1. a. Full Title: MS1314(SHHS101)
   The Psychometrics of the Sleep Habits Questionnaire
   b. Abbreviated Title:
   Psychometrics of Sleep Habits Questionnaire

2. Lead author:
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3. Timeline:
   The start date is October 1, 2007 or when approved. The finish date will be February 2007 or 6 months after start date.

4. Rationale:
   The Sleep Habits Questionnaire (SHQ) is the main self-report inventory of the multicenter, prospective cohort Sleep Heart Health Study (SHHS). However, the psychometrics of the SHQ have not been well established.

5. Hypotheses:
   Items and subscales of the SHQ on sleep habits, snoring, sleepiness, obstructive sleep apnea (OSA), and general symptoms related to sleep will demonstrate sufficient reliability and validity.

6. Data [variables, inclusion/exclusion, source, time window]:
   Data are available from 15,699 out of 30,733 individuals that completed the initial self-report SHQ. Data will also be obtained from follow-ups of the 6,395 subjects that enrolled in the SHHS. Variables include items for sleep habits, snoring, sleepiness, OSA, driving, medical interventions, and general symptoms related to sleep. Other variables are responses to polysomnography (PSG) and the items of the quality of life questionnaire (SF-36).

7. Type of study:
   Secondary study

8. Type of Publication:
   Journal article

9. Analysis Responsibility:
   Local
10. Introduction:
The SHHS is a multicenter, prospective cohort study intended to investigate the relationship between sleep-disordered breath and cardiovascular diseases. The self-report SHQ serves four purposes for the SHHS: 1) to ascertain snoring habits in potential participants; 2) to identify potential participants who should be excluded from participation; 3) to obtain data pertaining to sleep habits and symptoms; 4) to collect information pertaining to self-reported sleep habits from a very large sample (>20,000). The SHQ contains 40 items from previous population based studies, such as the Wisconsin Sleep Cohort, the Epworth Sleepiness Scale (ESS), the Tucson Epidemiological Study of Obstructive Airway Disease and the Cleveland Family Study. Items on the SHQ are generally well-accepted, and the ESS, modified in wording for clarity and grammatical correctness, is reliable and well-validated. However, the majority of the items and scales of the SHQ have not been investigated together or previously for internal consistency reliability, test-retest reliability, or validity. The scales on sleepiness, snoring, and driving, for example, require further research on reliability. The SHQ requires validation by comparison with responses to PSG and the items of the SF-36.

The SHQ represents a rare opportunity to establish reliability and validity for the items and scales on the 15,699 subjects which completed the SHQ. Moreover, the underlying psychometrics of the frequently cited SHQ of the SHHS require further analysis.

11. Brief analysis plan:
Cronbach’s alpha internal consistency reliability estimates will be calculated for sleep habits, snoring, driving, the ESS, and other general symptoms of sleep. Test-retest reliability of scores will be examined for items and scales common to the SHQ and follow-up questionnaires. Pearson correlations will be calculated between the SHQ and PSG as well as other measures, such as the SF-36. Pearson correlations will be calculated between scales of the SHQ. Lastly, descriptive statistics (frequencies, mean, and median) will be investigated for the various items.

12. Summary section:
In this proposal, questionnaire data from individuals enrolled in the SHHS will be analyzed to determine the reliability and validity of the SHQ. Although items of the SHQ are from previous studies, these items have not been fully studied in terms of reliability and validity.
13. References:
   a. Quan et al, Sleep, 2002; 25: 8-14
   c. Baldwin et al, Sleep, 2001; 24: 96-105
   e. Gottlieb et al, Sleep, 2006, 29: 1009-1014
   g. Kump et al, Am J Respir Crit Care Med, 1994; 150:735-741
   h. Johns MW, Sleep, 1991; 14:540-545
   i. Ware et al, Med Care, 1992; 30: 473-483
   k. O'Connor et al, Sleep, 2003; 26:74-79
   m. Klink et al, Chest, 1987; 91: 540-546
   o. Johns MW, Sleep, 1994; 17: 703-710

14. Writing group:
    John J.B. Allen and Brad H. Sokal and appropriate SHHS personnel.