

Journal Scan

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1. *Can J Public Health. 2012 May 24;103(4):e293-6.*

Risk assessment of aircraft noise on sleep in Montreal.

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ABSTRACT

OBJECTIVE: Estimate the number of awakenings additional to spontaneous awakenings, induced by the nighttime aircraft movements at an international airport in Montreal, in the population residing nearby in 2009.

METHODS: Maximum sound levels (LAS,max) were derived from aircraft movements using the Integrated Noise Model 7.0b, on a 28 x 28 km grid centred on the airport and with a 0.1 x 0.1 km resolution. Outdoor LAS,max were converted to indoor LAS,max by reducing noise levels by 15 dB(A) or 21 dB(A). For all grid points, LAS,max were transformed into probabilities of additional awakening using a function developed by Basner et al. (2006). The probabilities of additional awakening were linked to estimated numbers of exposed residents for each grid location to assess the number of aircraft-noise-induced awakenings in Montreal.

RESULTS: Using a 15 dB(A) sound attenuation, 590 persons would, on average, have one or more additional awakenings per night for the year 2009. In the scenario using a 21 dB(A) sound attenuation, on average, no one

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would be subjected to one or more additional awakenings per night due to aircraft noise.

CONCLUSION: Using the 2009 flight patterns, our data suggest that a small number of Montreal residents are exposed to noise levels that could induce one or more awakenings additional to spontaneous awakenings per night.

2. *J Natl Med Assoc. 2012 Nov-Dec;104(11-12):510-9.*

Beliefs and attitudes toward obstructive sleep apnea evaluation and treatment among blacks.

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ABSTRACT

OBJECTIVE: Although blacks are at higher risk for obstructive sleep apnea (OSA), they are not as likely as their white counterparts to receive OSA evaluation and treatment. This study assessed knowledge, beliefs, and attitudes towards OSA evaluation and treatment among blacks residing in Brooklyn, New York.

METHODS: Five focus groups involving 39 black men and women (aged > or =18 years) were conducted at State University of New York (SUNY) Downstate Medical Center in Brooklyn to ascertain barriers preventing or delaying OSA evaluation and treatment.

RESULTS: Misconceptions about sleep apnea were a common theme that emerged from participants' responses. Obstructive sleep apnea was often viewed as a type of insomnia, an age-related phenomenon, and as

being caused by certain bedtime activities. The major theme that emerged about barriers to OSA evaluation was unfamiliarity with the study environment. Barriers were categorized as: problems sleeping in a strange and unfamiliar environment, unfamiliarity with the study protocol, and fear of being watched while sleeping. Barriers to continuous positive airway pressure (CPAP) treatment adoption were related to the confining nature of the device, discomfort of wearing a mask while they slept, and concerns about their partner's perceptions of treatment.

CONCLUSION: Results of this study suggest potential avenues for interventions to increase adherence to recommended evaluation and treatment of OSA. Potential strategies include reducing misconceptions about OSA, increasing awareness of OSA in vulnerable communities, familiarizing patients and their partners with laboratory procedures used to diagnose and treat OSA. We propose that these strategies should be used to inform the development of culturally and linguistically tailored sleep apnea interventions to increase awareness of OSA among blacks who are at risk for OSA and associated co morbidities.

3. *Conf Proc IEEE Eng Med Biol Soc. 2012;2012:2144-8.*

Sleep and activity monitoring for Returning Soldier Adjustment Assessment.

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ABSTRACT

This paper describes the development of unobtrusive room sensors to discover relationships between sleep quality and the clinical assessments of combat soldiers suffering from post-traumatic stress disorder (PTSD) and mild traumatic brain injury (TBI). We consider the use of a remote room sensor unit composed of a Doppler radar, light, sound and other room environment sensors. We also employ an actigraphy watch. We discuss sensor implementation, radar data analytics and preliminary results using real data from a Warrior Transition Battalion located in Fort Gordon, GA. Two radar analytical

approaches are developed and compared against the actigraphy watch estimates—one, emphasizing system knowledge; and the other, clustering on several radar signal features. The radar analytic algorithms are able to estimate sleep periods, signal absence and restlessness in the bed. In our test cases, the radar estimates are shown to agree with the actigraphy watch. PTSD and mild-TBI soldiers do often show signs of sporadic and restless sleep. Ongoing research results are expected to provide further insight.

4. *Dynamics. 2012 Winter;23(4):32-6.*

Delirium in the intensive care unit: role of the critical care nurse in early detection and treatment.

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ABSTRACT

Critically ill patients are at increased risk of developing delirium, which has been considered one of the most common complications of intensive care unit (ICU) hospitalization. Despite the high occurrence of delirium in the ICU, researchers have shown it is consistently overlooked and often undiagnosed. An understanding of delirium and the three clinical subtypes of hyperactive, hypoactive and mixed-type delirium that exist are key to early detection and treatment. Critical care nurses are in the frontline position to detect and monitor for risk factors that contribute to the development of delirium in the ICU. Recognition of predisposing risk factors and the elimination of precipitating risk factors for delirium can prevent the devastating short-term and long-term consequences for the critically ill patient. The importance of the use of validated assessment tools, such as the Confusion Assessment Method for the ICU (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC) to detect key features of delirium development is emphasized. Recommendations to improve the practice of critical care nurses include continuing education regarding the causes, risk factors and treatments of delirium, and education sessions on the use of validated assessment tools. Early prevention strategies, such as modification of the ICU environment to promote normal sleep/wake cycles, including

reduction of unit noise and nighttime interruptions, are examined as interventions to avoid the development of delirium.

5. *Int J Environ Res Public Health*. 2012 Dec;9(12):4292-310.

Focused study on the quiet side effect in dwellings highly exposed to road traffic noise.

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ABSTRACT

This study provides additional evidence for the positive effect of the presence of a quiet façade at a dwelling and aims at unraveling potential mechanisms. Locations with dominant road traffic noise and high L (den)-levels at the most exposed façade were selected. Dwellings both with and without a quiet façade were deliberately sought out. Face-to-face questionnaires (N = 100) were taken to study the influence of the presence of a quiet side in relation to noise annoyance and sleep disturbance. As a direct effect, the absence of a quiet façade in the dwelling (approached as a front-back façade noise level difference smaller than 10 dBA) leads to an important increase of at least moderately annoyed people (odds-ratio adjusted for noise sensitivity equals 3.3). In an indirect way, a bedroom located at the quiet side leads to an even stronger reduction of the self-reported noise annoyance (odds-ratio equal to 10.6 when adjusted for noise sensitivity and front façade L (den)). The quiet side effect seems to be especially applicable for noise sensitive persons. A bedroom located at the quiet side also reduces noise-induced sleep disturbances. On a loud side, bedroom windows are more often closed, however, conflicting with the preference of dwellers.

6. *Eur Rev Med Pharmacol Sci*. 2013 Jan;17(1):49-55.

Role of serotonin in seasonal affective disorder.

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ABSTRACT

This review was prepared with an aim to show role of serotonin in seasonal affective disorder. Seasonal affective disorder, which is also called as winter depression or winter blues, is mood disorder in which persons with normal mental health throughout most of the year will show depressive symptoms in the winter or, less commonly, in the summer. Serotonin is an important endogenous neurotransmitter which also acts as neuromodulator. The least invasive, natural, and researched treatment of seasonal affective disorder is natural or otherwise is light therapy. Negative air ionization, which acts by liberating charged particles on the sleep environment, has also become effective in treatment of seasonal affective disorder

7. *BMC Psychiatry*. 2013 Jan 15;13:29.

Air ions and mood outcomes: a review and meta-analysis.

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ABSTRACT

BACKGROUND: Psychological effects of air ions have been reported for more than 80 years in the media and scientific literature. This study summarizes a qualitative literature review and quantitative meta-analysis, where applicable, that examines the potential effects of exposure to negative and positive air ions on psychological measures of mood and emotional state.

METHODS: A structured literature review was conducted to identify human experimental studies published through August, 2012. Thirty-three studies (1957-2012) evaluating the effects of air ionization on depression, anxiety, mood states, and subjective feelings of mental well-being in humans were included. Five studies on negative ionization and depression (measured using a structured interview guide) were evaluated by level of exposure intensity (high vs. low) using meta-analysis.

RESULTS: Consistent ionization effects were not observed for anxiety, mood, relaxation/sleep, and personal comfort. In contrast, meta-analysis results showed that negative ionization, overall, was significantly associated with lower depression ratings, with a stronger association observed at high levels of negative ion exposure (mean summary effect and 95% confidence interval (CI) following high- and low-density exposure: 14.28 (95% CI: 12.93-15.62) and 7.23 (95% CI: 2.62-11.83), respectively). The response to high-density ionization was observed in patients with seasonal or chronic depression, but an effect of low-density ionization was observed only in patients with seasonal depression. However, no relationship between the duration or frequency of ionization treatment on depression ratings was evident.

CONCLUSIONS: No consistent influence of positive or negative air ionization on anxiety, mood, relaxation, sleep, and personal comfort measures was observed. Negative air ionization was associated with lower depression scores particularly at the highest exposure level. Future research is needed to evaluate the biological plausibility of this association.

8. *High Alt Med Biol.* 2012 Dec;13(4):258-62.

Periodic breathing, arterial oxyhemoglobin saturation, and heart rate during sleep at high altitude.

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ABSTRACT

The aim of this study was to investigate the effects of

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acclimatization to high altitude on periodic breathing (PB), arterial oxygen saturation (Sao(2)), and heart rate (HR). Nine male elite climbers, age 24-52 years underwent overnight cardiorespiratory monitoring at sea level and at Everest North Base Camp (5180 m), during the first (BC1) and the tenth (BC2) nights. PB was commonplace in all subjects at high altitude. PB cycle duration increased ($p<0.0001$) from BC1 (21.7 ± 1.9 s) to BC2 (26.7 ± 2.1 s). Mean Sao(2) from BC1 to BC2, significantly increased during wakefulness ($77.4\pm 3.4\%$ vs. $82.5\pm 2.8\%$; $p<0.001$) and during sleep regular breathing ($73.3\pm 3.8\%$ vs. $77.8\pm 2.9\%$; $p=0.022$). During PB, mean higher Sao(2) was $75.3\pm 3.6\%$ at BC1 and $82.4\pm 2.9\%$ at BC2 ($p<0.001$); mean lower Sao(2) was $68.2\pm 4.0\%$ at BC1 and $74.5\pm 4.3\%$ at BC2 ($p<0.01$). During PB, mean higher HR was 72.4 ± 8.8 b/min at BC1 and 63.3 ± 6.0 b/min at BC2 ($p<0.0002$); mean lower HR were $53.6\pm 7.5\%$ at BC1 and $43.6\pm 7.3\%$ at BC2 ($p<0.0001$). The mean Sao(2) during PB compared with Sao(2) at night without PB was unchanged. Acclimatization to high altitude resulted in an overall increase in Sao(2) along with an increase in the PB cycle duration and a decrease in HR.

9. *Noise Health.* 2012 Nov-Dec;14(61):321-9.

Critical appraisal of methods for the assessment of noise effects on sleep.

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ABSTRACT

Various sleep measurement techniques have been applied in past studies on the effects of environmental noise on sleep, complicating comparisons between studies and the derivation of pooled exposure-response relationships that could inform policy and legislation. To date, a consensus on a standard measurement technique for the assessment of environmental noise effects on sleep is missing. This would be desirable to increase comparability of future studies. This manuscript provides a detailed description of the sleep process, typical indicators of disturbed sleep, and how noise interferes with sleep. It also describes and discusses merits and drawbacks of five established methods commonly used for the assessment of noise effects on sleep (i.e.,

polysomnography, actigraphy, electrocardiography, behaviorally confirmed awakenings, and questionnaires). Arguments supporting the joint use of actigraphy and a single channel electrocardiogram as meaningful, robust, and inexpensive methods that would allow for the investigation of large representative subject samples are presented. These could be used as a starting point for the generation of an expert consensus.

10. *Noise Health*. 2012 Nov-Dec;14(61):297-302.

Effects of environmental noise on sleep.

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ABSTRACT

This paper summarizes the findings from the past 3 year's research on the effects of environmental noise on sleep and identifies key future research goals. The past 3 years have seen continued interest in both short term effects of noise on sleep (arousals, awakenings), as well as epidemiological studies focusing on long term health impacts of nocturnal noise exposure. This research corroborated findings that noise events induce arousals at relatively low exposure levels, and independent of the noise source (air, road, and rail traffic, neighbors, church bells) and the environment (home, laboratory, hospital). New epidemiological studies support already existing evidence that night-time noise is likely associated with cardiovascular disease and stroke in the elderly. These studies collectively also suggest that nocturnal noise exposure may be more relevant for the genesis of cardiovascular disease than daytime noise exposure. Relative to noise policy, new effect-oriented noise protection concepts, and rating methods based on limiting awakening reactions were introduced. The publications of WHO's "Night Noise Guidelines for Europe" and "Burden of Disease from Environmental Noise" both stress the importance of nocturnal noise exposure for health and well-being. However, studies demonstrating a causal pathway that directly link noise (at ecological levels) and disturbed sleep with cardiovascular disease and/or other long term health outcomes are still missing. These studies, as well as the quantification of the impact of emerging noise sources

(e.g., high speed rail, wind turbines) have been identified as the most relevant issues that should be addressed in the field on the effects of noise on sleep in the near future.

11. *JAMA*. 2012 Dec 12;308(22):2390-8.

Effect of acetazolamide and autoCPAP therapy on breathing disturbances among patients with obstructive sleep apnea syndrome who travel to altitude: a randomized controlled trial.

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ABSTRACT

CONTEXT: Many patients with obstructive sleep apnea syndrome (OSA) living near sea level travel to altitude, but this may expose them to hypoxemia and exacerbation of sleep apnea. The treatment in this setting is not established.

OBJECTIVE: To evaluate whether acetazolamide and autoadjusted continuous positive airway pressure (autoCPAP) control breathing disturbances in OSA patients at altitude.

DESIGN, SETTING, AND PARTICIPANTS: Randomized, placebo-controlled, double-blind, crossover trial involving 51 patients with OSA living below an altitude of 800 m and receiving CPAP therapy who underwent studies at a university hospital at 490 m and resorts in Swiss mountain villages at 1630 m and 2590 m in summer 2009.

INTERVENTIONS: Patients were studied during 2 sojourns of 3 days each in mountain villages, 2 days at 1630 m, 1 day at 2590 m, separated by a 2-week washout period at less than 800 m. At altitude, patients either took acetazolamide (750 mg/d) or placebo in addition to autoCPAP.

MAIN OUTCOME MEASURES: Primary outcomes were nocturnal oxygen saturation and the apnea/hypopnea index; secondary outcomes were sleep

structure, vigilance, symptoms, adverse effects, and exercise performance.

RESULTS: Acetazolamide and autoCPAP treatment was associated with higher nocturnal oxygen saturation at 1630 m and 2590 m than placebo and autoCPAP: medians, 94% (interquartile range [IQR], 93%-95%) and 91% (IQR, 90%-92%) vs 93% (IQR, 92%-94%) and 89% (IQR, 87%-91%), respectively. Median increases were 1.0% (95% CI, 0.3%-1.0%) and 2.0% (95% CI, 2.0%-2.0). Median night-time spent with oxygen saturation less than 90% at 2590 m was 13% (IQR, 2%-38%) vs 57% (IQR, 28%-82%; $P < .001$). Acetazolamide and autoCPAP resulted in better control of sleep apnea at 1630 m and 2590 m than placebo and autoCPAP: median apnea/hypopnea index was 5.8 events per hour (5.8/h) (IQR, 3.0/h-10.1/h) and 6.8/h (IQR, 3.5/h-10.1/h) vs 10.7/h (IQR, 5.1/h-17.7/h) and 19.3/h (IQR, 9.3/h-29.0/h), respectively; median reduction was 3.2/h (95% CI, 1.3/h-7.5/h) and 9.2 (95% CI, 5.1/h-14.6/h).

CONCLUSION: Among patients with OSA spending 3 days at moderately elevated altitude, a combination of acetazolamide and autoCPAP therapy, compared with autoCPAP alone, resulted in improvement in nocturnal oxygen saturation and apnea/hypopnea index.

TRIAL REGISTRATION: clinicaltrials.gov Identifier: NCT00928655.

12. *BMC Pregnancy Childbirth*. 2012 Dec 10;12:144.

A postal survey of maternal sleep in late pregnancy.

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ABSTRACT

BACKGROUND: Sleep disturbances in late pregnancy are common. This study aimed to survey sleep problems in third trimester pregnant women and to compare sleep in the pre-pregnancy period with the third trimester.

METHODS: Third-trimester women (n=650) were sent a postal survey containing questions relating to sleep experience, including perceived sleep quality, sleep difficulties, night waking, sleep environment, snoring,

daytime tiredness and daytime napping. Time periods reported on were before pregnancy and in the last week.

RESULTS: Respondents numbered 244 (38%). Before pregnancy, the mean reported duration of night-time sleep was 8.1 (SD 1.1) hours; in the last week this had decreased to 7.5 (SD 1.8) hours ($p < .0001$). Only 29% rated their sleep quality in the last week as very good or fairly good, compared with 82% rating their sleep this way before the pregnancy. The main reasons for sleeping difficulties were discomfort (67%) and pain (36%). Snoring increased significantly over the course of the pregnancy, with 37% reporting snoring often or every night in the last week. Those with a pre-pregnancy body mass index of greater than 25 were significantly more likely to snore ($p = .01$). Only 4% of women had an abnormal Epworth Sleepiness Scale score (i.e. >10) prior to pregnancy, whereas in the last week 33% scored in the abnormal range. Likewise, 5% had regularly napped during the daytime before pregnancy, compared with 41% in the last week.

CONCLUSIONS: Sleep problems are common in women in late pregnancy, and increase markedly compared with before pregnancy.

13. *J Athl Train*. 2012 Nov-Dec;47(6):673-8.

Red light and the sleep quality and endurance performance of Chinese female basketball players.

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ABSTRACT

CONTEXT: Good sleep is an important recovery method for prevention and treatment of overtraining in sport practice. Whether sleep is regulated by melatonin after red-light irradiation in athletes is unknown.

OBJECTIVE: To determine the effect of red light on sleep quality and endurance performance of Chinese female basketball players.

DESIGN: Cohort study.

SETTING: Athletic training facility of the Chinese People's Liberation Army and research laboratory of the

China Institute of Sport Science. Patients or Other Participants: Twenty athletes of the Chinese People's Liberation Army team (age =18.60 ± 3.60 years) took part in the study. Participants were divided into red-light treatment (n = 10) and placebo (n = 10) groups. Intervention(s): The red-light treatment participants received 30 minutes of irradiation from a red-light therapy instrument every night for 14 days. The placebo group did not receive light illumination. Main Outcome Measure(s): The Pittsburgh Sleep Quality Index (PSQI) questionnaire was completed, serum melatonin was assessed, and 12-minute run was performed at preintervention (baseline) and postintervention (14 days).

RESULTS: The 14-day whole-body irradiation with red-light treatment improved the sleep, serum melatonin level, and endurance performance of the elite female basketball players ($P < .05$). We found a correlation between changes in global Pittsburgh Sleep Quality Index and serum melatonin levels ($r = -0.695$, $P = .006$).

CONCLUSIONS: Our study confirmed the effectiveness of body irradiation with red light in improving the quality of sleep of elite female basketball players and offered a nonpharmacologic and noninvasive therapy to prevent sleep disorders after training.

14. *Zhonghua Yu Fang Yi Xue Za Zhi.* 2012 Aug;46(8):713-7.

The association of sleep hygiene and sleep quality among school-age children

[Article in Chinese]

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ABSTRACT

OBJECTIVE: To study the association between sleep hygiene and sleep duration and quality among school-age children, and to explore the risk factors related to poor sleep hygiene.

METHODS: Totally 2019 grade-five children were sampled by stratified cluster random sampling from 10 primary schools in Shanghai, during November and

December 2009. Questionnaires were used to investigate children and their parents.

Adolescent Sleep Hygiene Scale (ASHS) was used to inquiry sleep hygiene of children; Children Sleep Habits Questionnaire (CSHQ) was used to assess their sleep duration and quality; Family and Social Environment Questionnaire was used to collect demographic and socio-economic information. T-test, one-way ANOVA and multiple linear regression model were established to identify the risk factors for sleep hygiene.

RESULTS: The age of subjects was (10.81 ± 0.38) years old, 49.0% (989/2019) were boys. The ASHS total score was 125.43 ± 15.17, girls with better sleep hygiene than boys (127.05 ± 14.41 vs 123.74 ± 15.75, $P < 0.05$). The sleep duration was (9.47 ± 0.58)h/d, children slept less than 9 h/d had lower ASHS total score than those slept 9 - 10 h/d or over 10 h/d (121.69 ± 16.09 vs 126.17 ± 14.62 vs 126.50 ± 15.36, $P < 0.05$). Children with poor sleep quality had worse sleep hygiene than those with good sleep quality (121.00 ± 15.84 vs 128.36 ± 13.92, $P < 0.05$). Children with television set in bedroom had lower ASHS total score than the others (122.40 ± 15.76 vs 126.74 ± 14.66, $P < 0.05$). Children from single parent family had lower ASHS total score (117.90 ± 16.80 vs 125.94 ± 14.89, $P < 0.05$). Children whose father had irregular sleep or wake pattern had lower ASHS total score (122.65 ± 15.30 vs 125.89 ± 14.90 vs 127.79 ± 14.71, $P < 0.05$). The regression model confirmed that existence of television set in children's bedroom, single-parent family and father's irregular sleep pattern were the risk factors of poor sleep hygiene. **CONCLUSION:** Sleep hygiene was closely associated with sleep duration and quality among school-age children. Children with television set in bedroom, male, from single parent family and whose father had irregular sleep or wake pattern had worse sleep quality.

15. *J Acoust Soc Am.* 2012 Nov;132(5):3109-17.

Annoyance and self-reported sleep disturbance due to night-time railway noise examined in the field.

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ABSTRACT

Railway noise interferes with daytime activities and disturbs sleep leading to annoyance of exposed residents. The main objective of this paper was to establish exposure-response relationships between nocturnal railway noise exposure and annoyance and to examine self-reported sleep disturbances as short-term reactions to noise. In a field study 33 residents living close to railway tracks in the Cologne/Bonn area (Germany) were investigated. Railway noise was measured indoors during nine consecutive nights at each site. Questionnaires referring to annoyance and non-acoustical factors were performed. Annoyance ratings increased significantly with the total number of trains and freight trains per night, and non-significantly with rising number of passenger trains and energy equivalent sound pressure level (L(Aeq)), when adjusting the model for non-acoustical variables. The total number of trains and the number of freight trains also significantly affected self-reported awakening frequency, but no other aspects of subjective sleep disturbances. The responses of this subject sample referring to railway noise in the previous night point to rather low impairments of exposed residents.

16. *Noise Health.* 2012 Sep-Oct;14(60):237-43.

Effects of industrial wind turbine noise on sleep and health.

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ABSTRACT

Industrial wind turbines (IWTs) are a new source of noise in previously quiet rural environments. Environmental noise is a public health concern, of which sleep disruption is a major factor. To compare sleep and general health outcomes between participants living close to IWTs and those living further away from them, participants living between 375 and 1400 m (n = 38) and 3.3 and 6.6 km (n = 41) from IWTs were enrolled in a stratified cross-sectional study involving two rural sites. Validated questionnaires were used to collect information on sleep quality (Pittsburgh Sleep Quality Index - PSQI), daytime sleepiness (Epworth Sleepiness Score - ESS), and general health (SF36v2), together with psychiatric disorders, attitude, and demographics. Descriptive and multivariate analyses were performed to investigate the effect of the main exposure variable of interest (distance to the nearest IWT) on various health outcome measures. Participants living within 1.4 km of an IWT had worse sleep, were sleepier during the day, and had worse SF36 Mental Component Scores compared to those living further than 1.4 km away. Significant dose-response relationships between PSQI, ESS, SF36 Mental Component Score, and log-distance to the nearest IWT were identified after controlling for gender, age, and household clustering. The adverse event reports of sleep disturbance and ill health by those living close to IWTs are supported.