

ARIC MANUSCRIPT PROPOSAL FORM

Manuscript #270

1. Title:

Relationship between postural change in blood pressure and three-year incidence of hypertension

2. Writing Group:

(lead) I. Holme R. Sharrett A. Folsom C. Light C. Nardo R. Watson H. Tyroler
G. Heiss

3. Background:

There is reasonable evidence that blood pressure readings following postural change and differences in blood pressures obtained in diverse body positions can have value in predicting risk of cardiovascular morbidity and mortality, additional to that derived from sitting arm blood pressure measurements [Borst (1984), de Biase (1988), Jorde (1986), Sparrow (1984, 1986)]. Sparrow, et al. (1984), have shown that a simple measurement of postural change in DBP was predictive of MI in the Normative Aging Study cohort after 8 1/2 years of follow-up. Sparrow et al. (1986) have also reported further analysis from the Normative Aging Study showing that supine systolic arm BP alone and the supine-sitting systolic arm BP difference were both independently associated with improved prediction of subsequent development of hypertension (using the conventional sitting arm BP definition). Some of the hypothesized mechanisms include increased sympathetic nervous activity (e.g., "hyper-responders"), defects in the baroreceptor reflex, and/or larger than normal cardiac outputs.

Measurement of blood pressure variability in population samples, such as obtained by the ARIC study, can be expected to provide an important complement for studies performed by physiologists and clinical scientists, which have indicated that blood pressure elevation is a heterogeneous phenomenon. Jorde and Williams (1986) as well as other researchers in this field, have concluded that cardiovascular responsiveness appears to provide an accurate indicator of heterogeneity in circulatory physiology for blood pressure and probably also heart rate.

4. Goal:

The purpose of the proposed analysis is to examine:

- a) the hypothesized (direct) association between blood pressure reactivity to a standard postural change and levels of blood pressure in individuals not treated with antihypertensive agents, examined during baseline survey of the ARIC cohort;
- b) the hypothesized (direct) association between increased blood pressure response to a standard postural change and blood pressure elevation over the course of three years of follow-up in the ARIC cohort;
- c) assess the possible modifying effect of age, gender, race, and diabetes mellitus on the associations identified above.

5. Data Needed:

Arm blood pressure obtained during Visit 1 ultrasound examination (supine and standing) and the following group of variables for both Visit 1 and Visit 2: sitting blood pressures; ARIC derived variables to indicate hypertension, diabetes, (prevalent) cardiovascular disease; selected, vasoactive medications; socio-demographic characteristics; measure of ponderosity; smoking status; physical activity scores; field center; sonographer and blood pressure technician IDs.

Proposed definition of incident hypertension:

- Population at risk at Visit 1: diastolic BP < 85 and systolic BP < 135, not on antihypertensive medication, has never been told by a physician that she/he has high blood pressure
- Incident hypertension (at Visit 2): diastolic BP \geq 90 or systolic BP \geq 140 or on antihypertensive medication (self-reported during medication survey at field center visit or according to a standard list of codes identifying antihypertensive agents).

Proposed exclusions at baseline:

- Individuals on anti-hypertensive agents (reported during medication survey interview and by screening of medication codes), prevalent coronary heart disease, missing data on postural change in blood pressure

REFERENCES

Borst C, van Brederode JFM, Wieling W, van Montfrans GA, Dunning AJ. Mechanisms of initial blood pressure response to postural change. *Clinical Science* 67: 321-327, 1984.

de Biase L, Amorosi C, Sulpizi L, de Felice M, Gallo P, Campa PP. Cardiovascular reactions to physiological stimuli in the elderly and the relationship with the autonomic nervous system. *Journal of Hypertension*: (suppl 1): S63-S67, 1988.

Jorde LB, and Williams RR. Innovative blood pressure measurements yield information not reflected by sitting measurements. *Hypertension* 8: 252-257, 1986.

Pickering TG, Harshfield GA, Kleinert HD, Blank S, Laragh JH. Blood pressure during normal daily activities, sleep and exercise: Comparison of values in normal and hypertensive subjects. *Journal of the American Medical Association* 247(7): 992-996, 1982.

Sparrow D, Tiff CP, Rosner B, Weiss ST. Postural changes in diastolic blood pressure and the risk of myocardial infarction: The Normative Aging Study. *Circulation* 70(4): 533-537, 1984.

Sparrow D, Rosner B, Vokonas V, Weiss ST. Relation of blood pressure measured in several positions to the subsequent development of systemic hypertension: The Normative Aging Study. *American Journal of Cardiology* 57: 218-221, 1986.