1. Title: Postural Change in Blood Pressure Predicts Incident Coronary Heart Disease: The ARIC Study

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4. Timeline:

   The baseline data for this analysis are currently available and the pertinent literature has been reviewed. Incident events data from 1987 through 1992 are currently available and incident events for 1993 should be available by mid-February. Analysis and writing will begin in late 1995 and continue into 1996.

5. Background and Rationale:

   The response of blood pressure to change in body position has been used in epidemiological studies as a measure of cardiovascular reactivity. Sparrow et al.\(^1\) reported that a 10 mmHg or greater increase in diastolic blood pressure from supine to standing significantly modifies the effect of seated systolic and distolic blood pressure on the incidence of myocardial infarction during 8.7 years of follow-up in a cohort of middle-aged white men. On further investigation of this population, Sparrow et al.\(^2\) concluded that the supine minus seated blood pressure is positively associated with the subsequent development of systemic hypertension independent of supine blood pressure.

   Currently, two ongoing investigations in ARIC (MS 270 and MS 270A) have shown that postural change in blood pressure is associated with prevalent CHD and both prevalent and incident hypertension.

6. Main Study Question:
The purpose of this manuscript is to determine if postural change in blood pressure predicts the occurrence of CHD (including MI, fatal CHD, and revascularization procedures).

Specific Hypotheses include:
(1) Postural change in systolic blood pressure is predictive of incident CHD (including MI, fatal CHD, and revascularization procedures).
(2) This association is statistically independent of traditional cardiovascular risk factors.
(3) Neither hypertension status nor antihypertensive treatment modify the association between postural change at baseline and incident events.

7. Data, Design, and Analysis:

Data analysis will be performed at the Department of Epidemiology, University of North Carolina at Chapel Hill. The closed Visit 1 data set will be used to obtain the data on postural change in blood pressure, as well as baseline covariates. Those with prevalent CHD will be excluded. The incident events data set will be used to determine the number of CHD events (including MI, fatal CHD, and revascularization procedures) after seven years of follow-up.

During the ultrasound examination in Visit 1 of the ARIC study, blood pressure was measured for two minutes in the supine and then for two minutes in the standing position. Postural change in blood pressure is calculated as the mean of the standing blood pressures minus the mean of the supine blood pressures. A detailed description of the procedure can be found in manual 11 of the ARIC study protocol. Baseline variables that will be assessed as potential effect modifiers or confounders include: age, race, gender, socioeconomic status (education, occupation, income), field center, BMI, seated SBP, serum cholesterol, cigarette smoking, physical activity, alcohol intake, diabetes status, and hypertension/antihypertensive treatment status.

The association of postural change in blood pressure with incident CHD will be assessed using proportional hazards regression analysis. Postural change will be modeled continuously, and for comparability with other studies, categorically. The impact of potential effect modifiers (e.g., hypertension/antihypertensive treatment status, diabetes status) on the relationship between postural change and incident CHD will be assessed, as will the impact of adjusting for traditional cardiovascular disease risk factors.