IRB #83-21 “The Effects of Circadian Rhythm Disruption on the Inflammatory Response to Particulate Matter Exposure from Woodsmoke”

Statistical Power

Utilizing data from Abedelmalek et al. (2012), which found an increase in exercise-induced IL-6 in the blood following acute sleep deprivation, we calculated, using a moderate effect size of 0.4 with an alpha = 0.05 and power = 0.8 that a total sample size of 12 would be sufficient.

Statistical Analysis

We will collect physiological data from participants at baseline (PRE) and immediately after (POST) a simulated wildland firefighting exercise bout on two separate visits to the laboratory. One visit will occur after a night of normal sleep (NS) while the other visit will occur after a night of restricted sleep (RS). We will perform a 2-way Repeated Measures ANOVA to assess the interaction between exercise and sleep. We will additionally test for simple main effects of exercise (PRE vs POST) and sleep (NS vs RS). Our experimental hypothesis is that sleep restricted will increase the inflammatory response to simulated wildland firefighting exercise.

Our null hypothesis is that there is not difference between NS and RS in the response to simulated wildland firefighting.

Significance will be accepted at $p < 0.05$.