1.a. Full Title:
Socioeconomic Status (SES) and Case-Fatality among Participants with Incident Heart Failure

b. Abbreviated Title (Length 26 characters):
SES and HF case-fatality

2. Writing Group:
Writing group members:
Kathryn Rose, Patricia Chang, Annie McNeill, Chirayath Suchindran, Wayne Rosamond, 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 Winter 2008. A manuscript draft is expected during Spring 2009.

4. **Rationale:**

Overall, the number of deaths attributable to heart failure (HF) is increasing\(^1,2\). Case-fatality rates for HF are relatively high during in-hospital, 30-day and 1- and 5-year periods, although they appear to be declining over time\(^3-5\). The in-hospital incident HF case-fatality rate reported in a population-based sample in England was 18%\(^6\), and other studies from Scotland and the Netherlands report similar results\(^7,8\). However, in-hospital mortality rates for HF ranged from 3% in IMPACT-HF\(^9\) to 4% (OPTIMIZE\(^10\) and ADHERE\(^11,12\)) and 7% (EHFS-I\(^1\) and EHFS-II\(^13\)). Meanwhile, 30-day mortality following a first diagnosis with HF is approximately 20%\(^5,6\), while 1-year case-fatality ranges from 30-50% overall\(^2,5,14,15\) and 5-year mortality often exceeds 50% - and has approached 80%\(^5,16-19\).

In comparison to the above estimates, a two- to four-fold increase in in-hospital mortality has been shown in patients with HF occurring after acute myocardial infarction\(^20\). Meanwhile, 30-day and 1- and 5-year mortality following a first HF diagnosis increases in the highest comorbidity-laden groups\(^2,21\). Registry studies indicate that, of patients hospitalized for HF, more than 50% had coronary artery disease, 27-44% had type-2 diabetes, and 18-30% had renal insufficiency\(^1\). It is estimated that ischemic heart disease is the most common cause of left ventricular systolic dysfunction leading to HF in industrialized societies\(^22\), and Cowie et al (2002) found that patients developing HF in the context of myocardial infarction had a worse prognosis compared to patients with other etiologies\(^6\). Therefore, it is possible that participants in the ARIC cohort with certain comorbidities at baseline, such as ischemic heart disease, may be at higher risk for subsequent mortality compared to participants free of the aforementioned comorbidities at baseline.

In addition, 1-year case-fatality due to coronary heart disease (CHD) has been associated with neighborhood-level socioeconomic status (nSES). For example, Winkleby et al (2007) found an increased likelihood of 1-year CHD case-fatality among 130,024 women and men in Sweden living in low nSES compared to high nSES areas. This relationship remained significant after controlling for age, marital status, family income, educational attainment, immigration status, time lived in neighborhood, and urban/rural status\(^23\).

Furthermore, since certain clinical comorbidities are more common among patients of low socioeconomic status\(^24\), it is possible that HF patients of low socioeconomic status with diabetes, for example, are at greater risk of mortality within one year compared to HF patients of low socioeconomic status without prevalent diabetes. No data are available which address whether the nSES - case-fatality relationship differs between patients with and without prevalent chronic disease (i.e., ischemic heart disease, diabetes, chronic kidney disease and obesity). If differences in the nSES–case-fatality relationship
exist between strata of (presence or absence of) certain chronic diseases at baseline, public health professionals may be able to further tailor their prevention messages to reach the segments of the population at greatest mortality risk.

5. Main Hypothesis/Study Questions:

1. Determine the association of nSES and HF case-fatality (in-hospital, 30-day, 1-year and 5-year).
   a. Do positive, graded associations between nSES and HF case-fatality exist?
   b. Does individual-level socioeconomic status, race/study community, age, gender or year of incident HF modify the nSES - HF case-fatality association?

2. Examine possible effect modification of the nSES - case-fatality relationship by prevalent chronic disease at baseline (i.e., ischemic heart disease, diabetes, kidney disease and obesity).

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

ARIC cohort data will be analyzed over the time period baseline-2005.

Case-fatality will be measured by ascertainment of in-hospital deaths, as well as deaths occurring within 30 days, 1 year and 5 years, respectively, of the incident HF event. In-hospital death (yes/no) will be obtained from the hospital record abstraction (HRA) form, while the date of all other deaths will be located in annual follow-up (AFU) data and will be classified as within 30 days, 1-year or 5 years of the incident HF event (yes/no).

The area-level (nSES) measure selected for study from the 1990 US Census is median household income. Tertiles of median household income (low, medium and high) will be formed by using community-wide data from all persons living in the study communities as reported in the 1990 US Census. Several baseline variables will be considered in the analysis as potential confounders or effect modifiers. Age, race/study community, gender, year of incident HF and selected individual-level socioeconomic variables (family income, education, occupation and health insurance status [i.e., receipt of Medicaid]) will be taken into account in the analyses, as well as health conditions present at baseline that may influence the effect of SES on HF case-fatality, such as ischemic heart disease, kidney disease, diabetes and obesity.

Logistic regression (PROC GENMOD) will be used to assess the influence of SES on in-hospital, 30-day, 1-year and 5-year case-fatality among HF patients.

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

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.cscc.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 1160 (Roberts)

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

11.b. If yes, is the proposal
    ____   A. primarily the result of an ancillary study
    ____   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.

References


