1.a. Full Title:
Racial and geographic comparisons in the presentation, co-morbid conditions and treatment in acute decompensated heart failure

b. Abbreviated Title (Length 26 characters):

2. Writing Group:
Laura Loehr, Chris Baggett, Hanyu Ni, Anita Deswal, PP Chang, Stuart Russell, Wayne Rosamond others invited to join

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

First author:
Laura Loehr, MD PhD
Cardiovascular Diseases Program, Bank of America Center, Suite 306
137 E. Franklin Street, Chapel Hill, NC 27514-3628
Phone: 919-619-5023 Fax: 919-966-9800
E-mail: lloehr@email.unc.edu

ARIC author to be contacted if there are questions about the manuscript and the first author does not respond or cannot be located (this must be an ARIC investigator).
Wayne Rosamond
Cardiovascular Diseases Program, Bank of America Center, Suite 306
137 E. Franklin Street, Chapel Hill, NC 27514-3628

Phone: Fax:
E-mail: Uccwdr@mail.cscc.unc.edu

3. Timeline:
Analysis to start immediately; Paper written and sent to journal within 8-12 months

4. Rationale:
HF represents one of the major public health problems faced by healthcare systems worldwide. In the elderly patients, the condition is often accompanied by cardiac (such as atrial fibrillation) and non-cardiac comorbidities (such as hypertension and diabetes) that play an integral role in its progression and response to treatment. Many heart failure hospitalizations are preventable with appropriate ambulatory care, and as such are considered an ambulatory care-
sensitive condition in which rates of hospitalization may serve as indicator of
ambulatory care access and quality (O'Neil). Understanding the racial
differences and geographic variation in HF comorbidity, especially among those
hospitalized for acute decompensated HF, can help health care professionals in
out-and inpatient settings provide most effective management of HF and thus
reduce patient suffering, rehospitalization rates, mortality and healthcare costs.

Incidence of heart failure (HF) is higher in African Americans compared to Whites
(Loehr et al). The prevalence of common conditions often comorbid with heart
failure, including atrial fibrillation, hypertension, and kidney disease, are known to
vary considerably between Blacks and Whites. A study from the OPTIMIZE-HF
(Organized Program to Initiate Lifesaving Treatment in Hospitalized Patients with
Heart Failure) Registry compared Blacks and Whites in their registry and found
that the mean age for Blacks with HF was ~10 years younger than for Whites
(Yancy et al, Echols et al). Furthermore, the prevalence of hypertension, and
end stage renal disease is higher in Blacks with HF. Conversely, the prevalence
of atrial fibrillation, coronary heart disease, and ischemic etiology of HF is higher
among Whites with heart failure compared to Blacks. Surprisingly, this study
found that in-hospital mortality was slightly lower in Blacks compared to Whites,
and length of stay was comparable. This could have been due to differences in
the proportion with HFpEF by racial group as compared to those with systolic
dysfunction.

We plan to characterize Black and White differences in the presentation,
comorbid conditions, and treatment of acute decompensated HF. Specifically,
we will describe Black/White differences in the ARIC surveillance communities in
acute decompensated HF for: 1) the presentation of HF and other demographics
(such as age, gender, type of insurance) and as measured by laboratory tests
(BNP, hemoglobin etc.) and vital signs (heart rate, SBP etc.); 2) the prevalence
of common comorbid conditions; and 3) type of HF (systolic dysfunction versus
HF with preserved ejection fraction) and 4) length of stay and in-hospital
mortality. In addition, we will describe the geographic variation by race across
the 4 communities in hospitalizations for acute decompensated HF for
demographics and insurance, in hospital treatment, discharge medications and
outcomes of length of stay and in-hospital mortality.

There is thought to be a higher prevalence of HFpEF among African Americans
which may explain differences in the prevalence of comorbid conditions,
therefore we plan as a secondary analysis to restrict the comparison of comorbid
conditions to those with HFpEF. The Worcester Heart Failure Study found that
as would be expected obesity is more prevalent in those with diastolic HF
compared to systolic HF (Chinali et al) whereas prior myocardial infarction is
more common in those with systolic HF. Therefore racial differences in CVD risk
factors and thus the type of HF may explain much of the differences in outcomes
seen by race. We will aim to determine if there are racial differences in comorbid
conditions when evaluated within one subtype of HF, those with HFpEF.
5. **Main Hypothesis/Study Questions:**

1) We will make Black to White comparisons in the number of acute decompensated HF events associated with hypertension, diabetes, obesity, atrial fibrillation, and coronary heart disease and other comorbid conditions. We hypothesize that rates of hypertension, diabetes, obesity, will be higher in Blacks, whereas atrial fibrillation, and coronary heart disease will be higher in Whites. However, when we restrict the analysis to those with HFpEF, we expect the distribution of comorbid conditions will be more similar between the two racial groups.

2) In addition, we hypothesize that mean age of Blacks with acute decompensated HF will be younger than for Whites.

3) Due to a higher prevalence of hypertension and a higher severity of disease among Blacks, we hypothesize that mean blood pressure and pulse pressure will be higher in Blacks compared to Whites.

4) Length of stay and in hospital mortality will be compared between Blacks and Whites and by surveillance community. As has been previously shown, we hypothesize that length of stay will be shorter in Blacks and in-hospital mortality will be the same, however differences in length of stay between blacks and whites may not be present when evaluated among those with HFpEF.

5) Treatment at discharge with beta blockers, ACE Inhibitors or angiotensin II receptor blockers, aldosterone blockers and diuretics will be compared by race.
and geographic region. Also, treatment with IV diuretics and IV inotropes during the hospitalization will be compared by race and geographic region.

6. Design and analysis (study design, inclusion/exclusion, outcome and other variables of interest with specific reference to the time of their collection, summary of data analysis, and any anticipated methodologic limitations or challenges if present).

Study Design, Inclusion/exclusion:

This study will include all heart failure events coded as acute decompensated heart failure for all years completed by the start date of this project (2005-2007). All data has been previously abstracted from the Heart Failure Abstraction (HFA) form. This study will compare Blacks to Whites and then the 4 geographic surveillance communities. For the racial comparisons, those not Black or White and those for whom race is not known will be excluded.

Variables of Interest:
- Race
- age at the time of hospitalization
- community of residence
- sex
- systolic dysfunction
- diastolic dysfunction
- prior diagnosis of HF
- prior hospitalization for HF

Presentation:
- Heart Rate
- Systolic blood pressure
- Diastolic blood pressure
- Pulse pressure
- Weight
- Hgb
- Creatinine
- BNP/NT-proBNP

Comorbidity:
- Arrhythmias: Atrial fibrillation/atrial flutter, heart block, V Fib or V Tach
- coronary heart disease
- ESRD
- Severe valvular disease
- pulmonary hypertension
- chronic bronchitis/COPD
- Asthma
- hyperlipidemia
- diabetes mellitus
- obesity
- current smoker
- OSA
- stroke or TIA

**Treatment:**
- Treatment during hospitalization: IV diuretics, IV inotropes
- Treatment at discharge: Ace inhibitors or angiotensin II receptor blockers, beta blockers, diuretics

**Outcome of interest:**
- length of stay
- in-hospital mortality

**Summary of data analysis:**

All analyses of event rates, proportions, and means will be weighted by the inverse of the sampling fraction. Univariate association by race for all comorbid conditions will be analyzed using chi-square analyses for categorical variables and analysis of variance (ANOVA) for continuous covariates. Age-adjusted Black White comparisons will be done with weighted logistic regression to account for the sampling scheme in ARIC surveillance.

**Limitations:**

Information is limited to that which was documented and abstracted from the medical record, therefore there may missing information if not asked at the time of a hospitalization or if not documented. In some cases, missing values and “no” values are indistinguishable.

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 ICTDER03 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 ICTDER03 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 ICTDER03 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)?

#927 Loehr, Rosamond et al. HF incidence and survival

#1489 Chang et al. Surveillance of heart failure hospitalizations requires more than just the ICD-9 code: rates of acute decompensation versus chronic disease in the ARIC Study

#1490  Chang et al. Utilization of optimal medical therapy for hospitalized heart failure and outcomes: the ARIC Study.

#1657 Avery et al. Enumerating the community burden of heart failure

#1569 Avery et al. The heart failure population burden due to acquired risk factors: The Atherosclerosis Risk in Communities study

#1537 Fox et al. Echocardiographic Predictors of Incident CHF and Cardiovascular Events in African Americans

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 (list number* _________)
____ 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.