

## ARIC MANUSCRIPT PROPOSAL FORM

Manuscript #289

1. Title:

BMI, fat patterning and CVD risk factors

2. Writing Group:

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3. Timeline:

Data for these analyses are already available as part of ARIC visit 1. We project that the analyses and writing will take place over the next year.

4. Rationale:

Several studies of exclusively or predominantly white populations have examined associations between fat patterning and risk factors for cardiovascular disease such as blood pressure, plasma lipids, insulin and glucose levels. Very few studies have investigated associations between fat patterning and CVD risk factors in an African American population. Recently it has been shown that the African Americans in visit one of ARIC had smaller mean waist to hip ratios than white participants of the same gender when the effects of BMI were held constant (MS#187). This result was unexpected given the increased prevalence of insulin resistance seen in African Americans and the relatively strong relationships that have been shown between waist-to-hip ratio and glucose tolerance. The effects of total adiposity versus fat patterning on the observed racial differences in glucose and insulin levels deserve careful examination. Effects of adiposity and fat patterning on blood pressure and plasma lipids, possibly mediated by insulin resistance, also deserve further investigation.

RELATIONSHIP WITH PREVIOUS AND CURRENT WORK IN ARIC

MS#12 Folsom et al (1989) examined the associations of BMI, WHR, glucose and insulin with wall thickness.

MS#68 Folsom et al (1991) showed relationships between cardiovascular risk factors and three categories of total fatness determined using the sum of two skinfolds. They also demonstrated a relationship between waist-to-hip ratio and cardiovascular disease prevalence in the ARIC cohort, but did not examine relationships between fat patterning and risk factors.

MS#89 (in progress) Szklo et al are examining the repeatability of plasma lipids over the intervals of visit one and two. BMI and WHR are examined as predictors of change in lipid levels.

MS#59a (in progress) Duncan et al are examining associations between WHR and lifestyle factors including physical activity, diet, smoking and alcohol, education and income.

5. Main Hypotheses/Issues to be Addressed:

1. BMI, waist-to-hip ratio, and waist to hip ratio adjusted for BMI are associated with CVD risk factors including plasma levels of glucose, insulin, LDL, HDL, total cholesterol and triglycerides and with diastolic and systolic blood pressure and with the prevalence of NIDDM and hypertension.
2. Waist to hip ratio adjusted for BMI is associated with CVD risk factors in "normal weight" as well as overweight individuals.
3. These association will be assessed for each of the four race-sex groups.

## 6. Data Requirements:

Associations between BMI and WHR will be examined in race-gender specific models by linear regressions techniques with adjustments for potential confounders. Models testing the effects of WHR will be examined with and without adjustments for BMI. Similar models will also be tested after additional stratification by weight categories (normal, overweight) and consideration of WHR\*BMI interaction terms in modeling.

Variables needed:

### **Anthropometrics:**

BMI

Waist circumference

Waist to hip ratio

### **Outcomes:**

fasting glucose

fasting insulin

LDL

HDL

apo a

apo b

total cholesterol

triglycerides

diastolic BP

systolic BP

uric acid

creatinine

diabetes

hypertension

### **Co-variates:**

center

age

smoking

wine intake

beer and liquor use

education

income

physical activity