1.a. Full Title:
An evaluation of area-level measures of SES: CVD health outcomes in the ARIC study communities

b. Abbreviated Title (Length 26 characters):
Area-level measures of SES

2. Writing Group:
Proposed writing group members:
Kathy Rose, Gerardo Heiss, Chirayath Suchindran, Eric Whitsel, Joy Wood, others welcome

I, the first author, confirm that all the coauthors have given their approval for this manuscript proposal. __rf___ [please confirm with your initials electronically or in writing]

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3. Timeline:
Analyses to begin in Fall 2005. An abstract will be prepared for a February deadline for the 2006 SER meeting. A draft of manuscript is expected during Summer 2006.
4. Rationale:

Neighborhood socioeconomic characteristics have been shown to be associated with CVD mortality in many different communities[1-3]. When considered jointly, an independent effect of neighborhood socioeconomic status (SES) tends to persist after controlling for individual socioeconomic characteristics[4, 5]. There is not a consensus in the literature as to which area-level indicators are best used to characterize the neighborhood socioeconomic environment. Studies to date have either utilized a single measure of neighborhood SES, such as “median household income”, “percentage of persons below poverty”, “female-headship rates”[6, 7], or composite measures[2, 8].

Single measures of neighborhood SES have been used as a proxy for neighborhood deprivation. The results of one study indicated that the single variables “median household income” and “percentage of persons below poverty” performed as well as a composite index[6]. In the same study, these single variable SES measures demonstrated the expected inverse gradient with seven different health outcomes, and were as robust when predicting the aforementioned gradient as more complex composite measures. The single variable “female-headship rates” is another measure shown to be associated with adverse health outcomes. LeClere et al. demonstrated that women living in neighborhoods with high female-headship rates were more likely to die of heart disease[7]. The association between female-headship rates and heart disease mortality were shown to be independent of individual socioeconomic characteristics for both white and black women[7]. These findings are of particular interest because female-headship rates both predicted heart disease mortality in women, and attenuated the gap in heart disease mortality between white and black women.

An index of area-level indicators allows researchers to use factor analysis to integrate the many facets of neighborhood SES[4]. Diez Roux et al. showed that a composite index performed well in three population-based studies[9]. The aforementioned analyses did not compare the performance of the index against any single-variable measures of neighborhood SES. In another study, the expected SES gradients were stronger and more consistent in whites than in blacks[2]. This is consistent with other evidence suggesting that some measures of SES do not perform equally across race groups[1].

We wish to investigate how well certain single measures of neighborhood SES will perform in comparison to a more complex composite measure in the four ARIC study communities at both the census tract and block group level. We are particularly interested in determining which area-level measures show the strongest expected gradients in health outcomes for whites and blacks of both genders. In order to assess the robustness of measures across health outcomes, sociodemographic groups, and time, respectively, we will include a variety of health outcomes from ARIC cohort and surveillance (see data section). There has been discussion in the literature that SES gradients seen in epidemiologic cohorts – because of selection factors – may not accurately reflect the SES-health outcomes that exist in the target population[9]. Thus, the availability of both ARIC surveillance and cohort data provides us with a unique opportunity to compare SES gradients seen with selected health outcomes at the
population level to those seen among the subset that chose to participate in an ongoing study.

The outcome of this work will guide our selection of neighborhood SES measures in our ancillary study (AS 2004.05 – The Neighborhood Burden of CHD in Communities Study) and also contribute to the literature, which with few exceptions, has not systematically examined the performance of neighborhood SES measures.

5. Main Hypothesis/Study Questions:

1. Do single-variable neighborhood SES measures (median household income, percentage of persons below poverty, female-headship rates) demonstrate an inverse gradient with CVD related health outcomes that are comparable to those seen when using a composite index at the census tract/block group level?
   a. Do the observed gradients vary by race, age, or gender?

2. Is there concordance between the ARIC cohort and surveillance data with respect to the SES gradients observed with CVD related health outcomes?
   a. Does the concordance vary by race or gender?

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

Data Sources:

Vital statistics data is currently available via death records for all persons living in the areas of the Minnesota and North Carolina ARIC study communities for the year 2000. ARIC surveillance data will be analyzed over two time periods, 1993-95 and 1999-2001. ARIC cohort data will be analyzed for multiple health outcomes with regard to area-level SES measures.

SES Exposures:

The single-variable area-level measures selected for study are: median household income, percent of persons below poverty, and female-headship rates by 1990 and 2000 census tract data. The composite area-level index we will use in the comparison has been used by Diez Roux and Borrell, and is comprised of the following six indicators of income/wealth, education, and occupation: median household income; median value of owner-occupied housing units; percentage of households receiving interest, dividend or net rental income; proportion of adults 25 years of age or older with a high school education; proportion of adults 25 years of age or older with a college education; and percentage of employed persons 16 years of age and older in executive, managerial or professional occupations[2, 9]. Different categorization schemes for SES measures will be explored (e.g., use of relative versus absolute criteria for defining deprivation, and using different population referents).
Health Outcomes:

In the analysis of vital statistics, the health outcomes measured will be all-cause and CVD mortality. In the analysis of ARIC surveillance events, health outcomes will include: definite and probable MIs as well as fatal CHD. All-cause and CVD mortality, prevalent and incident CHD, MI and fatal CHD are the outcomes of interest for analyses of the ARIC cohort data.

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 ICTDER02 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  n/a
(This file ICTDER02 has been distributed to ARIC PIs, and contains the responses to consent updates related to stored sample use for research.)

8.a. Will the DNA data be used in this manuscript?
____ Yes    __x__ No

8.b. If yes, is the author aware that either DNA data distributed by the Coordinating Center must be used, or the file ICTDER02 must be used to exclude those with value RES_DNA = “No use/storage DNA”?
____ Yes    ____ No  n/a

9. The lead author of this manuscript proposal has reviewed the list of existing ARIC Study manuscript proposals and has found no overlap between this proposal and previously approved manuscript proposals either published or still in active status. ARIC Investigators have access to the publications lists under the Study Members Area of the web site at: http://www.csc.unc.edu/ARIC/search.php
____ x__  Yes     ______ No

10. What are the most related manuscript proposals in ARIC (authors are encouraged to contact lead authors of these proposals for comments on the new proposal or collaboration)?
MS 864 (Borrell)
MS 454 (Diez Roux)

11. a. Is this manuscript proposal associated with any ARIC ancillary studies or use any ancillary study data?    ___x__ Yes    ____ No

11.b. If yes, is the proposal
___x___  A. primarily the result of an ancillary study* (AS 2004.05)
We will also use some census-tract level SES data collected as part of ARIC AS 1998.02.
B. primarily based on ARIC data with ancillary data playing a minor role (usually control variables; list number(s)*) ________________

*ancillary studies are listed by number at http://www.cscc.unc.edu/aric/forms/

12. Manuscript preparation is expected to be completed in one to three years. If a manuscript is not submitted for ARIC review at the end of the 3-years from the date of the approval, the manuscript proposal will expire.