Title: Longitudinal Association of Alcohol Consumption and Cognition
Abbreviated Title: Longitudinal alcohol and cognition

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Begin analysis when visit 4 data is available.

Rationale: Cognitive impairment has been linked to consumption of large quantities of alcohol with severe impairment in patients with Wernicke-Korsakoff syndrome (Parsons 1993). Cognitive defects in sober alcoholics with a subclinical syndrome are less severe and more variable (Parsons 1993). In addition, anatomic studies have identified abnormal neurons in alcoholic patients compared to controls (Harper 1987). The association of lower levels of alcohol intake and cognitive decline is less clear. Several studies have found various components of cognitive function were negatively associated with the amount of alcohol consumed in social drinkers (Parker 1977 and 1983, MacVane 1982). In contrast, other studies of light to moderate alcohol use found no cognitive decline or even some impairment in cognition (Christian 1995, Hebert 1993, Launer 1996, Geroldi 1994, Mangione 1993). There has been speculation that the discrepancies may be, in part, the result of biases resulting from cross sectional analyses. There are few longitudinal studies on cognitive function and alcohol in a population-based sample (Launer 1996). Launer 1996 compared cognitive decline from 1990 -1993 in elderly men (mean age 75) to the level of reported alcohol intake in 1990 and found no association. Hebert (1993), in a prospective, community-based study of persons more than 65 years old found that recent alcohol use in this population was not a predictor of cognitive change over a three year period. However, both studies were limited in that only information at one point in time was available and the 3-year follow-up may have been too soon to show a significant decline. Adams (1990) longitudinal study on the trend of alcohol intake with aging found that there was a decline in percentage of drinkers with age but found no decline in mean alcohol intake except in heavy drinkers. There was no evaluation of the effect that the change of alcohol consumption had on cognition. Adams suggested that risk of adverse effect of alcohol consumption may increase with age.

The longitudinal effect of alcohol intake on cognition in a population sample is unclear. At visit 4 ARIC will have data from four visits on alcohol intake (spanning 12 years) and...
a cognitive function test on all participants from visits 2 and 4 (all had a cognitive function test on a subset at visit 3). This will provide data for evaluation of the longitudinal effect of alcohol consumption on cognition. We can also determine whether there is a change in alcohol consumption over time, and whether that change is associated with any change in cognitive function.

**Main Study Questions**: The following questions will be addressed controlling for age, gender, race, history of prior stroke or TIA, education, income, depression, diabetes, hypertension, medication (especially diuretics, antidepressive, or other CNS drugs), BMI, subscapular fat measure, and cardiovascular disease.

1. Compared to never drinkers, are participants who fit the following criteria more (or less) likely to develop cognitive decline (decrease in cognition from visit 2 to visit 4):
   a. Quartile of alcohol intake when the quartile is defined based on the highest reported current intake at any visit from 14. Does this question vary among those who report consistent intake vs those whose intake varies by more than 1 quartile from visit 1 to visit 47
   b. Quartile of report alcohol intake in past. drinkers (defined as those when deny current alcohol intake at visit 1-4, but at some visit respond past alcohol consumption.)
   c. Quartile of ever drinkers (as defined by the highest level of current or past intake reported at any visit).

2. We will determine whether question 1 varies depending on the participant's age at visit 1.
   This can be done by stratifying by age. (Age has an effect on cognition separate from alcohol, but it has been suggested that alcohol may interact with age to increase cognitive problems.)

3. We would like to evaluate the relationship between change in alcohol consumption and Cognitive change. Is there an association of the trend in alcohol consumption and cognitive change?
   In those who were in the lowest quartile of cognition at either visit 2, 3, or 4 determine the pattern of reported alcohol consumption for all visits.
   w Data (variables, sources, inclusions/exclusions):
   Visit 1: gender, race
   Visits1-4: age, history of prior stroke or TIA, duration, income, depression, diabetes, hypertension, BMI, subscapular fat. medication (especially diuretics, antidepressive, or other CNS drugs), and cardiovascular disease.
   Visits 2-4: cognitive function scores

**References for longitudinal study:**


