ARIC Manuscript Proposal # 1826

PC Reviewed: 8/9/11  Status: A  Priority: 2
SC Reviewed: _________  Status: _____  Priority: ____

1.a. Full Title: Effect of continuity of care on outcomes among patients with heart failure in the ARIC Surveillance communities

b. Abbreviated Title (Length 26 characters): Continuity of care and HF in ARIC Surveillance

2. Writing Group:
   Writing group members: Anna Kucharska-Newton, Sally Stearns, Mark Holmes, Patricia Chang, , Saul Blecker, Randi Foraker, Laura Loehr, Alain Bertoni, Wayne Rosamond, others welcome

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

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3. **Timeline:** Analyses will start following proposal approval. The aim is to submit an abstract based on these data for the Academy Health meeting (abstract deadline, January, 2012).

4. **Rationale:**

The proposed research is meant to serve as a companion study to already proposed evaluation of continuity of care for ARIC cohort participants with heart failure (ARIC ms# 1799).

Numerous sources of public health research call attention to the continuing significant increase in expenditures associated with treatment for chronic disease conditions, specifically cardiovascular disease (1-3) and to the lack of improvements in quality of care and outcomes among those with cardiovascular disease. In an aging population, the increasing prevalence of cardiovascular disease places significant demands on a healthcare system in which it is estimated that two thirds of costs are associated with chronic disease (4). The importance of evaluating factors that contribute to these costs cannot be overstated. Likewise, comprehensive evaluation of the continuum of care is necessary to effectively address challenges posed by increasing prevalence of cardiovascular disease.

In a report recently submitted to the Department of Health and Human Services, the National Quality Forum listed coordination of care as one of six top priorities in the proposed changes to the healthcare system aimed at containing costs and providing better and more affordable care (5). Decreased coordination of care directly impacts continuity of care, defined according to the American Academy of Family Physicians, as “the process by which the patient and the physician are cooperatively involved in ongoing health care management toward the goal of high quality, cost-effective medical care.” Continuity of care, a multidimensional concept that includes a hierarchy of three broad categories of informational, longitudinal, and interpersonal continuity (6), is associated with improved outcomes, including delivery of preventive services and lower hospitalization rates, and with lower overall healthcare costs (7, 8). The greatest cost savings attributed to continuity of care result from decreased use of Emergency Departments (9, 10) and decreased hospitalization rates, specifically hospitalizations for ambulatory care sensitive conditions (11).

Patients with chronic cardiovascular disease conditions often require management by multiple healthcare providers (12). An average Medicare beneficiary sees seven medical providers in a year, whereas beneficiaries with chronic conditions see an average of 16 providers annually (13). Depending on disease severity, Medicare patients with heart failure see an average of 15 to 23 different providers annually (14), although less than 25% of all office visits for individuals with heart failure are heart failure specific. The degree to which individuals seek care at multiple sites may be justified by the severity of disease and by presence of comorbidities and as such may be a positive element in the overall patient management. At the other extreme seeing many different physicians may
reflect unnecessary fragmentation of care, which may result in the patient’s perception of inadequate care (15) and lead to adverse outcomes (16, 17). Increased continuity of care and coordination of care can substantially reduce the frequency of readmissions (18) for heart failure patients. Understanding factors associated with continuity of care and evaluating continuity of care across the spectrum of heart failure development is therefore essential.

The aim of this study is to characterize the continuum of care for patients with heart failure in the four ARIC study communities. Assessment of provider continuity will be based on Medicare claims and will be used to examine provider characteristics prior to and post event and to evaluate hospital readmission, length of stay, 30-day mortality, and 1-year mortality following index hospitalization. Since this study will be based on Medicare claims data, the age of study participants will be limited to 65 years and older. In this study, CMS Medicare claims data will provide extensive information concerning health care utilization within the ARIC study communities. ARIC Community Surveillance data will enrich the analyses with zip code level neighborhood socioeconomic variables. The socioeconomic context available from the ARIC Community Surveillance will significantly broaden the evaluation continuity of care beyond what can be achieved solely with CMS Medicare claims data.

Although the proposed analysis of continuity of care in the ARIC Surveillance communities is ecological in nature, it will provide the context for the evaluation of patterns of care in the more controlled setting of the study cohort. It will also contribute the healthcare context for future examination of trends in cardiovascular disease incidence and mortality.

5. Main Hypothesis/Study Questions:

Examine association of provider continuity, assessed on the basis of Medicare claim records, with length of stay, hospital readmission (30 day and 1 year post index hospitalization), and rates of 30 day and 1 year mortality post heart failure hospitalization in the ARIC surveillance communities.

This study will be conducted for the Medicare population (aged 65 years and older) living in the ARIC surveillance communities during the years 2000 – 2008. We will evaluate potential effect measure modification or confounding of the estimates by age, gender, race, neighborhood socioeconomic status, and selected comorbidities.

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).
**Inclusion/Exclusion criteria:** CMS Medicare records of hospitalized index heart failure events within the ARIC study surveillance communities. Age≥65 years.

**Outcome:** Length of stay, 30-day mortality, 1 year mortality, hospital readmission within 30 days of index hospitalization, hospital readmission within 1 year of index hospitalization.

**Exposure:** Continuity of care will be evaluated on the basis of CMS Medicare records of outpatient care available for individuals identified as having had a heart failure-related hospitalization. We will examine patterns of care prior to and following index HF-related hospitalization. Evaluation of care prior to index hospitalization is subject to selection bias. Greater continuity of care may prevent hospitalizations; consequently individuals hospitalized for HF may be sicker and may require more specialty care following hospitalization. We will use instrumental variables approach to account for unobserved variables and to evaluate the effects of this potential bias.

Continuity of care will be defined as:

a. Provider continuity through the entire process of care within 30 days prior to HF-related hospitalization, during hospitalization, and 1 year following hospitalization. Provider characteristics that will be important to evaluate will be:
   i. type of provider (primary care, specialist)
   ii. type of practice that the pre- and post-hospitalization care provider is associated with.
   iii. did the provider who examined the patient prior to hospitalization also examine the patient during admission and following hospital discharge

b. Provider continuity index

To illustrate variables necessary for determining the continuity of care index following is an example of this construct that has been used in other studies (11):

\[
1 - \frac{(\text{Number of ambulatory care providers})}{(\text{Number of ambulatory visits} + 0.1)}
\]

\[
1 - \left(\frac{1}{\text{(Number of ambulatory visits} + 0.1)}\right)
\]

**Covariates:**

- Demographic (race, age, gender)
- Social (neighborhood socioeconomic status: CMS Medicare records for the ARIC study have been geocoded, allowing for assessment of geographic attributes, such as census tract level median household income)
- Provider type (Primary care, Specialist/Cardiologist, Physician Assistant)
- Comorbidities (determined from inpatient claims generated in the 365 days before and including the heart failure discharge date for evidence of diabetes, hypertension, hypercholesterolemia, coronary artery disease, chronic kidney disease, COPD, depression)

7.a. **Will the data be used for non-CVD analysis in this manuscript?**  __x__ 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? __x__ 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 __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 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.csc.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)?

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.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: