1. Full Title: The Relationship of Sleep Architecture and Sleep Disordered Breathing
   Abbreviated Title (length 26): Sleep Architecture

2. Writing Group (list individual with lead responsibility first):
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3. Timeline:
   Target Start: January 1 1999;
   Target Finish date: April 1 1999.

4. Rationale:
   Sleep stages are assessed routinely clinically with polysomnography. The absolute time in
given sleep states, as well as the pattern and timing of progression from one stage to
another, provide information on overall sleep architecture and are used to quantify degree
of sleep fragmentation (1). These data are considered important in the evaluation of
primary and secondary sleep disorders. In sleep apnea, information on sleep architecture
is often used to grade the overall severity of the underlying breathing disorder. For
example, the disorder is considered to be more severe when associated with lesser Stage
REM and delta sleep and increased Stage I sleep. However, despite the frequency in
which sleep stage data are used to help grade the overall severity of SDB, there are no
clearly defined criteria for interpreting variations in sleep stages across individuals who
differ by age, gender, and various indices of co-morbidity.

Interpreting the extent to which any disturbance in sleep architecture may be attributable
to SDB rather than to the effects of aging or other influences (2,3) requires an assessment
of the extent to sleep architecture varies which SDB independently of influences of aging,
gender, race, and other co-morbidity.
In SDB, sleep has been staged for the SHHS using the recommendations of (1). The
availability of a large sample of relatively unselected subjects across a wide age and RDI
range presents an important opportunity to describe the relationship of SDB and sleep
architecture, and the extent to which any relationship may be independent of age, race,
gender, obesity, and other chronic medical illnesses.
5. Main Hypothesis:
a) Sleep stage distributions will vary with RDI levels, with increased fragmentation, decreasing delta and REM sleep with increasing sleep disordered breathing.
b) Increased fragmentation of sleep associated with increased sleep disordered breathing will be independent of effects of age, gender, BMI, and race on sleep architecture.
c) Effects will be observed both in those with and without chronic medical illnesses and with and without sleep complaints/sleepiness. However, interactive effects will be noted between severity of sleep-disordered breathing and history of chronic illnesses and self-reported sleepiness with sleep fragmentation.

6. Data (variables, time window, source, inclusions/exclusions):
Dependent variables: Percentage and absolute time in: Stage I, II, II/IV, REM; sleep latency, sleep efficiency REM latency; sleep stage shifts.
Independent variables: Age, BMI, sex, race, medication use, chronic illness history; self reported problems initiating sleep, snoring/disturbed sleep history, RDI (3* desaturation or arousal); Epworth Sleepiness Score, self reported time sleep.
Analyses: Descriptive statistics of each Stage, presented for the group, (including all comers and in the sample of subjects free of chronic medical illnesses, specifically, COPD, CHF, arthritis. Analyses also stratified by strata defined quartiles of sleep disordered breathing severity. Multiple regression analyses with stages as the dependent variable, and the above independent variables. Interaction terms will created as suggested by stratified analyses (e.g., RDI * ESS score).
Time window, source, inclusions/exclusions: All polysomnographic data that have been fully scored with "no problems with staging" noted.