



## **Study Design and Power Calculations for a National Study on the Effects of Aircraft Noise on Sleep around 77 Airports in the United States**

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### **ABSTRACT**

Aircraft noise can disrupt sleep and impair recuperation. The last U.S. investigation on the effects of aircraft noise on sleep was conducted more than 20 years ago. Since then, traffic patterns and noise levels produced by single aircraft have changed substantially. It is therefore important that field studies be conducted in the U.S. to acquire current data on sleep disturbance relative to varying degrees of aircraft noise exposure. Study designs used during two pilot field studies around Philadelphia and Atlanta airports were adapted and refined for this National Sleep Study. The research methodology, acquiring acoustical and physiological data (heart rate and body movements) with no investigator on site and equipment mailed to participants, was found to be feasible. Power calculations were conducted using simulations of expected sleep period times and 2018 air traffic density data, and determined the need for investigating 400 participants for 5 consecutive nights around 77 airports with relevant amounts of nighttime air traffic. This study will provide key insights into the effects of aircraft noise on objectively and subjectively assessed sleep disturbance.

### **DISCLAIMER**

At the time of this submission, the study was still undergoing Office of Management and Budget (OMB) review. As it is possible that this review will result in study design changes, we refrain from describing the study design in detail here. Instead, we refer the reader to four recent publications that describe the two pilot studies at Philadelphia and Atlanta airport in detail [1-4]. Results from these pilot studies were the basis for many study design decisions.

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