ARIC Manuscript Proposal #750

1. a. **Full Title:** Influence of food intake patterns on incidence of CHD and stroke and all-cause mortality: ARIC

    b. **Abbreviated Title (Length 26 characters):** Food patterns and CVD

2. **Writing Group (list individual with lead responsibility first):**

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3. **Timeline:** 6 months
    Approval of proposal
    Literature review – 2 weeks
    Outline paper – 1 week
    Data analysis – 8 weeks
    Write manuscript – 6 weeks
    Review and edit paper – 8 weeks

4. **Rationale:**

Epidemiological studies on diet and chronic disease often focus on the relationship between a single nutrient and an adverse health outcome. However, nutrient-based approaches have produced inconsistent results. We propose to explore the relationships between food intake patterns and the incidence of CHD and stroke and all-cause mortality.

Fruit and vegetable consumption and incidence of CHD and stroke and all-cause mortality

Previous studies have shown that habitual fruit and vegetable consumption is associated with lower risk of stroke among white men and women. Although this is not a new finding, we will confirm these study results among a diverse ethnic population, including African Americans.

Whole grain consumption and incidence of CHD and stroke and all-cause mortality

Consumption of whole grain foods has been recommended for optimal health. Among

women enrolled in the Iowa Women's Health Study (IWHS), whole grain consumption was associated with a 25% lower risk of CHD death. In a recent report of the Nurses Health Study, higher whole grain intake was associated with a lower risk of ischemic stroke among women. The proposed study will investigate these relationships among men and women, including African Americans.

Fish consumption and incidence of CHD and stroke and all-cause mortality
    A recent ecologic study reported that fish consumption is associated with a reduced risk of mortality from all-causes and stroke using data from 36 countries. However, inconsistent findings have been reported for the relationship between fish consumption and the incidence of stroke.

Food patterns and incidence of CHD and stroke and all-cause mortality
    In the past, most studies have associated a single nutrient or food with a disease outcome or mortality. Few studies have linked the entire dietary pattern with these outcomes. In this investigation, we will assess each study participant's diet according to the USDA's Healthy Eating Index, an indicator of the quality of dietary intake, and explore its association with the incidence of CHD and stroke as well as all-cause mortality. Furthermore, we are currently exploring food pattern indices in relation to atherosclerotic disease outcomes in the IWHS, and will apply food intake patterns identified there to the ARIC data.

5. Main Hypothesis/Study Questions:
    The ideas underlying this study are that risk of the occurrence of CHD and stroke and all-cause mortality are inversely associated with intake of fruit and vegetables, grain consumption, fish, and the Healthy Eating Index score. We propose to test the following hypotheses:

> Hypothesis 1: a) The risk of all-cause mortality and the incidence of CHD and stroke will decrease monotonically with increasing intake of fruit and vegetables;

> Hypothesis 2: a) The risk of all-cause mortality and the incidence of CHD and stroke will decrease monotonically with increasing intake of whole grain foods;

> Hypothesis 3: a) The risk of all-cause mortality and the incidence of CHD and stroke will decrease monotonically with increasing intake of fish;

> Hypothesis 4: a) The risk of all-cause mortality and the incidence of CHD and stroke will decrease monotonically with an increasing Healthy Eating Index score (diet quality index score);

    Proportional hazards regression analysis will be used to examine the relationship between food intake and all-cause mortality and the incidence of CHD and stroke in study participants enrolled in the ARIC cohort. Since dietary intake is available at baseline and visit 3, we will focus mainly on baseline dietary intake; however we may also consider diet as a time dependent variable; using the Willett method, refreshing diet with the average of years 0 and 6 at year 6 – this variant of the time dependent variable method allows long term estimation, at the same time

increasing precision when additional information is available.

6.Data (variables, time window, source, inclusions/exclusions):
  Variables - Baseline data; and diet at visit 3
  Independent variables: Food groups will be generated from: 1) the responses to the cereal question or 2) frequencies of foods consumed. We will form our own food groups, following principles established in the IWHS**.** A Healthy Eating Index score will be generated for each study participant using baseline data, including protein, total fat, saturated fat, polyunsaturated fat, unsaturated fat, carbohydrate, cholesterol, sodium (nutrient and the salt question), fiber and food group data.
  Covariates: age, sex, ethnicity, education, BMI, fat distribution (waist/hip ratio), blood pressure, serum cholesterol, serum insulin, serum glucose, HDL-cholesterol, smoking, physical activity (Sport index 0-5), diabetes status, vitamin intake, medication use, alcohol, energy (kcal). The minimal model will include age and energy intake, while the full model will include the rest of the covariates – looking for which variable is primarily confounding, if there is one.
  Dependent variables: time to first event (separate analysis for all-cause mortality, CHD, and stroke).
  Inclusions/exclusions: Exclusions are individuals with: prior CHD, prior stroke or TIA; missing data; possibly those coded with unreliable dietary data (questionable, uncooperative, unable to estimate frequencies); and those in the upper and lower 1% distribution for kcal or possibly those beyond fixed cutpoints for kcal, as in IWHS

7. **a.** **Will the data be used for non-CVD analysis in this manuscript?** **____ Yes _X__ No**

  b. **If Yes, is the author aware that the file ICTDER01 must be used to exclude persons**
   with a value RES_OTH = "CVD Research" for non-DNA analysis, and for DNA
   analysis RES_DNA = "CVD Research" would be used?   **____ Yes ___ No**
   (This file ICTDER01 has been distributed to ARIC PIs, and contains
   the responses to consent updates related to stored sample use for research.)

8. **a.** **Will the DNA data be used in this manuscript?**   **____ Yes _X_ No**

  b. **If yes, is the author aware that either DNA data distributed by the Coordinating**
   Center must be used, or the file ICTDER01 must be used to exclude those with value
   RES_DNA = "No use/storage DNA"?   **____ Yes ____ No**