1.a. **Full Title:** Evaluation of ICD codes for Determining Subclasses of Myocardial Infarction in a Community Surveillance Study

b. **Abbreviated Title (Length 26 characters):** Validation of MI Subclass

2. **Writing Group:**

Writing group members:
Wayne Rosamond, Chris Baggett, Lisa Wruck, Jonathan Newman, Richard Crow, Erin Michos, others welcome

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

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3. **Timeline:**
Analysis to begin immediately with first draft to be complete in 6 months.

4. **Rationale:**

Surveillance studies of cardiovascular disease often rely solely on ICD codes or claims data for defining events. Recently this practice has been expanded to use ICD codes to compute events rates separately
for subclasses of myocardial infarctions (e.g. STEMI from NSTEMI) (Yeh et al NEJM 2010;362:2155-2165). Diagnosis codes can also be used to define the anatomic location of a myocardial infarction. For example ICD-9-CM code 410.0 is used to define an STEMI of the anterolateral wall and code 410.6 is used to define a STEMI of the posterior wall, while ICD code 410.7 is used to define a subendocardial NSTEMI infarction or nontransmural infarction.

However, few studies have evaluated the validity of the fourth digit of the ICD codes for MI to correctly classify STEMI vs. NSTEMI events. Fewer still have validated the anatomic location of MI as derived from the fourth digits of ICD codes. ARIC is in the position to address this gap in the literature. ARIC surveillance captures up to three hospital electrocardiograms (ECG) for each suspected myocardial infarction samples. The Minnesota coding of these ECG can be used to define STEMI and NSTEMI, events as well as the anatomic location in STEMI. An independent evaluation of ECG evidence of MI subtype and anatomic location of STEMI can be compared to ICD codes to complete a formal validation of the use of ICD codes to categorize MI events.

Results from this work will help inform future studies using ICD code and/or claims data to describe the distribution and burden of CVD in the population.

5. Main Hypothesis/Study Questions:

1. How do the fourth digits of ICD-9-CM codes that categorize myocardial infarction into subclasses (e.g. STEMI, NSTEMI, anatomic location of STEMI) compare with a categorization of myocardial infarction events based on independent Minnesota coding of the hospital ECG?

2. Does the agreement of fourth digit ICD-9-codes for categorizing myocardial infarction with ECG evidence vary over time and across race, gender, and community location?

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 paper will use community surveillance data and the existing derived variables developed from ECG evidence to define STEMI, NSTEMI and anatomic location of the MI. These variables will be used as the gold standard in computing the positive predictive value of ICD codes in defining STEMI, NSTEMI, and MI location. We will follow previous published work from ARIC on validation of ICD code 410 (without the subclass digits) (Rosamond et al., Am J Epidemiol 2004, 160:1137-1146) to also compute sensitivity and false-positive rate of ICD code 410 and its fourth digits to correctly classify STEMI, NSTEMI, and anatomic location.

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
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.c.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)?

MS# 1331, MS# 210

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.c.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.csc.c.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.