Exploring the Impact of Wind Turbine Noise on Sleep Quality
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Background
- Wind power represents 4.4% of Ontario’s electricity production¹ and is expected to increase
- To date, health research has focused on sleep disturbance due to noise emissions
- No published studies have objectively measured the impact on sleep
- The goal of this research is to determine if wind turbines are a risk factor for poor sleep quality

Preliminary Results - Exposed
- 50 nights of data have been obtained from 11 participants
- Total Sleep Time was an average of 7.47 hours/person (95% CI [7.07,7.88])
- Mean Sleep Efficiency of 89.08% (95% CI [88.69,89.43])
- Mean Sleep Quality rated 3.4 on a 6-point scale
- $L_{Aeq}$ did not exceed regulatory limits for any of the observation nights (Fig. 4)

Methods
- Cohort study design
  - Exposed (Wind Turbines; n = 12)
  - Unexposed (No Wind Turbines; n = 12)
- 24 participants followed for 5 days each
- Sleep quality measured in two forms
  - Objective: actigraphy
  - Subjective: sleep diary
- Noise exposure measured inside the bedroom during sleep hours (2300 – 0700) using 8 hour equivalent ($L_{Aeq}$) and maximum sound pressure level ($L_{Amax}$)

Future Work
- Continue data collection in unexposed group
- Perform more in-depth data analysis
- Expected completion December 2012

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Fig. 1 – View of wind turbines outside participant’s home.
Fig. 2 – Turbine in study area measured at 620m from dwelling.
Fig. 3 – Actigraphs will be worn around the wrist for 5 nights.
Fig. 4 – Sleep efficiency among exposed individuals for each night of observation showing measured sound pressure level during sleep hours.
Fig. 5 – Satellite image of exposure area. Participant’s homes are shown in red. Wind turbines are shown in yellow.

¹ Independent Electricity System Operator (IESO). Obtained from http://www.ieso.ca/imoweb/media/md_supply.asp