ARIC Manuscript Proposal # 1752

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

1.a. Full Title:

Trends in the anatomic location and related prognosis of ST segment elevation myocardial infarction (STEMI) in Atherosclerosis Risk in Communities (ARIC) Study, Community Surveillance, 1987-2008

b. Abbreviated Title (Length 26 characters):

Trends in STEMI location

2. Writing Group:

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

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3. Timeline: 1yr

4. Rationale:

Continued and detailed evaluation of temporal trends in myocardial infarction (MI) is essential to monitor the burden of cardiovascular disease, the most common cause of death in the U.S.[1] The surface 12-lead electrocardiogram (ECG) has been used to describe trends in ST-segment elevation myocardial infarction (STEMI), non-ST-segment elevation MI (NSTEMI) and Q-wave MI. Recent studies have demonstrated that, over time, the severity and number of STEMIs has decreased. However, it remains unclear whether the short-term mortality after STEMI has changed, despite described decreases in the severity of initial events.[1-5] The distribution of ST-elevations on surface ECG during STEMIs corresponds to anatomic regions of at-risk myocardium.[6, 7] Further, the presence of Q-waves with STEMI has been associated with greater infarcted/jeopardized myocardium, and is a marker of poor prognosis.[8, 9] However, no studies to date have examined the temporal trends in STEMI location, with or without Q-waves; trends in mortality by STEMI location; or the interaction of trends in location by trends in mortality for STEMI. A description of these trends may have important clinical and policy implications for the management of cardiovascular diseases. This proposal arose from the 2010 NIH/NHLBI Population Studies Workshop held July 11-14 at Northwestern University Feinberg School of Medicine.

5. Main Hypothesis/Study Questions:

Study Question 1: To examine changes in STEMI location over time in ARIC Community Surveillance.

Study Question 2: To examine trends over time in the proportion of Q-waves (major and minor) by STEMI location in the ARIC Community Surveillance study.

Study Question 2: To examine changes over time in survival (30 day and 1 year) by STEMI location in ARIC Community Surveillance.

Study Question 3: To investigate the presence of any interaction between changes in STEMI location over time and changes in survival in ARIC Community Surveillance.

Modeling will be performed to investigate the variation of STEMI location by age, gender, ethnicity, prior MI, geographic location and revascularization status.

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: ARIC community Surveillance

Inclusion/Exclusion: All hospital records selected for abstraction meeting Minnesota ECG criteria for STEMI will be included for analysis. The previously published algorithm used in the ARIC surveillance study of definite and probable acute MIs will be used.[3, 10]Data from ECGs obtained in community surveillance (first, last, and third) for all qualifying events will be used. Due to potential difficulties with anatomic localization participants with NSTEMI will be excluded from initial analysis.

Outcome Variables: Proportion of STEMIs by location over time. 30day and 1year case fatality rate; STEMI severity as assessed by modified PREDICT score [3, 11, 12] and major/minor Q-waves as determined by Minnesota code (Appendix). Subgroup analysis will be completed on MI location by age, sex. STEMIs will be classified as anterolateral, inferior and anterior, with or without major/minor Q-waves, determined by Minnesota ECG code used in ARIC community surveillance

Data Analysis:
Primary Aim 1: To demonstrate the unadjusted changes in STEMI location over time and unadjusted changes in mortality by STEMI location, the proportions of STEMI location (anterior, anterolateral, inferior) will be modeled by polychotomous logistic regression and plotted.

Primary Aim 2: Weighted regression will be performed on the proportions of STEMI location with or without major/minor Q-waves, as the dependent variable and year as the independent variable. The 3 x 3 table below represents characteristics of STEMIs to be analyzed.

Secondary Aim 1: Multivariable logistic regression of proportions of STEMIs by location will be constructed on 30 day and 1-year survival as a function of time, race, sex and age.

MI Characteristics	Anterior (V1-V5)	Anterolateral (I, aVL, V6)	Inferior (II, III, aVF)
Major Q waves			
Minor Q waves			
Absent Q waves			

Methodologic Limitations: The Minnesota code defines STEMI as ST elevations in one lead, while current guidelines use two concurrent leads groups.[13] A recently published paper [3] from the ARIC surveillance study on MI (including STEMI) severity suggests this limitation may not be a barrier to meaningful analysis.

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 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)?

Myerson et. al. *Circulation* 2009 119(4); 503-14; Watkins et. al. *Am J Cardiology* 2005 96(10)1349-55; Rosamond et. al. *Int. J. Epidemiology* 2001 30 S 1; S17-22

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.

APPENDIX:

ST Segment Elevation

Anterolateral (I, aVL, V6)

ST segment elevation ≥ 1.0mm in any of leads I, aVL, V6

Inferior (II, III, aVF)

ST segment elevation ≥ 1.0mm in any of leads II, III, aVF

Anterior (V1-V5)

ST segment elevation ≥ 1.0mm in lead V5 or ST segment elevation ≥ 2.0mm in any of leads V1-V4

Q-wave criteria
(summarized from full Minnesota Coding Manual)

Major: Major Q-waves as any 1-1-x or any 1-2-x except 1-2-6 or 1-2-8 in any lead group; anterolateral, inferior, or anterior.

Minor: (If no criteria for major fulfilled: Minor Q-waves as 1-3-x or 1-2-8 in the any lead group; anterolateral, inferior, or anterior.

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