ARIC Manuscript Proposal # 1799

PC Reviewed: 5/10/11  Status: A  Priority: 2
SC Reviewed: _________  Status: _____  Priority: ____

1.a. Full Title: Continuity of physician care and outcomes among patients with heart failure. The Atherosclerosis Risk in Communities (ARIC) Cohort Study

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

2. Writing Group:
   Writing group members: Anna Kucharska-Newton, Sally Stearns, Mark Holmes, Patricia Chang, Michael Pignone, Debra Irwin, Randi Foraker, Laura Loehr, Alain Bertoni, Saul Blecker, 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]

First author: Anna Kucharska-Newton
Address: Department of Epidemiology, CVD Program BoA Center
137 E. Franklin St.
Chapel Hill, NC 27514-3628
CB# 8050

Phone: (919) 966-4564  Fax: (919) 966-9800
E-mail: Anna_Newton@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).
Name: Sally Stearns
Address: Department of Health Policy and Management
1104C McGavran-Greenberg
135 Dauer Drive, CB #7411
University of North Carolina at Chapel Hill
Chapel Hill, NC 27599-7411

Phone: (919) 843-2590  Fax: (919) 966-6961
Email: sally_stearns@unc.edu
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:**

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 affects 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 post index hospitalization is therefore essential.

The main aims of this study are: (1) to characterize the continuum of physician care for ARIC cohort study participants with an index hospitalization for heart failure using the linked ARIC - CMS Medicare data; and (2) to assess the relationship between continuity and health outcomes.

Assessment of physician continuity will be based on Medicare claims data. Outcomes to be considered will be hospital readmission, emergency room visits, and mortality. As the study develops, we will assess the association of provider continuity for the ARIC cohort participants with patient reported outcomes which will be obtained during ARIC Visit 5 and at the semi-annual follow-up of the cohort participants.

5. Main Hypothesis/Study Questions:

1. **Develop measures of continuity of care for ARIC cohort study participants hospitalized for heart failure using Medicare claims data for the ARIC cohort study.**

   The purpose of this study aim is to provide a quantitative analysis of provider continuity before and after index hospitalization for heart failure. The analysis will be based on CMS Medicare claims records for ambulatory care services and Emergency Department visits for ARIC cohort study participants (age 65 years and older) who have had an index hospitalization for HF. We expect to focus on continuity for at least two years prior to the index HF admission and for up to two years post index admission (depending on survival). Tentatively, the measures of physician continuity of care will exclude physician services during hospitalizations.

2. **Identify factors associated with continuity of care among those with heart failure**

   The purpose of this study aim is to identify factors associated with provider continuity pre and post index hospitalization according to the following categories:
   a. Demographic (race, age)
   b. Social (individual socioeconomic status defined by level of education; neighborhood socioeconomic status based on census tract level data on median household income)
   c. Comorbidities (diabetes, hypertension, hypercholesterolemia, coronary artery disease, chronic kidney disease, COPD, depression; will also consider using the Charlson index of comorbidity)
   d. Disease severity (evaluated on the basis of heart failure stage)
3. Examine the association of provider continuity with outcomes among ARIC cohort study participants hospitalized with heart failure

We will examine the association between provider continuity and the following outcomes:

a. Hospital admission for heart failure
b. Hospital readmissions following incident heart failure event (examined within 2 years of index hospitalization)
c. Emergency room visits
d. Mortality

4. 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:** Include all cohort participants with index heart failure hospitalization

**Outcomes:** Hospital admission, hospital readmission, emergency room use, mortality measures available from ARIC cohort event surveillance data as well as CMS Medicare inpatient/MedPAR and outpatient claims.

**Exposure:** Continuity of care will be evaluated for a two-year period prior to and following index hospitalization for heart failure. We will use CMS Medicare physician claims data to examine continuity of care. We will evaluate published methods used to quantitatively measure continuity of care so as to arrive at the method best suited to the ARIC study. Tentatively, we will calculate the measures of physician continuity using indicators of evaluation and management (E&M) visits. Our measure will consider aspects of physician care (e.g., whether care appears to be largely provided by primary care providers or specialists). We will also consider other measures available from the literature, such as the following continuity of care index that has been used in other studies (11):

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

1 - \( \frac{1}{\text{Number of ambulatory visits} + 0.1} \)

**Covariates, aside from the exposure measure:**

- Demographic (race, age, gender)
- Social (individual socioeconomic status defined by level of; neighborhood socioeconomic status based on census tract level data on median household income)
- Area characteristics (urban/rural, # of hospitals, etc.)
- Use of skilled nursing facilities
- Local hospital type (teaching vs non-teaching hospital)
Comorbidities (diabetes, hypertension, hypercholesterolemia, coronary artery disease, chronic kidney disease, COPD, depression; Charlson index of comorbidity)

Disease severity evaluated on the basis of heart failure stage

We expect to construct an analysis file using monthly observations per patient for patient outcomes that will have lagged measures of the continuity of care over a defined time period (e.g., six months). Analytic methods will be appropriate to the specific outcome or research question; tentatively, survival analysis with time-varying covariates will be used.

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.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)?

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.

References: