

## ARIC MANUSCRIPT PROPOSAL FORM

Manuscript #180

### 1. Title:

Neighborhood socioeconomic characteristics and cardiovascular disease.

### 2. Writing Group:

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### 3. Rationale:

Many studies have documented associations of socioeconomic status (as assessed by individual measures of income, education and occupation) and cardiovascular disease (CVD). Specific behaviors which place individuals at risk for CVD have also been found to vary by socioeconomic status. Most of these studies have measured socioeconomic status at the individual level. However, both individual health outcomes and individual behaviors may be at least partly determined by the socioeconomic contexts or environments in which people live, as well as by their individual characteristics. Thus, individual-level health behaviors and outcomes may have multi-level determinants. Contextual or ecological measures of socioeconomic status may therefore provide information which is not captured by individual-level data. The effects of individual risk factors may also vary across contexts.

Although the effects of macro (contextual) and micro (individual) factors on CVD have been studied separately, few attempts have been made to link both effects into one comprehensive, multilevel model of individual cardiovascular disease outcomes. Ecological studies documenting the effects of community characteristics on cardiovascular disease have usually not included information on individual risk factors in their analysis. Likewise, studies of individual risk factors have not included contextual measures.

The ARIC study provides a valuable opportunity to develop the conceptual and methodological issues involved in the analysis of the determinants of individual cardiovascular outcomes at multiple levels. By linking ARIC participants to their "block-group" of residence (as defined by the 1990 Census), information on neighborhood socioeconomic characteristics can be obtained from census data for each individual. These neighborhood characteristics can then be used to complement the individual socioeconomic information already collected by the ARIC study. The effects of individual factors and neighborhood characteristics on a) clinical CVD and b) early atherosclerotic disease can thus be studied.

### 4. Hypothesis:

The study will compare contextual (or ecologic) and individual measures of socioeconomic status and their effects on cardiovascular disease outcomes. The specific hypotheses to be tested include:

- a) Neighborhood socioeconomic characteristics are associated with cardiovascular disease outcomes independently of individual risk factors (including individual measures of socioeconomic status).
- b) The effects of individual factors vary across contexts.
- c) Ecological measures of socioeconomic status (neighborhood characteristics) are stronger predictors of individual cardiovascular disease outcomes than individual measures.

The outcomes investigated will include prevalent CVD (coronary heart disease and stroke/TIA) as well as early atherosclerotic disease as assessed by ultrasound measurement of the carotid artery wall. The neighborhood characteristics will include: % of families living under the poverty level; % of blue-collar worker and % of individuals over 25 years without high school education. Individual measures will include income, occupation and education as well as behaviors and biological risk factors. Associations will be investigated using cross-sectional data (initial ARIC visit and interview). Hierarchical regression techniques will be used to investigate the independent and interacting effects of variables operating at the macro and micro levels.

#### 5. Data Requirements:

The study will require that ARIC study participants be linked to their block group of residence. The block group is a subdivision of the census tract comprised of approximately 1,000 persons. The linkage can be carried out using the participant's home address, by means of a process termed geocoding. Confidentiality of participants' addresses is ensured during the linkage procedure. The linkage will be carried out so that neighborhood characteristics published by the 1990 Census can be associated with each individual. After each participant has been linked to his or her block group, addresses will be deleted from the data files. As mentioned, summary block-group characteristics published by the 1990 Census will be used in the analyses, so that individual block-groups will not be specifically identified when results are presented. The confidentiality of participants' identities will thus be ensured. Existing data files with information on initial interview and examination will also be used. There will be no additional data requirements.

Geocoding can be carried out by specialized firms, and is inexpensive. Census tract and block-group identifiers can be permanently appended to the ARIC data files, giving ARIC investigators access to the extensive information on block-group and census-tract characteristics published by the 1990 Census. This information can be used to characterize the area of residence of ARIC cohort members, and may be useful to investigators working on research questions unrelated to the present proposal.