

ARIC Manuscript Proposal # 1102

PC Reviewed: 09/20/05

Status: A

Priority: 2

SC Reviewed: 09/21/05

Status: A

Priority: 2

1.a. Full Title:

b. Abbreviated Title (Length 26 characters):

Neighborhood SES Disparities in Rates and Temporal Trends in Rates of MI in the ARIC Surveillance Communities

2. Writing Group:

Writing group members (in alphabetical order):

Randi Foraker, Gerardo Heiss, Kuo-Ping Li, Wayne Rosamond, C. Suchindran, Joy Wood, Randi Foraker, others welcome.

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

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3. Timeline:

Analyses to begin in Fall 2005. Abstract prepared in October 2005 for submission to AHA Epid Council Meeting. Draft of manuscript is expected during Summer 2006.

5. Rationale:

Since the mid 20th century, higher rates of CHD among those with lower SES have been repeatedly reported in industrialized countries.¹⁻⁵ The presence and strength of this association has varied by gender,⁶ race,^{2,7-9} age,⁶ and by type² and level of SES measure used.^{7,10} There is recent evidence that SES disparities in CHD mortality are increasing. In Sweden there was an earlier onset of MI decline in nonmanual male workers and until 1981 and an increase in CHD among manual working women, which had a net result of increasing the population attributable risk due to SES for the period of 1971-94.

¹¹ Similarly, between 1979-94 steeper rates of decline in CHD mortality among higher classes of employed persons resulted in a widening of SES disparities in Australia.¹² In the U.S. the onset of the decline in CHD mortality in white men¹³ and women¹⁴ began later among those living in lower than higher SES areas and increasing inequality by educational profile of state economic areas occurred between 1960 through the late 1980s.¹⁵ In a study of North Carolina decedents (1984-93) coded into four occupational classes based on usual occupation recorded on death certificate, CHD mortality decreased among whites in all occupational groups, but the rate of decline was steepest for those in the highest occupational classes. In contrast, among blacks, CHD mortality decreased only among those in the highest occupational status group. Among all others, CHD mortality rates increased across time. The net result, in both race groups, was that socioeconomic disparities increased across time.¹⁶ In the surveillance studies reviewed based on U.S. populations, almost none examined SES variations in trends of nonfatal CHD related outcomes (MI, case fatality, etc). This probably reflects the lack of SES information in hospital records, the source from which much of surveillance data is derived. An exception is a recent publication from the Worcester Heart Attack Study, which reported that long term survival after an MI was lower in neighborhoods with higher proportions of persons living in poverty and higher proportions of persons with lower educational levels.¹⁷

Both gender and racial differences in the rate of MI have been documented in ARIC surveillance: rates are higher in men than in women and within gender groups are higher among African Americans than in whites (consistently across rates are higher in African Americans and within race/ethnic groups higher among men than women (Rosamond, work in progress). However, socioeconomic discrepancies have not been investigated to date. With data being collected as part of ARIC ancillary study (AS) 2004.05 (The Neighborhood Burden of SES in Communities), address data from hospital records is being geocoded so that participants can be linked with census tract level SES characteristics. This will allow us to investigate the contribution of SES (neighborhood) to variations in rates of MI and to examine the contribution of SES to racial disparities in these rates.

5. Main Hypothesis/Study Questions:

1. Neighborhood SES is inversely associated with the rates of MI within and across study communities
2. Neighborhood disparities in the occurrence of MI increase over time

3. Racial disparities in MI rates are in part explained by neighborhood SES disparities

Data:

- Neighborhood (census tract) SES measures are available through ARIC ancillary study AS 2004.05. (The Burden of CHD in Communities). Empirical work currently in progress will be used to choose whether an index measure, which has been typically used in earlier work in the ARIC cohort, (e.g.,⁷ or a single measure reflective of economic deprivation (e.g., % living in poverty, median family income) will be used to represent neighborhood SES in the current project.
- Denominators will consist of race and gender specific census tract population counts for the year 2000 (assumes the population for the year 2000 is the average size between 199-2001 for persons between 35 and 74 years of age).
- Events (numerators) will consist of definite and probable hospitalized MIs.
- Covariates considered will include race, gender, center, year of event (time), and age.
- The year 2000 census counts will be used in standardizing rates by age (race and gender specific)

Exclusions:

Surveillance events included will be limiting to in hospital definite and probable MIs occurring since January 1993. Earlier events are not included because addresses – which are needed to link participants to census tract level SES indicators - were not routinely and uniformly abstracted from medical records until this time. For analyses focusing on the period prevalence of these procedures we will focus on events occurring in 1999-2001. For analyses addressing trends across time, data from 1993 – 2002 will be used.

Analyses:

Within each study community, race (Jackson and Forsyth only) and gender specific rates for MI (definite and probable) will be calculated by category (quantiles) of neighborhood SES (within and across study communities). GIS techniques will be used to “map” or graphically display rates by category of neighborhood SES within each of the study communities.

The main analytic technique used will be Poisson regression modeling that takes into account spatial autocorrelations. This will be implemented using WINBUGS software or the SAS macro GLIMMIX. Both procedures have the capabilities to estimate the model taking into account spatial autocorrelation.¹⁸ The data include observed and expected MI cases (age standardized) for each census tract. The GIS information will be used to determine the neighbors for each census tract. The covariates include indicators of neighborhood SES and demographic variables (age, race, center, gender). To examine whether SES effects vary over time, these models will be further extended to include time and time interactions.

7.a. Will the data be used for non-CVD analysis in this manuscript? ☐ Yes
☒ 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

(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
☒ 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"? n/a
☐ Yes ☐ No

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.cscce.unc.edu/ARIC/search.php>

☒ 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 085, MS 249 (Rosamond)

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

11.b. If yes, is the proposal
☒ A. primarily the result of an ancillary study (list number*)

AS 2004.05

☐ 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.cscce.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.

References

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