.on.ca/en/public/publications/ministry_reports/wind_turbine/wind_turbine.pdf
- “... being annoyed can lead to increasing feelings of powerlessness and frustration, which is widely believed to be at least potentially associated with adverse health effects over the longer term.”*Source: Ad Hoc Expert Group on Noise and Health*
http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1279888026747
- “Wind turbine annoyance has been statistically associated with wind turbine noise, but found to be more strongly related to visual impact, attitude to wind turbines and sensitivity to noise.” *Source: Knopper&Ollson review*
<http://www.ehjournal.net/content/pdf/1476-069X-10-78.pdf>
- “... self reported health effects like feeling tense, stressed, and irritable, were associated with noise annoyance and not to noise itself...” *Source: Knopper&Ollson review* <http://www.ehjournal.net/content/pdf/1476-069X-10-78.pdf>
- “... many of the self reported health effects are associated with numerous issues, many of which can be attributed to anxiety and annoyance.” *Source: Knopper&Ollson review* <http://www.ehjournal.net/content/pdf/1476-069X-10-78.pdf>
- “To date, no peer reviewed articles demonstrate a direct causal link between people living in proximity to modern wind turbines, the noise they emit and resulting physiological health effects. If anything, reported health effects are likely attributed to a number of environmental stressors that result in an annoyed/stressed state in a segment of the population.” *Source: Knopper&Ollson review* <http://www.ehjournal.net/content/pdf/1476-069X-10-78.pdf>
- “... some community studies are biased towards over-reporting of symptoms because of an explicit link between...noise and symptoms in the questions inviting people to remember and report more symptoms because of concern about noise.” *Source: Ad Hoc Expert Group on Noise and Health*
http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1279888026747
- “... it is probable that some persons will inevitably exhibit negative responses to turbine noise wherever and whenever it is audible, no matter what the noise level.” *Source: Fiumicelli review Fiumicelli article abstract*

- “The major source of uncertainty in our assessment is related to the subjective nature of response to sound, and variability in how people perceive, respond to, and cope with sound.” *Source: Oregon review*
<http://public.health.oregon.gov/HealthyEnvironments/TrackingAssessment/HealthImpactAssessment/Documents/Oregon%20Wind%20Energy%20HIA%20Public%20comment.pdf>
- “... sleep difficulties, as well as feelings of uneasiness, associated with noise annoyance could be an effect of the exposure to noise, although it could just as well be that respondents with sleeping difficulties more easily appraised the noise as annoying.” *Source: NHMRC 2010*
http://www.nhmrc.gov.au/files_nhmrc/publications/attachments/new0048_evidence_review_wind_turbines_and_health.pdf
- “Even noise that falls within known safety limits is subjective to the recipient and will be received and subsequently perceived positively or negatively.” *Source: Chatham-Kent Public Health Unit*
<http://www.harvestingwindsupport.com/blog/wp-content/uploads/2011/03/Chatham-KentHealth-and-Wind-.pdf>
- “... annoyance was strongly correlated with a negative attitude toward the visual impact of wind turbines on the landscape...” *Source: NHMRC 2010*
http://www.nhmrc.gov.au/files_nhmrc/publications/attachments/new0048_evidence_review_wind_turbines_and_health.pdf
- “Respondents tended to report more annoyance when they also noted a negative effect on landscape, and ability to see the turbines was strongly related to the probability of annoyance.” *Source: Minnesota Health Dept 2009*
<http://www.health.state.mn.us/divs/eh/hazardous/topics/windturbines.pdf>
- “[It is proposed that annoyance is not a direct health effect but an indication that a person’s capacity to cope is under threat. The person has to resolve the threat or their coping capacity is undermined, leading to stress related health effects... Some people are very annoyed at quite low levels of noise, whilst other are not annoyed by high levels.” *Source: NHMRC 2010*
http://www.nhmrc.gov.au/files_nhmrc/publications/attachments/new0048_evidence_review_wind_turbines_and_health.pdf
- “Further, sounds, such as repetitive but low intensity noise, can evoke different responses from individuals... Some people can dismiss and ignore the signal, while for others, the signal will grow and become more apparent and unpleasant over time... These reactions may have little relationship to will or intent, and more to do with previous exposure history and personality.” *Source: Minnesota Health Dept 2009*
<http://www.health.state.mn.us/divs/eh/hazardous/topics/windturbines.pdf>

- “Stress and annoyance from noise often do not correlate with loudness. This may suggest [that other factors impact an individual’s reaction to noise... individuals with an interest in a project and individuals who have some control over an environmental noise are less likely to find a noise annoying or stressful.” *Source: Minnesota Health Dept 2009*
<http://www.health.state.mn.us/divs/eh/hazardous/topics/windturbines.pdf>
- “There is a possibility of learned aversion to low frequency noise, leading to annoyance and stress...” *Source: Leventhall 2005 review*
<http://www.noiseandhealth.org/article.asp?issn=1463-1741;year=2004;volume=6;issue=23;spage=59;epage=72;aualast=Leventhall>
- “Noise produced by wind turbines generally is not a major concern for humans beyond a half mile or so because various measures to reduce noise have been implemented in the design of modern turbines.” *Source: NRC 2007*
http://www.vawind.org/assets/nrc/nrc_wind_report_050307.pdf
- “Noise... levels from an onshore wind project are typically in the 35-45 dB(A) range at a distance of about 300 meters... These are relatively low noise or sound-pressure levels compared with other common sources such as a busy office (~60 dB(A)), and with nighttime ambient noise levels in the countryside (~20-40 dB(A)).” *Source: NRC 2007*
http://www.vawind.org/assets/nrc/nrc_wind_report_050307.pdf
- “Complaints about low frequency noise come from a small number of people but the degree of distress can be quite high. There is no firm evidence that exposure to this type of sound causes damage to health, in the physical sense, but some people are certainly very sensitive to it.” *Source: Ad Hoc Expert Group on Noise and Health*
http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1279888026747
- “... there is the theoretical possibility that annoyance may lead to stress responses and then to illness. If there is no annoyance then there can be no mechanism for any increase in stress hormones by this pathway... if stress-related adverse health effects are mediated solely through annoyance then any mitigation plan which reduces annoyance would be equally effective in reducing any consequent adverse health effects. It would make no difference whether annoyance reduction was achieved through actual reductions in sound levels, or by changes in attitude brought about by some other means.” *Source: Ad Hoc Expert Group on Noise and Health*
http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1279888026747

Infrasound

- "Claims that infrasound from wind turbines directly impacts the vestibular system have not been demonstrated scientifically... evidence shows that the infrasound levels near wind turbines cannot impact the vestibular system."
<http://www.mass.gov/dep/public/press/0112wind.htm>

- “There is no evidence that infrasound ... [from wind turbines ... contributes to perceived annoyance or other health effects.” *Source: Bolin et al 2011 Review*
http://iopscience.iop.org/1748-9326/6/3/035103/pdf/1748-9326_6_3_035103.pdf
- “There is no consistent evidence of any physiological or behavioural effect of acute exposure to infrasound in humans.” *Source: UK HPA Report*
http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1265028759369
- “... self reported health effects of people living near wind turbines are more likely attributed to physical manifestation from an annoyed state than from infrasound.” *Source: Knopper&Ollson review*
<http://www.ehjournal.net/content/pdf/1476-069X-10-78.pdf>
- “... infrasound from current generation upwind model turbines [is well below the pressure sound levels at which known health effects occur. Further, there is no scientific evidence to date that vibration from low frequency wind turbine noise causes adverse health effects.” *Source: Ontario CMOH Report*
http://www.health.gov.on.ca/en/public/publications/ministry_reports/wind_turbine/wind_turbine.pdf
- “It would appear... that infrasound alone is hardly responsible for the complaints... from people living up to two km from the large downwind turbines.” *Source: Jakobsen 2005 review* <http://multi-science.metapress.com/content/w6r4226247q6p416/>
- “From a critical survey of all known published measurement results of infrasound from wind turbines it is found that wind turbines of contemporary design with the rotor placed upwind produce very low levels of infrasound. Even quite close to these turbines the infrasound level is far below relevant assessment criteria, including the limit of perception.” *Source: Jakobsen 2005 review* <http://multi-science.metapress.com/content/w6r4226247q6p416/>
- “With older downwind turbines, some infrasound also is emitted each time a rotor blade interacts with the disturbed wind behind the tower, but it is believed that the energy at these low frequencies is insufficient to pose a health hazard.” *Source: NRC 2007*
http://www.vawind.org/assets/nrc/nrc_wind_report_050307.pdf

Shadow flicker

- “Scientific evidence suggests that shadow flicker [from the rotating blades of wind turbines does not pose a risk for eliciting seizures as a result of photic stimulation.” *Source: Massachusetts review*
http://www.mass.gov/dep/energy/wind/turbine_impact_study.pdf

- Shadow flicker from wind turbines... is unlikely to cause adverse health impacts in the general population. The low flicker rate from wind turbines is unlikely to trigger seizures in people with photosensitive epilepsy. Further, the available scientific evidence suggests that very few individuals will be annoyed by the low flicker frequencies expected from most modern wind turbines.” *Source: Oregon review*
<http://public.health.oregon.gov/HealthyEnvironments/TrackingAssessment/HealthImpactAssessment/Documents/Oregon%20Wind%20Energy%20HIA%20Public%20comment.pdf>
- “Flicker frequency due to a turbine is on the order of the rotor frequency (i.e., 0.6-1.0 Hz), which is harmless to humans. According to the Epilepsy Foundation, only frequencies above 10 Hz are likely to cause epileptic seizures.” *Source: NRC 2007*
http://www.vawind.org/assets/nrc/nrc_wind_report_050307.pdf

Community & social response to wind turbines

- The perception of sound as noise is a subjective response that is influenced by factors related to the sound, the person, and the social/environmental setting. These factors result in considerable variability in how people perceive and respond to sound... Factors that are consistently associated with negative community response are fear of a noise source... [and noise sensitivity...” *Source: Oregon review*
<http://public.health.oregon.gov/HealthyEnvironments/TrackingAssessment/HealthImpactAssessment/Documents/Oregon%20Wind%20Energy%20HIA%20Public%20comment.pdf>
- “Wind energy developments could indirectly result in positive health impacts... if they increase local employment, personal income, and community-wide income and revenue. However, these positive effects may be diminished if there are real or perceived increases in income inequality within a community.” *Source: Oregon review*
<http://public.health.oregon.gov/HealthyEnvironments/TrackingAssessment/HealthImpactAssessment/Documents/Oregon%20Wind%20Energy%20HIA%20Public%20comment.pdf>
- “Effective public participation in and direct benefits from wind energy projects (such as receiving electricity from the neighboring wind turbines) have been shown to result in less annoyance in general and better public acceptance overall.” *Source: Massachusetts review*
http://www.mass.gov/dep/energy/wind/turbine_impact_study.pdf
- “... people who benefit economically from wind turbines [are less likely to report noise annoyance, despite exposure to similar sound levels as those people who [are not economically benefiting.” *Source: NHMRC 2010*
http://www.nhmrc.gov.au/files_nhmrc/publications/attachments/new0048_evidence_review_wind_turbines_and_health.pdf

- “Landowners... may perceive and respond differently (potentially more favorably) to increased sound levels from a wind turbine facility, particularly if they benefit from the facility or have good relations with the developer...”
Source: Oregon review
<http://public.health.oregon.gov/HealthyEnvironments/TrackingAssessment/HealthImpactAssessment/Documents/Oregon%20Wind%20Energy%20HIA%20Public%20comment.pdf>
- “The level of annoyance or disturbance experienced by those hearing wind turbine sound is influenced by individuals' perceptions of other aspects of wind energy facilities, such as turbine visibility, visual impacts, trust, fairness and equity, and the level of community engagement during the planning process.” *Source: Oregon review*
<http://public.health.oregon.gov/HealthyEnvironments/TrackingAssessment/HealthImpactAssessment/Documents/Oregon%20Wind%20Energy%20HIA%20Public%20comment.pdf>
- “Wind energy facilities... can indirectly result in positive health impacts by reducing emissions of [green house gases and harmful air pollutants, and... Communities near fossil-fuel based power plants that are displaced by wind energy could experience reduced risks for respiratory illness, cardiovascular diseases, cancer, and premature death.” *Source: Oregon review*
<http://public.health.oregon.gov/HealthyEnvironments/TrackingAssessment/HealthImpactAssessment/Documents/Oregon%20Wind%20Energy%20HIA%20Public%20comment.pdf>
- “The environmental and human-health risk reduction benefits of wind-powered electricity generation accrue through its displacement of electricity generation using other energy sources (e.g., fossil fuels), thus displacing the adverse effects of those other generators.” *Source: NRC 2007*
http://www.vawind.org/assets/nrc/nrc_wind_report_050307.pdf
- “Community engagement at the outset of planning for wind turbines is important and may alleviate health concerns about wind farms. Concerns about fairness and equity may also influence attitudes towards wind farms and allegations about effects on health. These factors deserve greater attention in future developments.” *Source: Ontario CMOH Report*
http://www.health.gov.on.ca/en/public/publications/ministry_reports/wind_turbine/wind_turbine.pdf

Appendix 2:

Is there anything *not* caused by wind farms?

A list of diseases, symptoms and aberrant behaviours in humans and animals said to be caused by wind turbines.

Teresa Simonetti, Sydney Medical School,
Prof Simon Chapman, School of Public Health
University of Sydney

Note to readers. We hope to expand this ever-growing list of claims made about health problems in humans and animals that wind farm opponents attribute to exposure to wind turbines. If you are aware of any extra claims, please send them with hyperlinks to simon.chapman@sydney.edu.au

106 and list still growing Last updated May 3, 2012

1. **"Air quality damage":** "... the proposed wind farm would ruin the pristine beauty of the area, damage air quality and increase noise levels."
<http://www.10news.com/news/30776233/detail.html>
2. **Angina Pectoris** <http://www.na-paw.org/pr-110725.php>
3. **Anxiety and panic disorder**
http://www.savewesternny.org/docs/pierpont_testimony.html)
4. **Atherosclerosis** (<http://www.wind-watch.org/documents/wind-power-and-ecology/>)
5. **Asbergers syndrome worsens**
<http://quixoteslaststand.com/category/autism-and-wind-turbines/>
6. **Autism worsens** <http://quixoteslaststand.com/category/autism-and-wind-turbines/>
7. **Bowel cancer** (<http://www.wind-watch.org/documents/wind-power-and-ecology/>)
8. **Bowels,"loss of"** <http://eastcountymagazine.org/node/9425>

9. Brain tumours (<http://www.wind-watch.org/documents/wind-power-and-ecology/>)

10. Cancer

<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>

11. Cardiovascular disease (http://www.windvigilance.com/about-adverse-health-effects/physiological-health-and-wind-turbines#_edn2)

12. Cardiac arrhythmias <http://eastcountymagazine.org/node/9425>

13. Chest pain

<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>

14. Cattle, spontaneous abortions (caused by “stray or tingle voltage”)

<http://eastcountymagazine.org/node/9425>

15. Cats producing small, unhealthy litters or dying (caused by

“stray or tingle voltage”) <http://eastcountymagazine.org/node/9425>

16. Chickens hatching with crossed beaks

<http://www.wind-watch.org/documents/wind-power-and-ecology/>)

17. Chickens: stop laying eggs

<http://www.windturbinesyndrome.com/2012/most-eggs-had-no-yolk-and-the-shells-were-like-jelly-australia/>

18. Chickens: eggs “most had NO yolk and the shells were like jelly”

<http://www.windturbinesyndrome.com/2012/most-eggs-had-no-yolk-and-the-shells-were-like-jelly-australia/>

<http://www.theaustralian.com.au/news/nation/where-eagles-dare-not-fly-waterloo-looms-as-wind-farms-power-town-revolt/story-e6frg6nf-1226334835470>

19. Childhood behavioural problems

(https://ch1prd0102.outlook.com/owa/redirect.aspx?C=V_4qLZGhTUezJxGRgldbabmtxzI1yc4IJOMzqXCrhpYcrcYqfdj4B7-J5axOpRZFtBFTNW4Pp9o.&URL=http%3a%2f%2fwww.healthywindwisconsin.com%2fOntario%2520Health%2520Survey%2520Abstract%2520Results%2520and%2520Responses.pdf)

20. Children’s “cardiovascular systems” affected

<http://eastcountymagazine.org/node/9425>

21. Cold sores (herpes)

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

22. Colon cancer (<http://www.wind-watch.org/documents/wind-power-and-ecology/>)

23. Cows (dairy) shocked through milking machines

(because of “stray or tingle voltage”

<http://eastcountymagazine.org/node/9425>

24. “cows are dying” going down, pretty much lifeless...19 died or had to be put down, I lost 30 calves so far.”

<http://eastcountymagazine.org/node/9425>

25. Crickets disappear <http://eastcountymagazine.org/node/9425>

26. Depression (<http://www.windvigilance.com/about-adverse-health-effects/mental-health-and-wind-turbines>)

27. Deaths, yes, many deaths “These extensive studies report numerous serious illnesses and, yes, many deaths, mainly from unusual cancers.

<http://www.wind-watch.org/documents/wind-power-and-ecology/>

28. Diabetes (http://www.next-up.org/pdf/Magda_Havas_EHS_Biological_Effets_Electricity_Emphasis_Diabetes_Multiple_Sclerosis.pdf)

29. Diabetes type 1 (<http://www.wind-watch.org/documents/wind-power-and-ecology/>)

30. Diarrhoea

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

31. Disrupted relationships

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

32. Dizziness (<http://www.wind-watch.org/news/2011/09/21/wind-farm-ruined-our-health-family-suit-claims-vertigo-nausea-and-sleep-loss/>)

33. Dogs: ignoring owners, climbing between couch pillows, wall-staring

“When they did venture outside, they wouldn’t listen when you called; they just kept wandering on and on. The other weird thing we noticed is that one of his dogs would try to squeeze itself between the lounge cushions to sleep, and the other dog would climb under the bed in the corner. Or they would sit for hours, staring at the wall.”

“<http://www.windturbinesyndrome.com/2012/most-eggs-had-no-yolk-and-the-shells-were-like-jelly-australia/> “once-active dogs spent their days staring blankly at the wall.” <http://www.theaustralian.com.au/national-affairs/opinion/wind-farm-scam-a-huge-cover-up/story-e6frgd0x-1226345185075>

34. Earthworms leave the soil near wind turbines “seagulls no longer follow the plough in areas near wind turbines. It has been suggested that the seagulls have learned that the worms have all been driven away and that in that area the farmer’s plough will not bring breakfast to the surface. They must go elsewhere for their food.” Suggestion is this effect might be as wide as 18km radius from a turbine <http://www.wind-watch.org/documents/wind-power-and-ecology/>

35. Ear pain

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

36. Epilepsy (developing late in life)

(<http://www.wind-watch.org/documents/wind-power-and-ecology/>)

37. Exacerbations of chronic disease (e.g. fibromyalgia, scleroderma, diabetes, hyperthyroidism)

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

38. Excess collagen (<http://www.wind-watch.org/documents/wind-power-and-ecology/>)

39. Eye pain

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

40. Fatigue, extreme

http://www.michigansthum.com/articles/2010/10/23/news/local_news/doc4cc27b56afe47785068939.txt

41. Falls and equilibrium problems

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

42. Frequent urination <http://betterplan.squarespace.com/todays-special/2010/6/18/61810-whats-on-the-docket-for-the-wind-siting-council-bad-vi.html>

43. Gastrointestinal upsets & indigestion

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

44. Goats, unexplained mass deaths “In New Zealand, 400 goats dropped dead.” <http://eastcountymagazine.org/node/9425>

45. Headache and migraine (<http://www.windvigilance.com/about-adverse-health-effects/physiological-health-and-wind-turbines>)

- 46. Hearing loss**
(http://www.savewesternny.org/docs/pierpont_testimony.html)
- 47. Heart attacks (including Tako Tsubo episodes)**
<http://waubrafoundation.com.au/Y2NpZD0xJmNhaWQ9MTMmYWlkPSZjc mM9MTQ00Tg1MjMyOA%3D%3D>
- 48. Hemorrhaging around heart (death) in cattle, caused by “stray voltage”**
<http://www.na-paw.org/pr-110725.php>
- 49. Horses “exhibiting behavior and handling issues”**
(because of “stray or tingling voltage”)
<http://eastcountymagazine.org/node/9425>**Heart palpitations (sic)**
<http://eastcountymagazine.org/node/9425>
- 50. Hyperacusis**
(<http://waubrafoundation.com.au/Y2NpZD0xJmNhaWQ9MTMmYWlkPSZjc mM9MTQ00Tg1MjMyOA%3D%3D>)
- 51. Hypertension – acute crises; new onset**
(<http://waubrafoundation.com.au/Y2NpZD0xJmNhaWQ9MTMmYWlkPSZjc mM9MTQ00Tg1MjMyOA%3D%3D>)
- 52. Inability to conceive** <http://betterplan.squarespace.com/todays-special/2010/6/18/61810-whats-on-the-docket-for-the-wind-siting-council-bad-vi.html>
- 53. Itching** <http://eastcountymagazine.org/node/9425>
- 54. Joint and muscle pain**
(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)
- 55. Kidney damage** <http://www.na-paw.org/pr-110725.php>
- 56. Learning ability, memory, language development in children**
<http://eastcountymagazine.org/node/9425>
- 57. Leukaemia (paediatric):** <http://eastcountymagazine.org/node/9425>
- 58. Loss of energy**
(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)
- 59. Lung cancer** (<http://www.wind-watch.org/documents/wind-power-and-ecology/>)

- 60. Lymphoma (paediatric)** <http://eastcountymagazine.org/node/9425>
- 61. Memory loss (irreversible)**
<http://waubrafoundation.com.au/Y2NpZD0xImNhaWQ9MTMmYWlkPSZjc mM9MTQ0OTg1MjMyOA%3D%3D>
- 62. Meniere's disease** (<http://www.windcows.com/COMPLAINTS.html>)
- 63. Malformations in chickens, cattle** - no eyeballs or tails, cows holding pregnancy only 1 to 2 weeks and then aborting, blood from nostrils, black and white hair coats turning brown, mastitis, kidney and liver failure
<http://betterplan.squarespace.com/todays-special/2010/6/18/61810-whats-on-the-docket-for-the-wind-siting-council-bad-vi.html>
- 64. Mouth ulcers** <http://www.na-paw.org/pr-110725.php>
- 65. Multiple menstrual periods (4-5) per month**
<http://betterplan.squarespace.com/todays-special/2010/6/18/61810-whats-on-the-docket-for-the-wind-siting-council-bad-vi.html>
- 66. Muscle twitches**
(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)
- 67. Multiple sclerosis** (http://www.next-up.org/pdf/Magda_Havas_EHS_Biological_Effets_Electricity_Emphasis_Diabetes_Multiple_Sclerosis.pdf)
- 68. Motion sickness** (<http://www.wind-watch.org/news/2011/09/21/wind-farm-ruined-our-health-family-suit-claims-vertigo-nausea-and-sleep-loss/>)
- 69. Nausea** (<http://www.wind-watch.org/news/2011/09/21/wind-farm-ruined-our-health-family-suit-claims-vertigo-nausea-and-sleep-loss/>)
- 70. Nerve pain & tingling**
(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)
- 71. Nerve problems**
(<http://www.windcows.com/LIVINGNEXTTOWINDFARM.html>)
- 72. Nosebleeds**
(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)
- 73. "Nonconvulsive mental defects"**
<http://www.wind-watch.org/documents/wind-power-and-ecology/>
- 74. Non-Hodgkins lymphoma** <http://www.na-paw.org/pr-110725.php>

75. Pain “pain in and around the eyes, pain on top of the head, pain in the back of the head, behind the ears and early this year, we started to get throbbing pain at the back of the head” <http://www.abc.net.au/news/2010-07-05/residents-reject-wind-farm-health-findings/892014>

76. Palpitations

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

77. Panic, need to flee <http://wellingtontimes.ca/unity-of-knowledge/>

78. Paralysis

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

79. Peacocks: relationship problems: “my peahen refused to remain with the peacock.”

<http://www.windturbinesyndrome.com/2012/most-eggs-had-no-yolk-and-the-shells-were-like-jelly-australia/>

80. Perforated eardrum

<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>

81. Pericardial thickening (<http://www.wind-watch.org/documents/wind-power-and-ecology/>)

82. Piglets: higher mortality rates (because of “stray or tingle voltage”)

<http://eastcountymagazine.org/node/9425>

83. Poor appetite

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

84. Poor concentration and memory (<http://www.windvigilance.com/about-adverse-health-effects/mental-health-and-wind-turbines>)

85. Poor wound healing

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

86. Rage attacks <http://www.wind-watch.org/documents/wind-power-and-ecology/>

87. Sheep: “...very sensitive to noise and to disturbance. This will impact their ability to go where they’re used to going”

<http://www.10news.com/news/30776233/detail.html>

88. Sheep: deformities

<http://www.theaustralian.com.au/news/nation/where-eagles-dare-not-fly-waterloo-looms-as-wind-farms-power-town-revolt/story-e6frg6nf-1226334835470>

89. Sick Building Syndrome <http://www.windvigilance.com/news/wind-turbines-linked-to-sick-building-syndrome>

90. Stomach ulcers

<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>

91. Stress & irritability (<http://www.windvigilance.com/about-adverse-health-effects/mental-health-and-wind-turbines>)

92. Stroke (<http://www.wind-watch.org/documents/wind-power-and-ecology/>)

93. Suicidal ideation

<http://waubrafoundation.com.au/Y2NpZD0xJmNhaWQ9MTMmYWlkPSZjc mM9MTQ0OTg1MjMyOA%3D%3D>

94. Sweating at night <http://www.theaustralian.com.au/national-affairs/opinion/wind-farm-scam-a-huge-cover-up/story-e6frgd0x-1226345185075>

95. Tachycardia

(http://www.goodhuewindtruth.com/LIFE_IN_A_WIND_FARM.html)

96. Tinnitus (http://www.savewesternny.org/docs/pierpont_testimony.html)

97. Vertigo (<http://www.wind-watch.org/news/2011/09/21/wind-farm-ruined-our-health-family-suit-claims-vertigo-nausea-and-sleep-loss/>)

98. Vibrations in “body systems and cavities”

<http://eastcountymagazine.org/node/9425>

<http://www.wind-watch.org/documents/wind-power-and-ecology/>

99. “Vibroacoustic disease” (<http://www.wind-watch.org/documents/wind-power-and-ecology/>)

100. Visceral Vibratory Vestibular Disturbance (sic) (VVD)
 (“rapid heartbeat, nausea, internal quivering or pulsation,
and more.”

<http://eastcountymagazine.org/node/9425>

101. Vomiting up blood

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

102. Watery eyes <http://eastcountymagazine.org/node/9425>

103. Weight gain

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

104. Weight loss

(<http://www.healthywindwisconsin.com/Ontario%20Health%20Survey%20Abstract%20Results%20and%20Responses.pdf>)

105. Whale migration affected

<http://www.edenmagnet.com.au/news/local/news/general/panel-hears-wind-farm-concerns/2449490.aspx>

106. "Wind Turbine Syndrome"

[http://www.windturbinesyndrome.com/wind-turbine-syndrome/what-is-wind-turbine-syndrome/worsening-control-of-preexisting-and-previously-stable-medical-problems-such-as-angina, hypertension \(high blood pressure\), diabetes, migraines, tinnitus, depression, and post traumatic stress disorder](http://www.windturbinesyndrome.com/wind-turbine-syndrome/what-is-wind-turbine-syndrome/worsening-control-of-preexisting-and-previously-stable-medical-problems-such-as-angina-hypertension-high-blood-pressure-diabetes-migraines-tinnitus-depression-and-post-traumatic-stress-disorder)

<http://waubrafoundation.com.au/Y2NpZD0xJmNhaWQ9MTMmYWlkPSZjcmM9MTQ0OTg1MjMyOA%3D%3D>

