PC Reviewed: 09/19/00   **Status: A**   **Priority: 2**
SC Reviewed: 10/03/00   **Status: A**   **Priority: 2**

1.a. Full Title: Dietary intake as a predictor of incidence of type 2 diabetes in African-Americans (AAs) and Whites.

 b. Abbreviated Title (Length 26 characters): Dietary intake and incident diabetes

2.   Writing Group (list individual with lead responsibility first):
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3.   Timeline: We plan to begin the data analysis immediately after the proposal is approved. We expect to complete the project in one year.

4. Rationale: Incidence of type 2 diabetes has been increasing steadily. Studies on type 2 diabetes have suggested that both genetic and environmental factors contribute to the etiology of type 2 diabetes. Body weight is well recognized as a risk factor for diabetes, however, other effects of diet remain less well understood. The position statement from the American Dietetic Association supported dietary modification in the management, but not the prevention of diabetes (American Dietetic Association, 1994). In recent years, several prospective studies have addressed the association between carbohydrates, fiber, fats, and alcohol consumption and risk of type 2 diabetes (see Table). All of these studies used self-report to determine diabetic status and none examined an African American cohort.

Total carbohydrate has not been found to be associated with type 2 diabetes in several longitudinal studies. However, some studies have found an association with either glycemic index or dietary fiber. Although Colditz found no association between dietary fiber and type 2 diabetes in early examination of the Nurses Health Study cohort (Colditz et al, 1992), with more years of follow-up Salmeron showed an inverse association between total and cereal fiber intake and risk of type 2 diabetes (Salmeron et al, 1997). Similar results were found in the Iowa Women's Health Study and the Health Professionals Follow-up Study, although the result was not significant for total fiber in the latter study (Meyer et al, 2000; Salmeron et al, 1997).

The same three studies cited above (The Nurses' Health Study, The Health Professional Follow-up Study and The Iowa Women's Health Study) examined the relationship of glycemic load with diabetes risk. The glycemic index was devised from clinical studies as an indicator of the effect of various foods on postprandial glycemic responses. The Nurses' Health Study and the Health Professional Follow-up Study showed positive relations between the glycemic load and diabetes risk, but the Iowa Women's Health Study did not show any association.

The relationship of fat intake and incidence of type 2 diabetes has also been studied (Colditz et al, 1992; Salmeron et al, 1997; Salmeron et al, 1997). Dietary total fat and

animal fat were not related to the risk, while vegetable fat was inversely related to the risk.

Studies examining risk factors for type 2 diabetes have generally provided no clear association between alcohol consumption and risk of diabetes mellitus. Some studies reported that higher levels of alcohol consumption were associated with an increased risk of type 2 diabetes (Gerald et al, 1977; Holbrook et al, 1990). Other studies suggested that the relationship of alcohol consumption and incidence of type 2 diabetes has no or an inverse association (Stampfer et al, 1988; Colditz et al, 1992; Rimm et al, 1995).

At all ages, African-Americans (AAs) have a higher risk of developing diabetes mellitus than Whites (Pi-Sunnyer, 1980; Van Ltallie, 1985). In addition to higher incidence and prevalence figures, AAs also seem to suffer more from the complications of the disease (Pi-Sunnyer, 1980). Nevertheless we know of no previous prospective studies examining the relationship between dietary intake and risk of type 2 diabetes in AAs and Whites.

The purpose of this research is to examine the relationship dietary intake, particularly macronutrients and alcohol consumption, and the incidence of type 2 diabetes in AAs and Whites. This study will contribute to the literature as the first examination of the association between dietary factors and type 2 diabetes in African-Americans and as the first study to use measured glucose levels as part of the definition of diabetic cases.

Participants were classified as being diabetic if they had one fasting glucose ≥126mg/dL, one non-fasting glucose 200 ≥mg/dL, reported that a physician had told them they had diabetes or reported taking medication for diabetes within two weeks preceding their examination.

Discrete proportional hazard analysis and logistic regression models will be used to examine the dietary intake and alcohol intake as predictors of type 2 diabetes in AAs and Whites. Models will be compared. Covariates to be examined include age, center, ethnicity, education, smoking, physical activity, BMI, and family history of diabetes. Measurement error in the ascertainment of dietary intake will be considered in the interpretation of the analyses.

5. Main Hypothesis/Study Questions:

1. Is the quantity and type of carbohydrate in diet associated with the incidence of type 2 diabetes in AAs and Whites?

2. Is the quantity and type of fat in diet associated with the incidence of type 2 diabetes in AAs and Whites?

3. Is the quantity and type of fiber in diet associated with the incidence of type 2 diabetes in AAs and Whites?

4. Is the quantity and status of alcohol associated with the incidence of type 2 diabetes in AAs and Whites?

5. Is the Glycemic Load of carbohydrate in diet associated with the incidence of type 2 diabetes in AAs and Whites?

6. Data (variables, time window, source, inclusions/exclusions):

Exposure Variables (visit 1):
Dietary intake (from the Food Frequency Questionnaire)

(*Dr. Willett at Harvard has agreed to reanalyze the ARIC visit 1 food frequency questionnaire and provide variables previously not in the ARIC nutrient data base including glycemic index and cereal fiber. This reanalysis is currently in progress.)
Alcohol consumption

Outcome Variables: Incidence of type 2 diabetes in visit 2, 3, or 4

Other Variables: ID
Age
Center
Ethnicity
Education
Smoking
Physical activity
BMI

Exclusions: Race not Black or White
Black and from Minnesota or Maryland
Diabetic at Baseline
Upper and Lower 1% at Total calories

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

8.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

Prospective Studies about Macronutrients as a Predictor of Diabetes

Study	# of population /ethnicity & gender	age	follow up period	# of cases	diagnosis of diabetes
Meyer, 2000 -The Iowa Women's Health Study	35,988 US women	55-69	6	1,141	Self-report
Salmeron, 1997 -The Nurses' Health Study	65,173 US women	40-65	6	915	Self-report
Salmeron, 1997 -The Health Professionals Follow up study	42,759 US men	40-75	6	523	Self-report
Rimm, 1995 -The Health Professionals Follow up study	41,810 US men	40-75	6	509	Self-report
Colditz, 1992 -The Nurses' Health Study	84,360 US women	30-55	6	702	Self-report
Feskens, 1989 -The Zutphen Study	841 Dutch men	40-59	25	58	Self-report
Stampfer, 1988 -The Nurses' Health Study	85,051 US women	34-59	4	526	Self-report