# The "Second-Night" Effect: A Comparison of Sleep Behavior between the Sleep Laboratory and In-Home Settings

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## Objective

This study sought to compare wrist-worn actigraphy endpoints collected while in the home and in an in-patient sleep laboratory. Congruent to prior observations, we hypothesized that there would be differences in sleep characteristics related to the sleep environment.

## Background

Sleep disturbances are a hallmark of Parkinson's disease and its related disorders[1]. Sleep lab data involving polysomnography is considered the gold standard for measurement of sleep related disorders. With increasing availability of mobile sensors using actigraphy and other sensor based measures, we now have the ability to measure individual variability for sleep.

The "First-Night Effect", characterized by a decrease in sleep quality on the first night of a sleep lab, can be problematic when extrapolating in-home sleep behavior from sleep lab observations[2].

## Methods

24 healthy male subjects (aged 18-40) wore the Philips Actiwatch Pro for an initial in-home fortnight, followed by a two-night sleep lab visit, then another in-home fortnight. Activity count data from the wrist-worn Actiwatch were analyzed by the validated Philips Actiware algorithm to determine sleep and wake periods. Total Sleep Time (TST) and Wake After Sleep Onset (WASO) were calculated for each night.

Three consecutive sets of Friday-Saturday periods (Pre-Lab, Lab, and Post-Lab) were analyzed using Pairwise *t*-tests, with a nominal significance threshold of .05.

## Results

There was no significant difference between Pre-Lab and Post-Lab WASO and TST, on either night ($t$ = -0.151–0 .948, $p$ = 0.360–0.882).

Compared to the home setting, both TST ($t$ = -3.304, $p$ = .006) and WASO ($t$ = -3.081, $p$ = .009) demonstrated a significant decrease on the first night of the sleep lab setting . A significant decrease in WASO ($t$ = -2.515, $p$ = 0.026) and increase in TST ($t$ = 2.987, $p$ = 0.010) was observed in the second night in the sleep lab setting.

## Conclusions

Our results show shorter, but less interrupted, sleep on the first night in the sleep lab, and longer, but less interrupted, sleep on the second night, compared to the in-home actigraphy data.

Neither night was representative of natural, in-home sleep behavior.

The simulated, controlled sleep lab environment may not be conducive to monitoring natural sleep behavior. Wrist-worn actigraphy represents a feasible methodology to capture natural, in-home sleeping patterns in Parkinson's disease.

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**References**

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