1. a. **Full Title:** Anger confers risk of CHD to individuals who otherwise are at low risk of the disease: The Atherosclerosis Risk in Communities (ARIC) study

b. **Abbreviated Title (Length 26 characters):** Anger and CHD risk score

2. **Writing Group (list individual with lead responsibility first):**
   - **Lead:** Janice E. Williams
   - **Address:** P. O. Box 3168
     LaGrange, Georgia 30241
   - **Phone:** 706-884-0149
   - **Fax:**
   - **E-mail:** jwill22@bellsouth.net

   Writing group members: Catherine C. Paton, Aaron Folsom, David Couper, F. Javier Nieto, Herman A. Tyroler

3. **Timeline:**
   - Complete data analysis – August 2000
   - Draft of manuscript to Publications Committee – January 2001
   - Journal submission – May 2001

4. **Rationale:**

Three prospective studies in ARIC have examined the relationship of anger proneness (trait anger) to cardiovascular disease (CVD) (1-3). In the first study, individuals who were highly prone to frequent and intense anger had a near three times greater risk of acute MI/fatal CHD compared to their counterparts who were least anger-prone. This association was observed among normotensive individuals, but not among hypertensives (1). In the second study, an irascible temperament (a key component of an anger prone personality) was positively associated with acute MI/fatal CHD in normotensive individuals, and again, not in hypertensives (2). In the third study, proneness to anger was associated with a near three-fold increase in the incidence of ischemic stroke among younger men and women and those who had lower high-density lipoprotein (HDL-C) levels (3). This association was not observed among older persons or those with higher HDL-C levels. Thus, in each of these studies anger was positively associated with disease in persons who otherwise were at low risk of cardiovascular disease, at least with respect to hypertension, age, and lipid levels. The pattern that has emerged in these studies led the authors to hypothesize that anger confers its more potent risk in individuals who are at low (versus high) risk of CHD or stroke. The purpose of the current paper is to test this hypothesis for CHD risk.
5. Main Hypothesis/Study Questions:

Anger proneness is a more potent CHD risk factor in individuals who are at low (versus high) risk of the disease.

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

Visit 2 variables – age; sex; Spielberger Trait Anger Scale; cholesterol levels - total, LDL and HDL; hypertensive status; diabetes; smoking.
Events: CHD events through 1997

Statistical Analysis:

CHD risk will be computed using a the method similar to that of Wilson, D’Agostino, Levy, Belanger et al. (4) in which a risk score is based on the weighted values of the following factors: age (continuous), total or LDL cholesterol levels (continuous), HDL cholesterol (continuous), hypertensive status (categorical), diabetes status (categorical), and smoking (categorical).

Step 1: Estimated beta coefficients for the risk factors will be obtained from proportional hazards regression analysis in which time to CHD event is modeled.

Step 2: The estimated beta coefficient for each risk factor will be multiplied by the specific value of that risk factor for each participant, and all such products will be summed to obtain a risk score.

Step 3: Participants will be categorized into high and low CHD risk groups based on their risk score. For both groups, proportional hazards regression analysis will be used to model time to CHD event using trait anger as the exposure variable and adjusting for potential confounders not in the risk score (e.g., waist-to-hip ratio, fibrinogen, level of educational attainment). Sex-specific and race-specific models will be fit. In addition, a model will be fit to test formally the interaction of CHD risk.

Literature Cited


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 1CTDER01 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

c. Will the DNA data be used in this manuscript?  _____ Yes  ___x__ No

d. 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