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1. Title: Fruits, vegetables, and antioxidants as protective factors for stroke

2. Working Group:
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3. Timeline:
   Analysis completed six months after data received and draft manuscript distributed twelve months after data received (December 1998)

4. Rationale:
   Serum carotenoid and carotenoid intake are recently suggested candidates for addition to the list of risk factors for stroke. The Nurses' Health Study found that women in the highest beta carotene intake category had a 39% decreased risk of stroke while the Framingham Study reported decreasing risk of stroke as fruit and vegetable intake increased in men. This suggests carotenoid or other compounds in fruits and vegetables may convey a vascular protective effect independent of atherosclerotic pathology. Also, in two cancer prevention trials in China, the relative risks of death from cerebrovascular disease in the groups receiving beta-carotene containing supplements were .90 (95% CI: .76-1.07) and .62 (95% CI: .37-1.06). In addition to hypertension, diabetes, and cigarette smoking as risk factors for stroke, ARIC has identified lipoprotein(a) as a contributor to risk. Since all of these risk factors are adequately measured in ARIC, and carotenoid intake estimates are available, it will be possible to provide a thorough examination of the question of whether carotenoid independently impact stroke risk. It may also be possible to examine whether there are differential associations with the stroke origin subclasses.

5. Main Hypotheses:
   The aim of this analysis is to test the hypothesis that 1) dietary carotenoid intake is inversely associated with the incident stroke events that occurred in the first five years of the study 2) whether the previously identified risk factors for stroke materially alter any such association. We will also explore relationships between stroke risk and fruits and vegetable consumption as well as the intake of dietary antioxidants including vitamin E and vitamin C.

6. Data and data analysis:
   All ARIC participants with complete Visit 1 dietary information and drug use data (for dietary supplements) will be included. The analysis will relate the incidence of stroke to the quintile of pro-vitamin A carotenoid intake. The consumption of individual foods high in carotenoid will also be examined. Dietary intake will be adjusted for total energy consumption. The association will also be examined both stratifying and adjusting for hypertension, diabetic status, smoking status and BMI. Visit 3 dietary and supplement information will be compared with analogous Visit 1 information. The relationship between dietary supplement use and stroke will also be examined separately and in combination with dietary intake.

From 1987-1995 268 incident strokes have been identified in the ARIC cohort; 222 of these are definitely or probably of the ischemic type. With this number of strokes this analysis will have more then 80% power to detect relative risks of 1.5 (alpha=.05) comparing those above the median of carotinoid consumption to those below.