ARIC Manuscript Proposal # 1462

PC Reviewed: 01/13/08	**Status: A**	**Priority: 2**
SC Reviewed: _____	**Status: _____**	**Priority: ____**

1.a. Full Title:

Socioeconomic Status (SES) and the Trajectory of Self-Rated Health (SRH): Before and After a Heart Failure Event

b. Abbreviated Title (Length 26 characters):

SES and SRH in heart failure

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]**

First author: Randi Foraker
Address: Bank of America Center
137 E Franklin Street, Suite 306
Chapel Hill, NC 27514

Phone: 919-966-1407 Fax: 919-966-9800
E-mail: randi_foraker@unc.edu

Corresponding/senior author (if different from first author correspondence will be sent to both the first author & the corresponding author):
Address:

Phone: Fax:
E-mail:

3. Timeline:

Analyses to begin Winter 2008. An abstract will be prepared for the February deadline of the 2009 Society for Epidemiologic Research meeting. A manuscript draft is expected Spring 2009.

4. Rationale:

Self-rated health (SRH) is obtained by asking individuals to objectively describe their health status on a four- to eight-point Likert scale (i.e., excellent, good, fair or poor)[1]. SRH data are simple to collect[2], yet difficult to interpret, since the SRH scale is not precisely ordinal. Thus, Diehr et al (2003) proposed a transformation based on data from the Cardiovascular Health Study to a scale from 100 (perfect health) to 0 (death). Diehr's transformation represents the probability of being healthy in the future, conditional on the current value of SRH[3].

SRH is relatively stable until age 50[4], and declines with age[2]. SRH has been found to be associated with adverse health outcomes, such as repeated hospitalizations among heart failure (HF) patients[5], and mortality[6]. Thus, it is hypothesized that SRH may be able to predict adverse health outcomes.

While many studies have investigated factors associated with current SRH[2,7,8] or a change in SRH (i.e., from baseline)[6], few studies have reported the trajectory of repeated measures of SRH across some specified time period[9]. Miller and colleagues (2007) used the theory of SRH incorporating a forward- and backward-looking trajectory of health proposed by Idler and Benyamini[10] to inform their statistical analysis strategy[11].

Cross-sectional analyses among elderly persons have shown that living in disadvantaged neighborhoods, having low education and low household wealth increase the odds of reporting poor health[7,8,12,13]. Furthermore, the association between neighborhood-level SES (nSES) and SRH remains after taking other individual-level measures - including measures of income, education and occupation - into account[7]. Proposed mechanisms include an increase in allostatic load due to the stressors of low socioeconomic status (SES), and few resources available to persons from low nSES areas in order to deal with such stress[7]. No research has been done to date to quantify the trajectory of repeated measures of SRH among HF patients by SES. Information regarding SRH trajectories that differ by SES may be used to develop interventions which prevent the loss of well-being associated with an incident diagnosis of HF.

5. Main Hypothesis/Study Questions:

1. Describe and compare the trajectory of mean SRH between participants of low-, medium- and high-nSES prior to and following an incident HF event in the ARIC cohort.

a. Compare nSES-SRH trajectory against that of a "random" event occurring among a comparison group selected from the entire ARIC cohort.
b. Determine whether the prevalence or absence of chronic diseases at baseline (ischemic disease, diabetes, obesity or kidney disease) modify the nSES – SRH trajectory.

2. If SRH declines post-event, determine how much of the decline in SRH post-event is due to deaths, and estimate the proportion of individuals, by nSES, who did not recover after the event.
    a. Compare results by nSES group to the experience of the comparison group in order to determine how much of the decline is SRH is to be expected (i.e., from the aging of the cohort).

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

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

SRH was measured at baseline and at each annual follow-up (AFU) with the question, "Over the past year, compared to other people your age, would you say that your health has been *excellent*, *good*, *fair* or *poor*?" However, to get an accurate picture of SRH, it is important to take death into consideration in analyses. For example, if only live participants are considered during follow-up, SRH may be shown to improve after a sentinel health event, since the sickest patients (i.e. those with *fair* or *poor* SRH) have died[3]. The area-level (nSES) measure selected for study from the 1990 US Census is median household income.

The response set is not precisely ordinal, and the responses will be transformed according to Diehr et al[14]: 95 for *excellent*, 80 for *good*, 30 for *fair*, 15 for *poor*, and 0 for *death*. This transformation represents the estimated probability of persons being healthy two years later, as developed from several data sources, including the Cardiovascular Health Study[3,9]. The ARIC cohort has experienced little loss to follow-up, therefore, we anticipate being able to estimate (i.e. interpolate) missing SRH data, with the exception of data missing due to death, from data collected before and after the missing SRH assessment. We will assess the time from baseline until incident HF diagnosis and from diagnosis until death (or end of follow-up time) in the ARIC cohort to determine if there is a more appropriate analysis window (i.e., 2 years prior to the event and 2 years following the event[9]).

Utilizing a method previously employed by Diehr et al[9], a comparison group of 2,000 cohort participants will be formed by a random sample of all cohort members alive at a randomly-selected date, which represents a random "event" experienced by the comparison group. All cohort participants are eligible to become part of the comparison group, regardless of their incident HF status during follow-up. This comparison group will serve to help determine if the nSES-SRH trajectories differ from the trajectory of SRH that would be expected due to aging. The age-sex-race/center distribution of SRH

among patients who have an incident HF event will be standardized to the age-sex-race/center distribution of SRH for the comparison group. Specifically, health at each time point will be regressed on age, sex and race/center for the participants in the random group. The observed SRH measurements for the participants with incident HF will be adjusted as follows: observed SRH - predicted SRH + mean of SRH for the comparison group. Analysis of variance will be used to test for differences in adjusted SRH between nSES groups and between nSES groups and the comparison group.

We will use the change in adjusted SRH between the year of event and one year later to calculate how much of the decline in SRH post-event is due to deaths by nSES and for the comparison group. For example, we will calculate the mean adjusted decline in SRH among participants alive one-year post event and divide that value by the mean adjusted decline in SRH among all participants (regardless of vital status). The proportion of decline in SRH post-event due to deaths is then one minus the aforementioned value. We will also report the proportion of individuals who did not recover, that is, whose health was worse two years post-event compared to one year post-event, by nSES and for the comparison group.

It is hypothesized that differences in SRH may be due to differences in prevalent disease conditions at baseline[2]. Therefore, we plan to further stratify nSES groups and the comparison group by presence or absence of the following conditions at baseline: ischemic heart disease, diabetes, chronic kidney disease and obesity. It is feasible that these health conditions, present at baseline, may influence the rate of decline in SRH over time. To account for multiple statistical comparisons, the Bonferroni correction will be employed in analysis of variance testing.

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# 830 (Houston)

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

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