

ARIC Manuscript Proposal # 1292

PC Reviewed: 10/09/07

Status: A

Priority: 2

SC Reviewed: _____

Status: _____

Priority: _____

1.a. Full Title:

Neighborhood Socioeconomic Status, Health Insurance, and Evidence-Based Pharmacologic Treatment of Myocardial Infarction: ARIC Community Surveillance

b. Abbreviated Title (Length 26 characters):

SES and Medicine Treatment

2. Writing Group:

Writing group members:

Kathryn Rose, Wayne Rosamond, Eric Whitsel, Chirayath Suchindran, 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 2007. An abstract will be prepared for the October deadline of the 2008 American Heart Association Epidemiology and Prevention meeting. A draft of manuscript is expected during Summer 2008.

4. Rationale:

Pharmacologic treatments are efficacious for reducing morbidity and mortality post-myocardial infarction (MI)¹⁻⁴. The prescription of evidence-based treatments such as aspirin, blood pressure and lipid-lowering medications is monitored for improving hospital quality of care for all patients⁵. Overall, the prescription of these effective pharmacologic agents has increased over time among patients post-MI^{3,6-8}. However, during the time period of interest for this investigation, we expect to find that prescriptions for aspirin or other anti-platelet agents, beta-blockers, angiotensin converting enzyme (ACE) inhibitors, lipid-lowering medications and their combinations have increased while those for calcium channel blockers have decreased, paralleling trends previously observed in ARIC community surveillance⁹.

Previous studies have shown that receipt of evidence-based pharmacologic treatments post-MI differ by race, gender, age, health insurance, and hospital type¹⁰⁻²³. Hospital data in the United States (U.S.) do not generally include individual measures of SES, such as income, education or occupation. Several investigators have used insurance status as a proxy for individual SES²⁴⁻²⁶, although the validity of this approach is not known. However, Medicaid coverage, with the exception of limited medical conditions (HIV/AIDS, chronic kidney disease, blindness) is only provided to patients below the federal poverty level²⁷, and thus, in the absence of other SES information, is likely a reasonable surrogate for low SES. In our ongoing work as part of ARIC ancillary study 2004.05, among ARIC community surveillance patients, 70% of Medicaid recipients live in low neighborhood SES (nSES) areas, as defined by census tract median household income^{28,29}.

While some researchers treat nSES as a surrogate for individual SES, evidence suggests that social and environmental contexts play independent roles in health outcomes^{30,31}. The separate influence of nSES on health could be due to access to primary care, presence or absence of stressors such as noise and crime, and level of social support among neighborhood residents. Relatively little U.S. research currently exists on the relationship between nSES and prescription of evidence-based pharmacologic therapy post-MI. Rao and colleagues categorized nSES by income of the zip code of residence, and found that among Medicare beneficiaries, higher neighborhood income was correlated with higher rates of evidence-based medical treatment³². Meanwhile, a study in Canada found that access to cardiovascular medications did not differ between patients of different census-level nSES areas³³.

Thus, we propose to explore nSES as a potential barrier to receipt of evidence-based medical therapy post-MI. In addition, we will investigate whether type of health insurance is associated with the use of evidence-based pharmacologic treatments. Our other work in progress in the context of ARIC community surveillance has illuminated the influence of nSES on prehospital delay time²⁸, incident MI rates²⁹ and receipt of coronary revascularization procedures³⁴ in the context of definite or probable hospitalized MI. We will determine the independent and joint influence of nSES and health insurance on receipt of evidence-based agents post-MI, during the hospitalization or at discharge.

5. Main Hypothesis/Study Questions:

1. Are nSES and health insurance positively associated with use of pharmacologic therapy (aspirin or anti-platelet agents, beta blockers, calcium channel blockers, ACE inhibitors, lipid-lowering medications, and their combination) among hospitalized MI patients, given during the hospitalization or at discharge?
 - a. Do positive, graded associations between nSES/health insurance and use of pharmacologic therapy, given during the hospitalization or at discharge, exist within and across study communities?
 - b. Does race, age, gender, study community or whether events are incident or prevalent modify the nSES/health insurance-pharmacologic therapy association?
 - c. If nSES/health insurance disparities exist, do they vary across time?

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

Data sources:

ARIC community surveillance data will be analyzed over the time period 1993-2002. Neighborhood census tract-level SES variables are available in The Burden of CHD in Communities (ARIC ancillary 2004.05) study. Definite and probable MI events are of interest. Outcomes will include currently used and discharge medications (aspirin or anti-platelet agents, beta blockers, calcium channel blockers, ACE inhibitors, lipid-lowering medications, and their combination) given during hospitalization or at discharge. Covariates considered will include race, gender, center, age, type of health insurance, year of event, hospital type (teaching vs. non-teaching), and presence of cardiac pain, a predictor of medication prescription in other settings. Other variables will be primarily used to define contraindications for prescription of selected medications (Table 1).

Over 11,000 (weighted) incident (defined as first definite/probable MI occurring in the context of ARIC community surveillance with no reported history of prior MI) events and approximately 20,000 (weighted) prevalent MI events occurred in ARIC community surveillance between 1993 and 2002. We plan to use census tract-level median

household income as a measure of nSES. Health insurance will be characterized as: prepaid or prepaid plus Medicare, Medicare only, Medicaid only, Medicare and Medicaid, other and none as based on our previous work²⁸.

Exclusions:

Definite and probable MIs will be included since 1993. Prior to 1993, patient addresses were not routinely abstracted from the medical record, and thus cannot be reliably linked to census tract-level SES variables.

Medication-specific analyses will be conducted as well as those for combination therapy. Absolute and relative contraindications exist for the use of each medication, and therefore exclusions will be made where data are available (Table 1).

Analyses:

Pharmacologic treatment (yes/no) for each medication as well as combined medications is the outcome of interest. Patients with treatment contraindications will be excluded from the treatment-specific analyses in order to provide an estimate based on patients who are eligible for pharmacologic therapy. Odds ratios for pharmacologic treatment (and 95% confidence intervals) will be calculated using generalized estimating equations (GEE) to account for the clustering of observations by census tract. GEEs provide standard errors of the odds ratios which have been adjusted to take into account the dependence of observations made on patients from the same census tract³⁵. All analyses will be weighted to account for the sampling of ICD-9-CM hospital diagnosis codes³⁶. We will use SAS software (SAS Institute, Cary, NC) with the procedure GENMOD. We plan to repeat the analysis using GLIMMIX to investigate whether random slopes/intercepts are better than fixed effects for modeling multi-level, time dependent data.

Crude nSES/health insurance-treatment analyses will be conducted, the influence of covariates in a full model will be tested, and effect modification of the nSES/health insurance-treatment relationship will be explored.

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 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 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

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>

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 110 (Romm)

MS 216 (Lewis)

MS 395 (Rosamond)

MS 490 (Li)

MS 833 (Briley)

MS 1103 (Rose)

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 (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.csc.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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Table 1. Examples of absolute and relative contraindications for selected pharmacologic treatments for MI

Aspirin or anti-platelet agents	Beta Blockers	Calcium Channel Blockers	ACE or ATII Inhibitors	Lipid-Lowering Medications
Dying within 6 h of admission	Dying within 6 h of admission	Dying within 6 h of admission	Dying within 6 h of admission	Dying within 6 h of admission
Stroke	Asthma	Heart failure	End stage renal disease	End stage liver disease
CNS hemorrhage	Chronic obstructive pulmonary disease	Bradycardia		
Peptic ulcer disease	End stage renal disease			
Warfarin use	Heart failure			
Coagulopathy	Bradycardia			
End stage liver disease				

