NIH Award from the National Heart, Lung and Blood Institute

Principal investigator: Mercedes Carnethon, preventive medicine
Feinberg School of Medicine

- **Project:** Autonomic, Endothelial, and Inflammatory Correlates of Sleep Duration
- **Start Date:** July 1, 2009
- **Total Award Amount:** $659,454

**How the results of this project will benefit society:**
Persons who sleep for less time each night have worse health profiles characterized by higher rates of hypertension, diabetes, and heart disease. Studies in persons with sleep disordered breathing (SDB) conditions such as sleep apnea and experimental studies that restrict sleep have identified a number of mechanisms that could explain this association. No studies have tested whether these mechanisms are present in relation to measured (i.e., not self-reported) sleep duration in an observational setting of persons who do not have SDB.

**The problem the project is trying to solve:**
Short sleep duration (<6 hours/night) is associated with a higher prevalence and incidence of hypertension, diabetes, and overweight/obesity, all of which can contribute to coronary heart disease. Pathophysiologic mechanisms that could explain these associations such as autonomic nervous system dysfunction, endothelial dysfunction, inflammation, and insulin resistance have been identified in the setting of sleep disordered breathing (SDB), namely sleep apnea, or in experimental studies of sleep restriction. However, more than 90 percent of adults do not suffer from SDB, and complete sleep restriction is rare. Rather, an important public health concern is whether these pathophysiologic mechanisms are apparent in association with short sleep duration in persons without SDB.

**How this project will work:**
The present epidemiologic study will recruit a sample of 500 adults aged 35-64 from the Chicago, IL area who do not have SDB as determined by validated screening questionnaires and in-home overnight polysomnography. Half of the population will be female and 25 percent each will be of Caucasian, African-American, Asian, and Latino race/ethnicity. Participants free from SDB will undergo wrist actigraphy to measure sleep duration for seven days in their regular home environment. The investigators will test the hypothesis that shortened sleep duration, in the absence of SDB, is associated with lower resting parasympathetic function, endothelial dysfunction insulin resistance, and inflammation. Using the wealth of assembled data, investigators will explore the confounding and modifying effects of demographic characteristics, physical activity and depressive symptoms on any observed associations.

The primary innovation of this cross-sectional epidemiologic study is the ability to study the association of objectively measured sleep duration within the normal population range on pathophysiologic mechanisms associated with metabolic syndrome components. Our population-based sampling method permits generalizability of our findings to the racially/ethnically diverse population with known variations in sleep duration and metabolic disease. Findings from this cross-sectional study will suggest mechanisms to explain the prior-observed associations between sleep duration and cardiovascular disease risk factors. Findings from this study will suggest mechanisms to explain the prior-observed associations between sleep duration and cardiovascular disease risk factors.

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