ARIC Manuscript Proposal #2336

PC Reviewed: 4/8/14	**Status: A**	**Priority: 2**
SC Reviewed: __/__/__	**Status: _____**	**Priority: _____**

1.a. Full Title:

Trends in Atypical Presentation of Myocardial Infarction: Atherosclerosis Risk in Communities (ARIC) Surveillance, 1987-2010

b. Abbreviated Title (Length 26 characters):

Trends in atypical MI

2. Writing Group:
Bailey DeBarmore, Wayne Rosamond, Ph.D. M.S., Lisa Wruck Ph.D., Eric A. Whitsel M.D. M.P.H., Larisa Tereshchenko, M.D. Ph.D., Jessica Zegre-Hersey, Anna Kucharska-Newton, others welcome.

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

First Author: Bailey DeBarmore

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: Wayne Rosamond, Ph.D.
Address: Collaboration Studies Coordinating Center
University of North Carolina – Department of Biostatistics
137 E. Franklin St, Suite 203, Room3
Chapel Hill, NC 27514-4145

Phone: 919.962-3230 Fax: 919.966.9800
E-mail: wayne_rosamond@unc.edu

3. Timeline: Analysis to be completed immediately. First draft completed by May 2014

4. Rationale:

Epidemiologic algorithms commonly used to identify myocardial infarction (MI) evaluate typical symptoms of it, including the presence of chest pain that lasts more than 20 minutes. Despite that, previous studies have shown that about 43% of patients with non-ST segment elevation myocardial infarction (NSTEMI) and 27% of patients with STEMI present with atypical symptoms or absence of chest pain[1]. This is important since atypical presentation of MI is associated with delayed hospital arrival[2, 3], lower likelihood of receiving medical therapies and invasive cardiac procedures, as well as higher in-hospital, thirty-day, and one-year mortality[1][4]. Trends in incident MI with atypical symptoms have not been thoroughly investigated and are of interest given recent publications on changing rates of MI, its subtypes (STEMI vs NSTEMI) [5], anatomical location[6], and severity[7]. A description of these trends may have important clinical implications for the timely identification and treatment of MI.

5: Main Hypothesis/Study Questions:

Primary Aim 1: To examine the trend in rates of MI with atypical symptoms in ARIC Community Surveillance stratified by type of MI (STEMI vs NSTEMI);

Primary Aim 2: To examine and compare case fatality rates of MI with typical vs atypical symptoms in ARIC Community Surveillance.

Secondary Aim1: To examine the association between MI with atypical symptoms and comorbidities (Shock, Congestive Heart Failure, Pulmonary Edema, Stoke, Pneumonia), as well as medical history (history of hypertension, diabetes, smoking, prior stroke) in ARIC Community Surveillance.

Secondary Aim 2: To examine the differences in treatment type and treatment delay between MI with typical vs atypical symptoms in ARIC Community Surveillance.

Secondary Aim 3: To estimate the impact of absence of chest pain on detection of MIs using the standard criteria for diagnosis.

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 methodological limitations or challenges if present).

Study Design: ARIC Community Surveillance 1987-2011

Inclusion/Exclusion Criteria: all validated Definite and Probable MIs at all ARIC centers, ages 35-74; sub-group analysis for age 35-84 for years 2005-2011 will also be completed.

Outcome Variables: Incidence of MI with atypical symptoms over time stratified by type of MI (STEMI vs NSTEMI). 30-day and 1-year case fatality rate from MI with atypical symptoms. Subgroup analysis will be completed by age, sex, and race. Type and time to treatment in MI with atypical symptoms. Association with comorbidities and medical history with absence of chest pain.

Data analysis:

Inverse sampling probability weights will be used in data analysis to estimate the parameters and perform statistical testing in order to take into account the ARIC study`s sampling design.

Primary Aim1: To examine trends in incidence rates of MI with atypical symptoms, linear and quadratic Poisson regression will be used and results plotted. Changes in proportion of MI events that are associated with atypical symptoms will be investigated using logistic regression.

Primary Aim 2: Logistic regression will be used to investigate trends in fatality

Secondary Aim 1: Logistic regression will be used to investigate the association between MI with atypical symptoms and comorbidities/medical history.

Secondary Aim2: Logistic regression will be used to compare differences in treatment delay, defined as categorical variable, between MI with typical and atypical symptoms.

Secondary Aim3: A t-test will be used to compare the rates of MI using the standard ARIC diagnostic algorithm to the estimated rates after taking into account the proportion of events that do not present with chest pain that would otherwise be classified as MI.

Methodological Limitations:

7.a. Will the data be used for non-CVD analysis in this manuscript? _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 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 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

____Yes _X_ No

10. What are the most related manuscript proposals in AIC (authors are encouraged to contact lead authors of these proposals for comments on the new proposal or collaboration)?

Manuscript proposal 227. Whitsel et al. Hypertension and Painless Myocardial Infarction: Atherosclerosis Risk in Communities (ARIC) Surveillance, 1987-1995. (This manuscript proposal has not been published and has not been active for over 5 years)

11.a. Is this manuscript proposal associated with any ARIC ancillary studies or use an ancillary 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-year from the date of approval, the manuscript proposal will expire.

BIBLIOGRAPHY

1. **Canto, A.J., et al., *Differences in symptom presentation and hospital mortality according to type of acute myocardial infarction.* American heart journal, 2012. 163(4): p. 572-9.**
2. **Saczynski, J.S., et al., *Trends in prehospital delay in patients with acute myocardial infarction (from the Worcester Heart Attack Study).* The American journal of cardiology, 2008. 102(12): p. 1589-94.**
3. **Ottesen, M.M., et al., *Prehospital delay in acute coronary syndrome--an analysis of the components of delay.* International journal of cardiology, 2004. 96(1): p. 97-103.**
4. **Dorsch, M.F., et al., *Poor prognosis of patients presenting with symptomatic myocardial infarction but without chest pain.* Heart, 2001. 86(5): p. 494-8.**
5. **Rosamond, W.D., et al., *Twenty-two-year trends in incidence of myocardial infarction, coronary heart disease mortality, and case fatality in 4 US communities, 1987-2008.* Circulation, 2012. 125(15): p. 1848-57.**
6. **Newman, J.D., et al., *Trends in Myocardial Infarction Rates and Case Fatality by Anatomical Location in Four United States Communities, 1987 to 2008 (from the Atherosclerosis Risk in Communities Study).* The American journal of cardiology, 2013.**
7. **Myerson, M., et al., *Declining severity of myocardial infarction from 1987 to 2002: the Atherosclerosis Risk in Communities (ARIC) Study.* Circulation, 2009. 119(4): p. 503-14.**