

## ARIC MANUSCRIPT PROPOSAL FORM

Manuscript #505A

1. Title (26 length):

Weight loss-hypertension

Full Title: Associations between weight loss and the remission of hypertension in a biethnic cohort: The Atherosclerosis Risk in Communities Study

2. Writing Group (list individual with lead responsibility first):

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3. Timeline:

Much of the work for this manuscript was done as part of MS #505. The analyses will be completed in one month. The manuscript will be completed in two additional months.

4. Rationale:

Both cross-sectional (1-3) and prospective (4-7) studies have shown that obesity is associated with hypertension. Clinical trials indicate that weight loss is associated with decreased blood pressure (8-10). These clinical trials have several weaknesses. First, participants were limited to highly selected overweight subjects, and thus the generalizability is limited. Second, all the populations studied were white, and results may not be applicable to other groups. Third, weight reduction programs were used, and these programs may have effects independent of weight loss they produce. Finally, the studies were conducted over relatively short time periods (<3 year) and the long-term effects (that is, effects over a period of nine years) could not be evaluated.

To the best of our knowledge, associations between weight loss and the remission of hypertension have been compared in African Americans and whites only in a cohort from Evans County, GA initially examined between 1960 and 1962 and followed for seven years. Using data from this cohort, tyroler et al. showed that weight loss on the remission of hypertension were greater in whites than in African-Americans (11). The study, however, did not include SBP and blood pressure medication into their criteria of hypertension. Also, other potential confounding factors such as baseline SBP, DBP, age, diet intake, and pre-existing diseases were not included into their models. The purpose of this study was to examine the associations between weight loss and the remission of

hypertension in African American and white men and women in the ARIC Study. The roles of ethnicity, gender, and blood pressure medication on the associations between weight loss and the remission of hypertension were also examined.

5. Hypothesis:

1. Weight loss is associated with an increased remission of hypertension.
2. The associations between weight loss and the remission of hypertension are different in participants who report taking blood pressure medication and in those who do not.
3. The associations are different across ethnicity-gender groups.

6. Design:

The study will be conducted among participants who were hypertensive at visit 1. Weight loss will be calculated as the difference in weight from visit 1 to visit 2, from visit 1 to visit 3, and from visit 1 to visit 4. Remissions of hypertension will be assessed at visits 2, 3, and 4. Only the first occurrence of remissions will be included in the analyses. For participants with antihypertensive medication, they will be classified as having remissions of hypertension if they have all the following three conditions. First, they did not report taking antihypertensive drugs or other drugs with antihypertensive effect within two weeks preceding a visit (visit 2, 3 or 4). Second, their DBP is less than 90 mmHg. And third, their SBP is less than 140 mmHg. For participants who reported taking no blood pressure medication, the criteria of hypertension are as above and a decrease in DBP of at least 3.5 mmHg and a decrease in SBP of at least 7.0 will be chosen because they represent approximately one standard deviation of changes in the respective variables within visits 1-4. Within visits 1-4, the root mean square error of the linear regression between SBP and date of visit within visits 1-4 was 6.9 mmHg. The corresponding value for DBP was 3.6 mmHg.

Unadjusted and adjusted associations between annual weight loss and the remission of hypertension will be calculated across ethnicity-gender groups. Several covariates will be selected for inclusion in all models a priori: baseline age, study center, SBP, DBP, BMI, height, WHR, smoking status, educational level, total caloric intake, percent calories from fat, and physical activity. Effect modifications by baseline age, BMI, and prevalence of CVD, cancer, and diabetes will be examined by testing interaction terms in the models.

We will correct for the measurement error in blood pressures by replacing the baseline blood pressures with the Stein estimates of the true values of these baseline blood pressures (12). We will use these Stein estimates for baseline SBP and DBP in the models as covariates. In these corrections for measurement error, we will use reliability coefficients of 0.75 and 0.62 for baseline SBP and DBP, respectively. These values were from a sample of 363 ARIC participants with repeat measurements 1-2 weeks apart during ARIC visit 3.

Cox Proportional Hazard Models with time-dependent weight loss will be used to examine the associations between weight loss and the remission of hypertension across ethnicity-gender groups (13). Effect modifications by gender and ethnicity will be

examined by testing the interaction term in the combined model. Analyses will be performed using SAS (PROC PHREG) (14).

#### 7. Data Requirement:

We will use data from the ARIC visits 1-4.

##### Identification information:

- Participant identification number
- Visit date
- ARIC field center

##### Demographics:

- Ethnicity
- Gender
- Date of Birth
- Age

##### Anthropometrics:

- Weight
- Height
- Waist circumference
- Hip circumference

##### Blood Pressure/Hypertension:

- Systolic blood pressure
- Diastolic blood pressure
- Blood pressure medication

##### Others (baseline only):

- Smoking
- Physical activity
- Education
- Dieting status
- Type of dieting
- Dietary intakes
- History of CVD
- History of diabetes
- History of non-skin cancer

#### 8. Manuscript Requests with Overlap:

Proposal #505 "The Relationship of weight change and weight cycling with hypertension" that examines the associations of weight change in blood pressure changes, the incidence of hypertension (among normotensive people), and the remission of hypertension (among hypertensive people).

This proposed manuscript is a subset of manuscript #505. It will examine the associations between weight loss and the remission of hypertension in hypertensive subjects. Studies of the incidence versus the remission of hypertension examine two different groups of participants (normotensive versus hypertensive). The associations between weight loss and the remission of hypertension in hypertensives are very important and we think it is appropriate to examine the associations in a separate manuscript.

## REFERENCES

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