ARIC Manuscript Proposal #2004

PC Reviewed: 9/11/12 Status: A Priority: 2
SC Reviewed: _________ Status: ____ Priority: ____

1.a. Full Title: “Continuity of care following myocardial infarction. The ARIC study cohort”

b. Abbreviated Title (Length 26 characters): Continuity of care for MI

2. Writing Group: Anna Kucharska-Newton, Lisa Wruck, Sally Stearns, Timothy Carey, Carla Sueta, Patty Chang, Montika Bush, 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: Cardiovascular Epidemiology
Department of Epidemiology
Gillings School of Global Public Health
137 E. Franklin St.
Chapel Hill, NC 27514

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: Lisa Wruck
Address: Collaborative Studies Coordinating Center,
137 East Franklin St, Suite 203
Campus Box CB #8030
Chapel Hill, NC
27514

Phone: (919) 966-1895 Fax: wruck@ad.unc.edu

3. Timeline:
Analyses to be completed within 2 years following manuscript proposal approval.
4. **Rationale:**

This is a manuscript proposal originating from ARIC Ancillary Study 2012.07: “Use of CMS Medicare data for the measurement of continuity of care among ARIC cohort participants following myocardial infarction”.

Proposed methodological approach follows closely methods described in ARIC manuscript proposals 1799 and 1826 which outline evaluation of continuity of care for ARIC cohort participants with heart failure and for members of the ARIC study communities who have had a diagnosis of heart failure, respectively. This proposal differs from the referenced two proposals which are focused on heart failure events, by evaluating continuity of care among study participants who have been hospitalized for myocardial infarction.

Comprehensive evaluation of the continuum of care for persons with cardiovascular disease is necessary to effectively address challenges posed by increasing disease prevalence. Patients with chronic cardiovascular disease conditions often require management by multiple healthcare providers (1). An average Medicare beneficiary sees seven medical providers in a year, whereas beneficiaries with chronic conditions see an average of 16 providers annually (2). 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 (3) and lead to adverse outcomes (4, 5).

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). 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 use the linked ARIC - CMS Medicare data to characterize the continuum of physician care for ARIC cohort study participants following an incident myocardial infarction; and (2) to assess the relationship between continuity of care and health outcomes for ARIC cohort participants following an incident MI. Assessment of physician continuity will be based on Medicare claims data. We will evaluate adherence to guideline recommendations for transition of care from the inpatient setting to outpatient care as well as long-term continuity of care.

5. **Main Hypothesis/Study Questions:**

Aim 1: *Develop measures of transition of care and continuity of care for ARIC cohort study participants hospitalized for incident myocardial infarction using Medicare claims data for the ARIC cohort study.*

The purpose of this study aim is to provide a quantitative analysis of provider continuity following index hospitalization for myocardial infarction (MI). 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 a hospitalization for incident MI. We will evaluate transition of care from the hospital to the outpatient setting and continuity of care occurring over a period of up to two years following index hospitalization (follow-up time will depend on survival and re-admissions).

**Aim 2: Identify factors associated with continuity of care following index hospitalization for myocardial infarction**
The purpose of this study aim is to identify factors associated with provider continuity following index hospitalization for MI 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. MI severity

**Aim 3: Examine the association of provider continuity with outcomes among ARIC cohort study participants following incident myocardial infarction**

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

- a. Hospital readmission for myocardial infarction
- b. Incidence of heart failure
- c. Emergency room visits
- d. Mortality

**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).**

This study will include all cohort participants hospitalized with incident myocardial infarction during the years 2000-2006. The year 2000 is chosen as the start of the observation period so as to assure uniformity of criteria for MI diagnosis.

Hospital admission, hospital readmission, emergency room use, mortality will be evaluated using data from the CMS Medicare Denominator, MedPAR, Carrier, and Outpatient files.

Continuity of care will be evaluated for a maximum two-year period following incident MI hospitalization. We will use Evaluation and Management (E&M) codes to identify ambulatory visits that will be used to measure continuity of care.

Transition of care will be evaluated using the following criteria:

1) presence of a follow-up visit with physician/health care provider within three weeks following discharge
2) time to physician/health care provider visit following discharge
3) frequency of visits to physician/health care provider
4) evidence of charges attributed to cardiac rehabilitation
We will use published methods (12-16) used to calculate quantitative indices of continuity of care. Assessment of continuity of care will include evaluation of physician specialty (e.g., whether care appears to be largely provided by primary care providers or specialists).

Study covariates will include the following:
- 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)

Continuity of care will depend on disease severity. The PREDICT score has been previously used by ARIC investigators to estimate disease severity (17). We will calculate the PREDICT score for each study participant using ARIC medical chart abstraction data. We will use this score as well as the STEMI/NSTEMI classification of MI events to categorize severity of MI.

We will use survival analysis to estimate time to physician visits and to evaluate the association of continuity of care with outcomes.

We expect to encounter the following study limitations:

1. **Relatively small sample size.** We expect <800 incident MI hospitalizations to have occurred in the ARIC cohort during the years 2000-2008. We may want to expand the present study to include all (incident and recurrent) MI events to increase the sample size, especially in evaluating the association of continuity of care with outcomes.

2. **Presence of Managed Care.** As is shown in the table below for select years, a large proportion of ARIC study participants in the Minnesota and Forsyth County ARIC Study Centers and, to an increasing extent, in the Jackson Center are members of a Managed Care Organization. Medical claims records for those study participants will not be, for the most part, available in the CMS Medicare claims data. This will further decrease available sample size and possibly bias estimates as HMO members are usually considered to be healthier than non-members.

<table>
<thead>
<tr>
<th>Year</th>
<th>Forsyth County</th>
<th>Jackson</th>
<th>Minnesota</th>
<th>Washington County</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>34.1</td>
<td>0.42</td>
<td>24.5</td>
<td>0.35</td>
</tr>
<tr>
<td>2004</td>
<td>35.5</td>
<td>0.4</td>
<td>27.3</td>
<td>0.4</td>
</tr>
<tr>
<td>2005</td>
<td>42.0</td>
<td>9.2</td>
<td>32.8</td>
<td>2.6</td>
</tr>
<tr>
<td>2006</td>
<td>44.9</td>
<td>31.0</td>
<td>36.1</td>
<td>4.9</td>
</tr>
</tbody>
</table>

3. **Accurate identification of providers:** Physicians are identified in CMS Medicare data on the basis of the Unique Provider Identification Number (UPIN) (until 2007) or the National Provider Identifier (NPI) (post 2007). A physician can have more than one UPIN and correspondence between the UPIN and NPI numbers for individual physicians may not always be possible to establish.
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 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 ICTDER 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.cscu.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)?

ARIC MS # 1799 Kucharska-Newton et al. “Continuity of physician care and outcomes among patients with heart failure. The Atherosclerosis Risk in Communities (ARIC) Cohort Study”
ARIC MS # 1826 Kucharska-Newton et al., “Effect of continuity of care on outcomes among patients with heart failure in the ARIC Surveillance communities”

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

11.b. If yes, is the proposal

__x__  A. primarily the result of an ancillary study (list number* 2012.07)

_____ 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.cscu.unc.edu/aric/forms/
12a. 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.

12b. The NIH instituted a Public Access Policy in April, 2008 which ensures that the public has access to the published results of NIH funded research. It is your responsibility to upload manuscripts to PUBMED Central whenever the journal does not and be in compliance with this policy. Four files about the public access policy from http://publicaccess.nih.gov/ are posted in http://www.cscc.unc.edu/aric/index.php, under Publications, Policies & Forms. http://publicaccess.nih.gov/submit_process_journals.htm shows you which journals automatically upload articles to Pubmed central.

References: