

Committee Secretary
Senate Standing Committee on Community Affairs
PO Box 6100
Parliament House
Canberra ACT 2600

Dear Committee Secretary,

I hereby provide my submission to the Senate Community Affairs Reference Committee Inquiry into the Social and Economic Impact of Rural Wind Farms. My submission addresses any adverse health effects for people living in close proximity to wind farms and concerns over the excessive noise and vibrations emitted by wind farms, which are in close proximity to people's homes. My submission in Section 1 refers to recent media reports that discuss the National Health and Medical Research Council (NHMRC) public statement on Wind Turbines and health along with related evidence which the NHMRC published in 2010. I provide an update to the evidence since 2010 in Sections 2 and 3. Section 4 discusses the proposed State and International Centres that were recommended in the context of the recent national health reforms and their potential for addressing emerging public health issues.

1. Media report: NHMRC evidence on wind turbines

Recent media reports by Lloyd (2011)¹ highlights that stakeholders in favor of wind turbines such as the Clean Energy Council, have cited the National Health and Medical Research Council's (NHMRC's) public statement² that 'there is currently no published scientific evidence to positively link wind turbines with adverse health effects'. Lloyd (2011)¹ emphasizes that the NHMRC report does not give the clean bill of health that the industry claims. In correspondence to Peter Mitchell from Victoria, who set up the Waubra Foundation with Sarah Laurie, the NHMRC said it acknowledged that there were opposing viewpoints regarding wind turbines and their potential effects on human health. "*It is important that these views are presented by the variety of groups or people including those with a vested interest*" the NHMRC said. "*It is important to note that the Review, its conclusions and recommendations are based on the published scientific evidence at the time of the writing and may be updated in future to take into account new evidence as it emerges*" (Lloyd, 2011)¹.

The NHMRC published two documents in July 2010 relating to wind turbines, including "*Wind Turbines and Health: NHMRC Public Statement*"² and "*Wind Turbines and Health A rapid Review of the Evidence*"³ (NHMRC 2010a; 2010b). In my view these documents are excellent and provide a comprehensive review of the literature up to the date of publication. I have undertaken further work since the publication of the NHMRC's document to consider more recent scientific evidence. This may inform the deliberations of the current Senate Inquiry into Rural Wind Farms. The NHMRC documents are easy to access and the key findings will not be repeated here (See NHMRC, 2010a, 2010b).^{2 3}

The information provided below is supplementary to the NHMRC's documents and should be read in conjunction with them. The review below was undertaken by considering the available published scientific literature obtained from searching electronic Medicine and health data bases⁴ using the search term 'wind turbines'. The review identified two important journal articles which are attached for the Senate's consideration. The key findings are summarized below.

2. Potential of wind turbines to elicit Seizures

Smedley, Webb and Wilkins (2010)⁵ investigated the potential risk of epileptic seizures from wind turbine shadow flicker under various meteorological conditions. They extended a previous model to include attenuation of sunlight by the atmosphere applying the *libradtran radiative transfer code*. The code was used to determine the diffuse radiance distribution in the sky, the intensity of the direct beam, along with surface reflectivity for each meteorological case. The model is considered reliable and robust. They found that where the observer looked toward the horizon with eyes opened

¹ Lloyd, G (2011) "Doubt over green energy's clean bill of health" *The Weekend Australian*, Focus page 13 March 5-6 2011.

² NHMRC (2010) "Wind Turbines and Health: NHMRC Public Statement" July 2010.

³ http://www.nhmrc.gov.au/files/nhmrc/file/publications/synopses/public_statement_wind_turbines_and_health.pdf

³ NHMRC (2010) "Wind Turbines and Health: A Rapid Review of the Evidence" July 2010.

⁴ http://www.nhmrc.gov.au/files/nhmrc/file/publications/synopses/evidence_review_wind_turbines_and_health.pdf

⁴ The data bases searched included: Access Medicine, Best Practice, Cochrane Library (EBM review, ACP Journal Club, Cochrane DSR, CENTRAL, Cochrane Methodology Register, DARE, Health Technology Assessment, NHS Economic Evidence Evaluation Data base, EMBASE, MD Consult, Medline, Ovid Medline in Process and Scopus available at:

<http://www.lib.monash.edu.au/databases/medicine.html>

⁵ Smedley, AD, Webb AR and Wilkins A (2010) "Potential of wind turbines to elicit seizures under various meteorological conditions" *Epilepsia* 51 (7):1146-1151.

there is a risk when he is closer than 1.2 times the total turbine height when on land, and 2.8 times the total turbine height in marine environments. The risk was limited by the size of the image of the sun's disc on the retina.

Smedley et al (2010)⁵ also found that when looking at the ground where the blade shadow is cast, observers are at risk only when the distance is less than 36 times the blade width. Here the risk was limited by the image contrast. However, if the observer views the horizon and closes his eyes the stimulus size and contrast ratio are epilogetic for solar elevation angles down to approximately 5 degrees. The authors conclude that large turbines rotate at a rate below that at which the flicker is likely to present a risk. However, there is a risk from smaller turbines that interrupt sunlight more than three times per second. They found a negligible risk at a distance more than about 9 times the maximum height reached by the turbine blade which is a distance similar to that in guidance from the UK planning authorities (Smedley et al 2010)⁵.

3. Responses of the ear to low frequency sounds, infrasound and wind turbines

Salt and Hullar (2010)⁶ undertook a comprehensive review of the literature on ear responses to wind turbines. They highlighted that some people with wind turbines located close to their homes have reported a variety of clinical symptoms that in rare cases are severe enough to force them to move away. Symptoms include sleep disturbance, headaches, difficulty concentrating, irritability and fatigue along with dizziness or vertigo tinnitus and the sensation of aural pain or pressure (Harry, 2007⁷; Pierpont, 2009)⁸. The symptom group has been termed 'wind turbine syndrome' and speculated to result from the low frequency sounds that wind turbines generate (Pierpont, 2009)⁸ Similar symptoms resulting from low frequency sound emissions from non-wind turbine sources have also been reported (Feldmann and Pitten, 2004)⁹.

Salt and Hullar (2010)⁶ found that individuals may be hypersensitive to infrasound under some clinical conditions eg Meniere's disease, superior canal dehiscence or asymptomatic cases of endolymphatic hydrops⁶. Meniere's disease is an abnormality of the inner ear and characterized by recurrent vertigo (dizziness), hearing loss and tinnitus (ie roaring, buzzing or ringing sound in the ears)¹⁰. Superior canal dehiscence syndrome (SCDS) is a rare medical condition of the inner ear leading to hearing loss and balance disorders. Some symptoms include fatigue, headache/migraine, brain fog, pulsatile tinnitus, a feeling of fullness in the affected ear, hyperacusis (over sensitivity to sound), autophony where a person's own speech or other self-generated noises eg heartbeat, eye movements, creaking joints, chewing are heard usually loudly in the affected ear; dizziness, vertigo and chronic disequilibrium. Tullio phenomenon including sound-induced vertigo, nystagmus and oscillopsia is also a symptom¹¹.

Salt and Hullar (2010)⁶ emphasize that demonstrating an accurate frequency spectrum of the sound generated by wind turbines creates technical problems. Studying the effects of wind turbine noise is made difficult by the widespread use of "A weighting" to document the wind turbine sound levels. It underestimates the influence of the sound on the ear. They recommended that more effort should be made to document the infrasound component of wind turbine sounds under difference conditions. There is an urgent need for more research directly addressing the physiologic consequences of long term low level infrasound exposure on humans given our understand of how low frequency sounds is processed in the ear and on reports that wind turbine noise causes greater annoyance than other sounds of similar level and affects the quality of life in sensitive individuals⁶.

4. Proposed new State and International Centres

Work was undertaken at Bayside Health (now Alfred Health) over seven years to 2005 and, then at Western Health to 2007 on implementing EBM evidence and Clinical Practice Guidelines (CPGs) through clinical protocols, pathways and management plans. The approach was led by Dr Kathryn Antioch, using NHMRC and international methodologies, including The Netherlands^{12 13} Given evidence of improvements in quality and efficiency, the Australian Health Care and Hospitals Association sponsored presentations by Dr Antioch in all Australian States and Territories and New Zealand in the context of the renegotiations of the Australian Health Care Agreements (2008).¹⁴ The key recommendation from stakeholders participating in the national presentations was to implement the EBM methodology nationally. In subsequent briefs to Council of Australian Governments (COAG) and other Federal and State stakeholders from 2008 to 2010, Dr

⁶ Salt AN and Hullar TE (2010) "Responses of the ear to low frequency sounds, infrasound and wind turbines" *Hearing Research* 268 pg 12-21.

⁷ Harry A (2007) Wind turbines, noise and health

⁸ Pierpont N (2009) Wind turbine syndrome: K selected books. .

⁹ Fieldman J, Pitten FA (2004) "Effects of low frequency noise on man – a case study" *Noise Health* 7, 23-28.

¹⁰ <http://medical-dictionary.thefreedictionary.com/menieres+disease>

¹¹ <http://encyclopedia.thefreedictionary.com/Superior+canal+dehiscence>

¹² http://www.aph.gov.au/Senate/committee/economics_ctte/health_finance_10/submissions.htm (Antioch KM: submission 1)

¹³ http://www.aph.gov.au/Senate/committee/clac_ctte/Nat_hlth_hospital_network_43/submissions.htm (Antioch KM: submission 10)

¹⁴ http://www.aushealthcare.com.au/news/news_details.asp?nid=8754

Antioch recommended that the methodology could be implemented, with economies of scale, by establishing *State Centres of Evidence Based Medicine (EBM), Health Services and Workforce Redesign* and, for the 2010 COAG briefing, also by creating an *International Centre of EBM and Health Economics* ^{15 16}

These recommendations, along with associated cost savings, were included in her submissions to four Federal Senate Committees undertaking parliamentary inquiries during 2010, which were published. ^{16 17 18 19} The Senate Community Affairs Legislation Committee inquiry into the National Health and Hospital Network (NHHN) Bill (2010) and the Senate Economics Legislation Committee inquiry into the Federal Financial Relations Amendments (NHHN) Bill 2010 published her submissions, showing estimated cost savings nationally and by State and Territory. They also cited some of her views on aspects of the government's reforms in their final reports ^{20 21} The Senate Committee inquiring into the new NHHN (2010) Bill had invited Dr Antioch to review the legislation. ***The national annual cost savings associated with the reforms are \$273.5m or \$1,367.6m over five years.*** Recent work in Victoria has estimated that the costs of establishing a State-wide Centre within an existing hospital network²² would result in net cost savings of \$76,628,721 per annum or \$383,143,605 over five years. This is extremely cost effective.

In addition to the functions of such Centres relating to EBM, health services and workforce redesign functions for the new national health reforms, they could also assist with updating stakeholders with evidence regarding emerging health issues of State and national public health significance. This could assist with the work of the NHMRC and the Australian Commission on Safety and Quality in Health Care. Discussions with private hospital stakeholders have emphasized that the Centres could assist in this way, especially with regard to evidence relating to new health technologies available internationally and under consideration in Australia. Some health insurance funds have also called for the rapid dissemination of EBM material in the media.

5. Recommendation

That you note the above.

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Health Economics and Funding Reforms
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Dr Antioch previously held two ministerial appointments, as the health economics member, to the Principal Committees of the National Health and Medical Research Council (NHMRC) for six years to 2009. These were the Health Advisory Committee and National Health Committee, which approved Clinical Practice Guidelines and translated evidence into clinical practice. She was also an appointed member of the NHMRC's Lead Committee and Privacy Working Committee. She was involved in developing the NHMRC's public statement on Blood Lead Levels for Australian in 2009.²³ She was previously appointed by the Victorian Governor in Council to a Victorian Health Practitioners Registration Board. She is currently investigating the health impacts, and associated benefits, of reducing carbon emissions for various emission targets.

¹⁵ <http://www.health.gov.au/internet/nhhrc/publishing.nsf/Content/297-interim>

¹⁶ http://www.aph.gov.au/senate/committee/fapa_ctte/coag_health_reforms/submissions.htm (Antioch KM: submission 20)

¹⁷ http://www.aph.gov.au/Senate/committee/clac_ctte/Nat_hlth_hospital_network_43/submissions.htm (Antioch KM: submission 10)

¹⁸ http://www.aph.gov.au/Senate/committee/clac_ctte/planning_options_people_ageing_with_disability_43/submissions/index.htm
(Antioch KM submission 71).

¹⁹ http://www.aph.gov.au/Senate/committee/economics_ctte/health_finance_10/submissions.htm (Antioch KM: submission 1)

²⁰ http://www.aph.gov.au/Senate/committee/economics_ctte/health_finance_10/report/index.htm

²¹ http://www.aph.gov.au/senate/committee/clac_ctte/Nat_hlth_hospital_network_43/report/report.pdf

²² costs includes staffing costs, office equipment and other operating costs, with the use of existing office space,

²³ <http://www.nhmrc.gov.au/publications/synopses/gp3syn.htm>