

ARIC Community Surveillance Manuscript Development Workshop Series

Session One: Surveillance Overview

Surveillance Workshop Series

- Session One
 - Background and manuscript development
 - Webinar Dec 14
- Session Two
 - Analytic issues with surveillance data
 - Webinar to be scheduled
- Session Three
 - Refining proposals and starting analysis
 - Conference call or in-person sessions at CC

Today's Objectives

- Provide overview of surveillance design, data availability and access
- Review manuscript proposals
- Build on list of manuscript ideas and identify lead authors

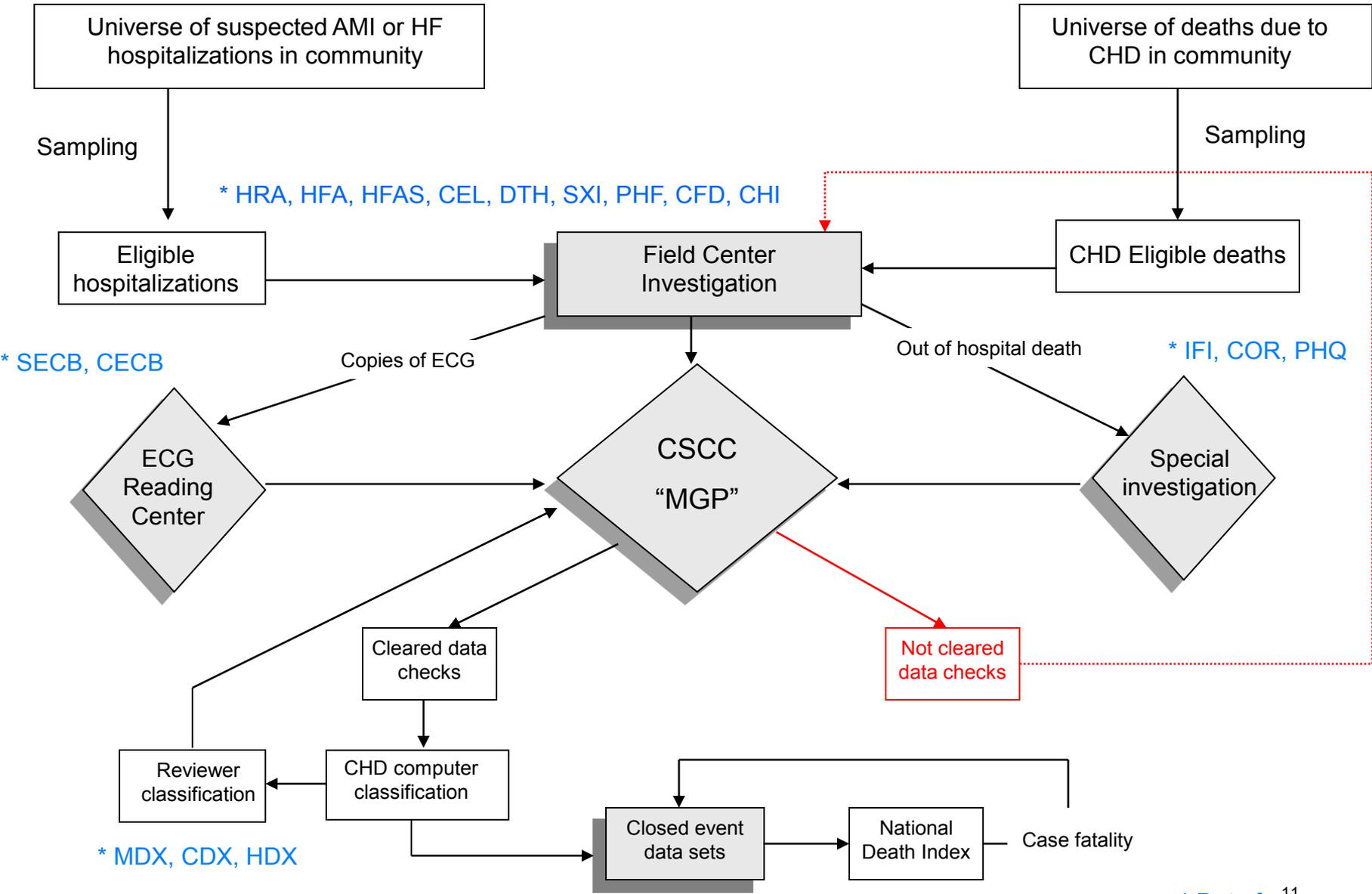
Background (1)

- What is ARIC Surveillance?
 - Identifies, validates endpoints among cohort participants and community residents
 - Cohort = 15,792 people
 - Community = 447,000 people
- What is ARIC **Community** Surveillance?
 - Retrospective continuous monitoring and validation of hospitalized AMI, heart failure, and CHD death (in and out of hospital) among residents in four communities to evaluate trends in mortality, incidence, case fatality, and medical care
- What age range is covered by ARIC **Community** Surveillance
 - Ages 35-74 (1987-2004)
 - Ages 35-84 (2005-2014)
 - Ages 55+ Heart Failure (2005-2014)

Background (2)

- How is **Community** Surveillance different from Cohort Surveillance?
- Volume
 - Cohort
 - Lots of data (40+ forms), fewer incident events (1500 CHD, 150 HF)
 - Community
 - Less data (15 forms), many incident events (33,000+ MI, 13,000+ HF)
- Sampling
 - Cohort
 - All persons followed, all hospitalizations and deaths captured
 - Community
 - Random sample of CHD hospitalizations and deaths captured
- Events
 - Community surveillance does not include stroke events

ARIC Community Surveillance



Diagnostic criteria for hospitalized acute myocardial infarction diagnostic algorithm. The ARIC Study

| Chest pain PRESENT | | | | ECG Evidence | Chest pain ABSENT | | | |
|--------------------|-------------|-------------|-------------|---------------------|--------------------|-------------|-------------|-------------|
| Definite MI | Definite MI | Definite MI | Definite MI | Evolving diagnostic | Definite MI | Definite MI | Definite MI | Definite MI |
| Definite MI | Probable MI | Suspect MI | No MI | Diagnostic | Definite MI | Suspect MI | No MI | No MI |
| Definite MI | Probable MI | Suspect MI | No MI | Evolving ST-T* | Probable MI | Suspect MI | No MI | No MI |
| Definite MI | Suspect MI | No MI | No MI | Equivocal | Suspect MI | Suspect MI | No MI | No MI |
| Probable MI | Suspect MI | No MI | No MI | Absent or uncodable | Suspect MI | No MI | No MI | No MI |
| Abnormal | Equivocal | Incomplete | Normal | | Abnormal | Equivocal | Incomplete | Normal |
| Biomarker Evidence | | | | | Biomarker Evidence | | | |

* ST-T = ST-T segment abnormalities

CHD form data

- Hospital abstraction form (HRA)
 - Discharge codes
 - Demographics
 - Insurance
 - Medical history
 - Co-morbidities
 - Clinical care
 - Diagnostic data
- Death Certificate form (DTH)
 - Demographics
 - Location of death
 - Cause and timing of death
- Informant interview form (IFI)
 - Medical history, symptoms
 - Circumstances surrounding death
 - EMS care
- Physician questionnaire form (PHQ) and Coroner form (COR)
 - Medical history
 - Details of death (location, timing, medications)

Heart Failure data

- Worsening or new onset of symptoms
- Results of history and physical
- Findings from diagnostic tests
 - chest X-ray
 - transthoracic echo
 - transesophageal echo
 - coronary angiography
 - radionuclide ventriculogram
 - MRI, CT
 - stress tests
- Biochemical analysis
 - BNP, pro-BNP, troponin,
 - hemoglobin, hematocrit
 - serum creatinine,
 - BUN, sodium
- Medications

Examples of published ARIC Community Surveillance analyses

The New England Journal of Medicine

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TRENDS IN THE INCIDENCE OF MYOCARDIAL INFARCTION AND IN MORTALITY DUE TO CORONARY HEART DISEASE, 1987 TO 1994

WAYNE D. ROSAMOND, PH.D., LLOYD E. CHAMBLESS, PH.D., AARON R. FOLSOM, M.D., LAWTON S. COOPER, M.D.,
DAVID E. CONWILL, M.D., LIMIN CLEGG, PH.D., CHIN-HUA WANG, PH.D., AND GERARDO HEISS, M.D., PH.D.

CHD mortality and MI incidence trends

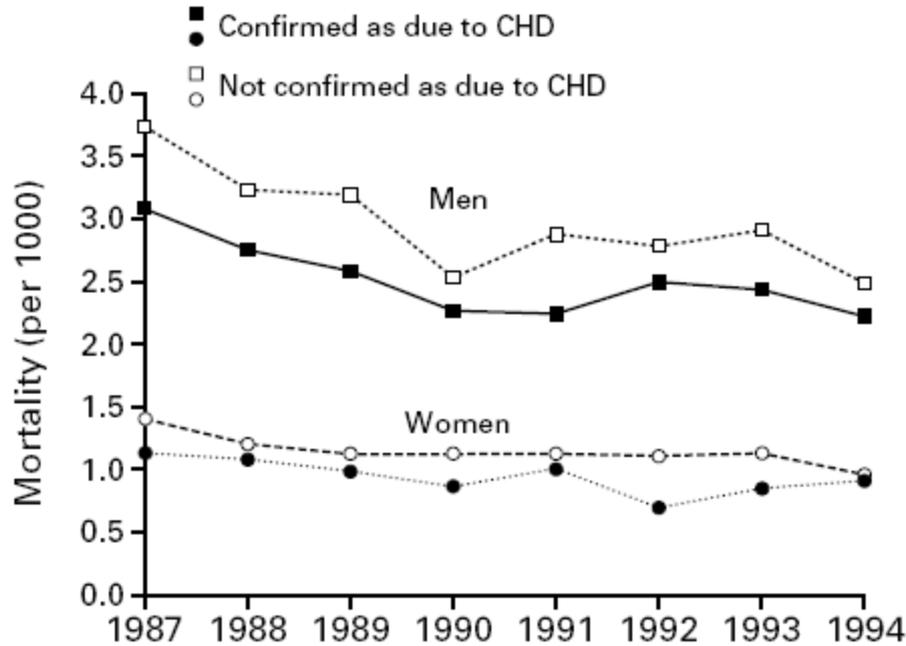


Figure 1. Age-Adjusted Mortality from CHD among Men and Women 35 to 74 Years Old, 1987 to 1994.

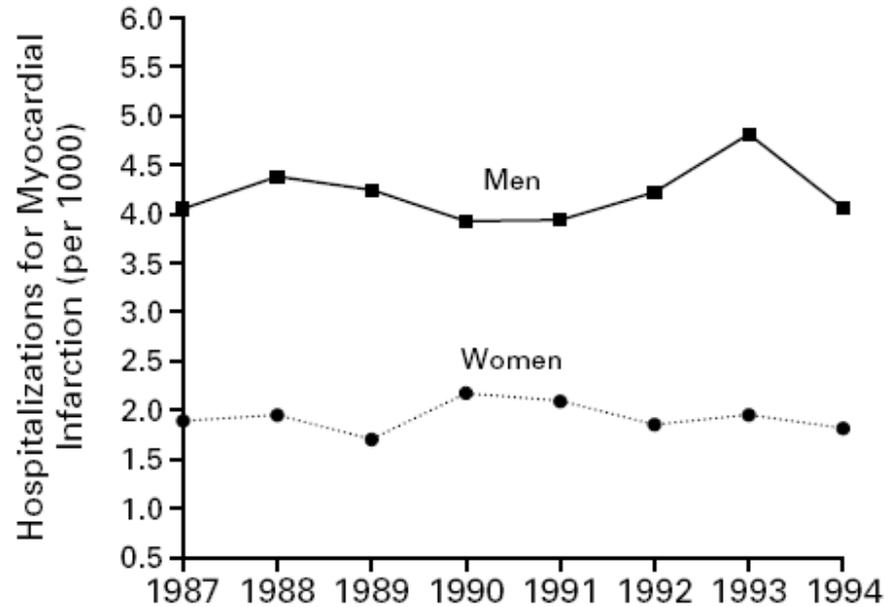


Figure 3. Age-Adjusted Incidence of Hospitalization for Acute Myocardial Infarction among Men and Women 35 to 74 Years Old, 1987 to 1994.

Declining Severity of Myocardial Infarction From 1987 to 2002

The Atherosclerosis Risk in Communities (ARIC) Study

Merle Myerson, MD, EdD; Sean Coady, MA; Herman Taylor, MD;
Wayne D. Rosamond, PhD; David C. Goff, Jr, MD, PhD;
for the ARIC Investigators

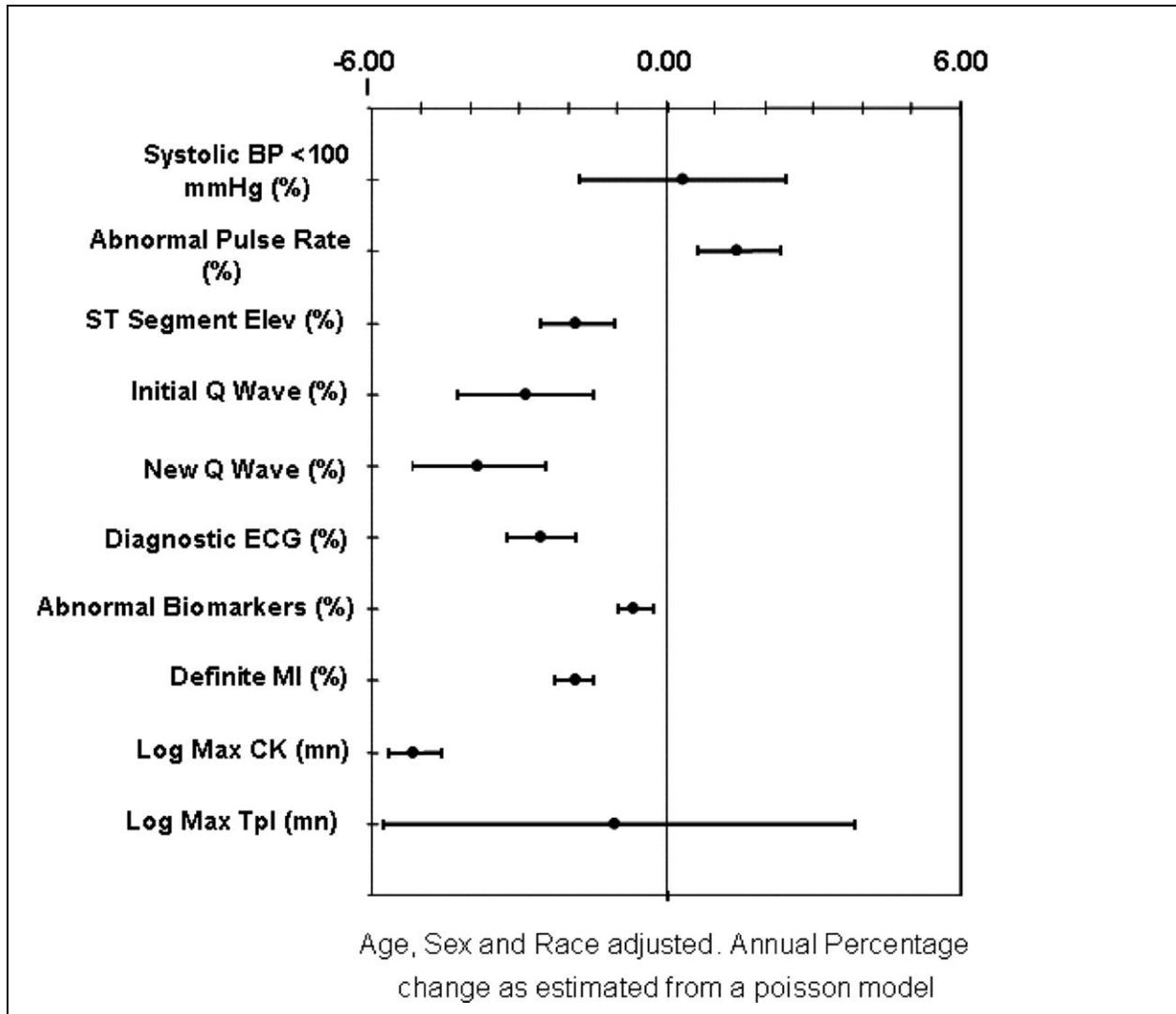
Background—Death rates for coronary heart disease have been declining in the United States, but the reasons for this decline are not clear. One factor that could contribute to this decline is a reduction in the severity of acute myocardial infarction (MI). We hypothesized that for those patients hospitalized in the Atherosclerosis Risk in Communities (ARIC) Study with acute incident MI, there was a decline in MI severity from 1987 to 2002.

Methods and Results—The community surveillance component of the ARIC Study consisted of tracking residents 35 to 74 years of age with hospitalized MI or fatal coronary heart disease in 4 diverse communities. For incident, hospitalized MI, a probability sample of hospital discharges was validated and an MI classification was assigned according to an algorithm consisting of chest pain, ECG evidence, and cardiac biomarkers. Severity indicators were chosen from abstracted hospital charts validated as a definite or probable MI. With few exceptions, the MI severity indicators suggested a significant decline in the severity of MI during the period of 1987 to 2002. The percent of MI cases with major ECG abnormalities decreased as evidenced by a 1.9%/y ($P=0.002$) decline in the proportion of those with initial ST-segment elevation, a 3.9%/y ($P<0.001$) decline in those with subsequent Q-waves, and a 4.5%/y ($P<0.001$) decline in those with any major Q wave. Maximum creatine kinase and creatine kinase-MB values declined (5.2% and 7.6%; $P<0.001$, $P<0.001$ per year, respectively), although in the later years, maximum troponin I values remained stable (1.1%/y decline; $P=0.66$). The percent with shock declined (5.7%/y; $P<0.001$), although those with congestive heart failure remained stable. A combined severity score, the Predicting Risk of Death in Cardiac Disease Tool (PREDICT) score, also declined (0.2%/y; $P<0.001$). Results for blacks paralleled those of the entire group, as did results for women.

Conclusions—Evidence from ARIC community surveillance suggests that the severity of acute MI has declined among community residents hospitalized for incident MI. This reduction in severity may have contributed, along with other factors, to the decline in death rates for coronary heart disease. (*Circulation*. 2009;119:503-514.)

Key Words: epidemiology ■ myocardial infarction ■ prevention

Annual percentage change for indicators of MI severity: ARIC Community Surveillance, 1987 to 2002



Variation and Temporal Trends in the Use of Diagnostic Testing During Hospitalization for Acute Myocardial Infarction by Age, Gender, Race, and Geography (the Atherosclerosis Risk In Communities Study)

Camille A. Pearte, MD, MPH^{a,b,*}, Merle Myerson, MD, EdD^a, Joseph Coresh, MD, MHS^{c,d}, Robert L. McNamara, MD, MHS^e, Wayne Rosamond, PhD^f, Herman Taylor, MD^g, and Teri A. Manolio, MD, PhD^a

The use of cardiovascular procedures has become routine in the management of acute myocardial infarction (MI). However, diagnostic testing beyond coronary revascularization procedures and use over time has not been well characterized. Records of 35- to 74-year-old adults hospitalized with MI in 4 US communities from 1987 to 2001 were abstracted using standardized data collection methods. Rates of procedure use and outcomes were compared by patient characteristics. Of 11,242 patients (mean age 61 years, 43% women, 22% black), angiography use increased substantially over time, echocardiography use increased more in women than men (interaction $p < 0.05$), use of right-sided cardiac catheterization decreased, and use of nuclear scans and exercise tests remained constant. Men, whites, and locations with the highest angiography and right-sided cardiac catheterization use had lower noninvasive testing. In multivariate analysis, women had less angiograms and more echocardiograms obtained than men, but only in those with no previous MI before this hospitalization (both interaction $p < 0.05$). Similarly, in those without previous MI, blacks were even less likely than whites to undergo angiography compared with those with a history of MI (interaction $p = 0.0001$). Adjusted mortality rates were similar by gender, but mortality was higher in blacks than whites, a difference that decreased with adjustment for angiography use. In conclusion, in patients hospitalized with MI, use of many diagnostic cardiovascular procedures varied over time, with differences by gender, age, race, and geography that persisted over time unexplained by many measurable characteristics. There may also be continued perception of lower risk in women and blacks without a known diagnosis of MI. © 2008 Elsevier Inc. All rights reserved. (Am J Cardiol 2008;101:1219–1225)

Trends in procedure use in patients hospitalized for MI by gender.
 ARIC
 Community Surveillance
 1987-2001

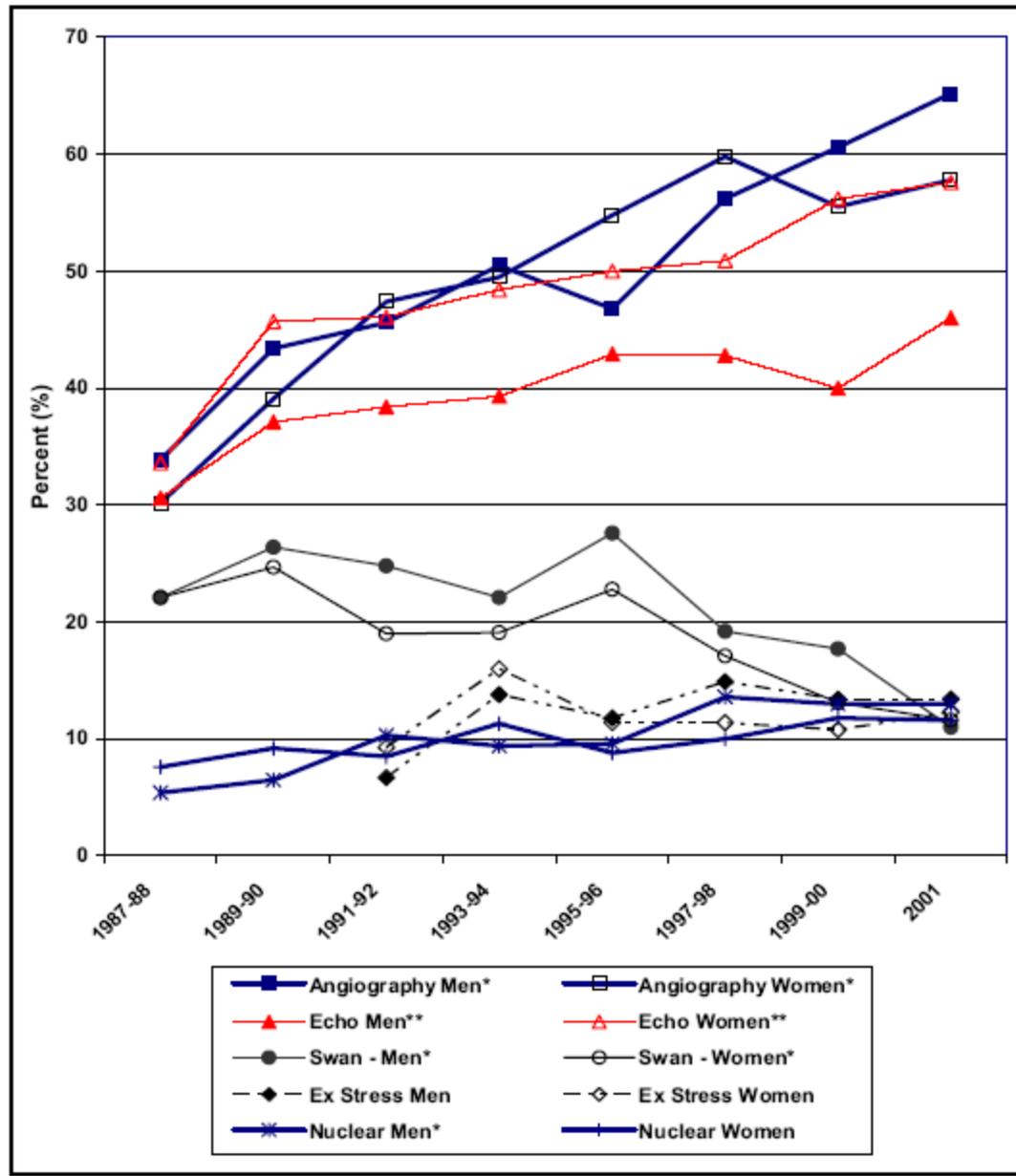
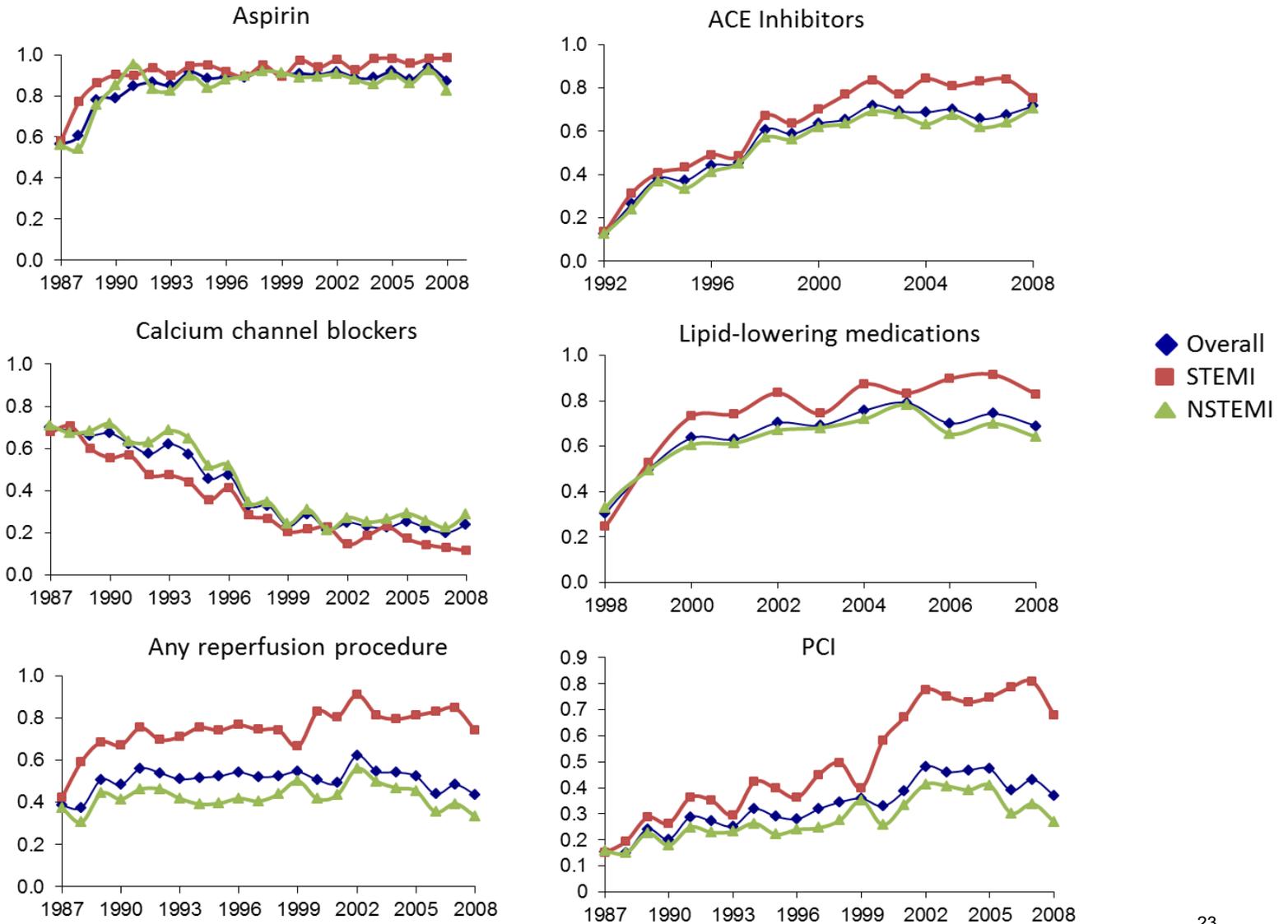
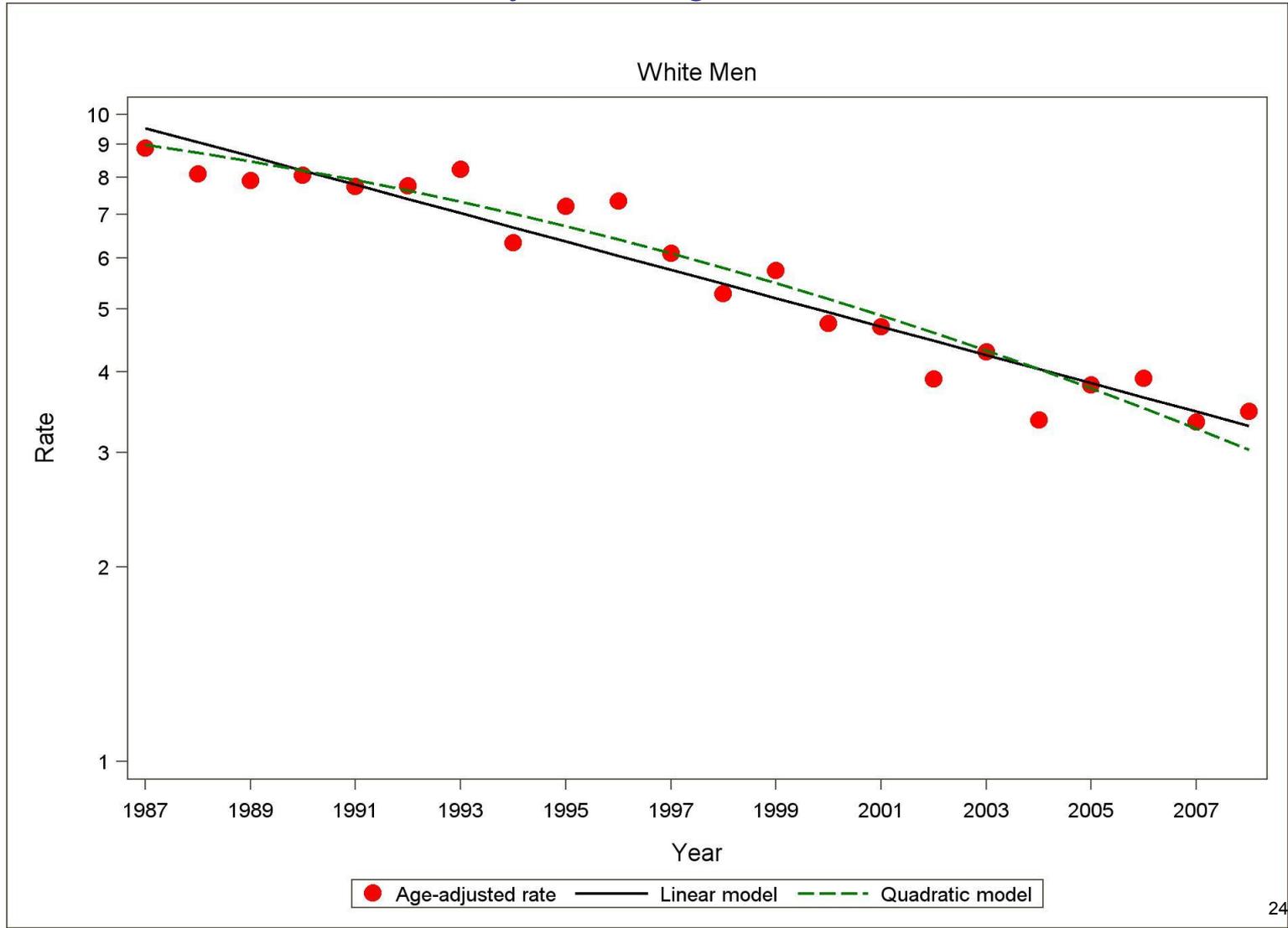


FIGURE 1. Medication and procedure use by year in STEMI & NSTEMI patients in ARIC Surveillance: 1987 – 2008*.



Age- and biomarker-adjusted rate (per 1000 persons) in first hospitalized myocardial infarction or death due to CHD without prior myocardial infarction, 35 to 74 years of age, 1987-2008.





Sensitivity, positive predictive value, false-positive rate, and comparability ratio for various heart failure classification criteria according to ARIC Heart Failure classification criteria

| Comparison Classification criteria | ARIC (ADHF) | | | Comparability ratio |
|------------------------------------|-------------|---------------------------|---------------------|---------------------|
| | Sensitivity | Positive predictive value | False-positive rate | |
| Framingham | 0.90 | 0.68 | 0.60 | 1.31 |
| Modified Boston | 0.88 | 0.64 | 0.72 | 1.38 |
| NHANES | 0.90 | 0.62 | 0.81 | 1.46 |
| Gothenburg | 0.80 | 0.62 | 0.70 | 1.29 |
| ICD-9-CM 428 | 0.95 | 0.62 | 0.83 | 1.52 |
| Primary 428 | 0.38 | 0.92 | 0.04 | 0.41 |

Accessing and Using Surveillance Data

Myocardial infarction

CHD death

Heart Failure

Atherosclerosis Risk In Communities (ARIC) --> Manuals/Forms/Data --> Overview

The screenshot shows a Microsoft Internet Explorer browser window displaying the ARIC website. The address bar shows the URL: <http://www.csc.c.unc.edu/eric/displaydatatree.php>. The page title is "Atherosclerosis Risk In Communities (ARIC) - Manuals/Forms/Data -> Overview".

The main content area features a navigation menu at the top with links: Home, Manuals/Forms/Data, Documents, Data Summary, Obtaining Data, Ancillary Studies, Publications, Directories, and Secure. Below the menu, the page is titled "Atherosclerosis Risk In Communities (ARIC) Manuals/Forms/Data -> Overview".

The central part of the page displays a hierarchical tree of resources, where each node is represented by a blue button. The tree structure is as follows:

- Cohort Exam
 - Manuals
 - Forms
 - Data
 - Topics
 - Carotid MRI
- Annual Follow Up
 - Manuals
 - Forms
 - Data
- Surveillance
 - Manuals
 - Coronary Heart Disease (CHD)
 - Forms
 - Data
 - Heart Failure (HF)
 - Forms
 - Data
 - Cohort Stroke
 - Forms
 - Data

At the bottom of the page, there is a link: [Click here for information and descriptions of the \[Word\], \[Excel\], \[PowerPoint\], \[PDF\], \[HTML\], \[Image\], \[Globe\], \[Printer\] and \[Help\] icons.](#)

Below the link, the contact information for the ARIC Coordinating Center is provided:

Collaborative Studies Coordinating Center Department of Biostatistics
 Gillings School of Global Public Health University of North Carolina at Chapel Hill
 137 E. Franklin Street Suite #203 Chapel Hill, NC 27514-4145
 Contact the ARIC Coordinating Center Contacts

**ARIC Manuscript Proposals using CHD Community Surveillance Data
Dec 2011**

The following table lists CHD community surveillance approved manuscript proposal (published and unpublished listed separately) and ideas for future proposals.

| Man # | Title | General Study Questions | Lead Author | Status/Citation |
|--|---|-------------------------|-------------|--|
| Approved and unpublished CHD surveillance manuscript proposals | | | | |
| 85 | The relation between hospital medical care for acute myocardial infarction and 28-day case fatality | | Rosamond | Transferred to O'Brien #1648 in 2010 |
| 126 | MI survival (M) | | Folsom | Withdrawn |
| 133 | Serum enzyme elevations as predictors of mortality after acute myocardial infarction (H) | | Cooper | Withdrawn |
| 158 | Black-white differences in out-of-hospital deaths due to myocardial infarction (H) | | Taylor | Languishing |
| 175 | Thrombolytic therapy (H) | | Rosamond | Transferred to O'Brien 1649 |
| 211 | Methodologic differences between community and cohort surveillance in the ARIC Study (M) | | Thomas | Withdrawn |
| 227 | The morphology of painless versus painful MI | | Whitsel | Drafted x2, never submitted; withdrawn |
| 378 | CHD mortality and race differences in person years of life between ages 35-75 | | Suchindran | Withdrawn |
| 395 | Trends in the utilization of aspirin, beta blockers and calcium channel blockers in the setting of AMI in the ARIC communities: 1987-1993 | | Rosamond | Transferred to O'Brien #1649 in 2010 |
| 550 | Time trend of coronary angiography after myocardial infarction | | Peart | Transferred to Peart 971 |
| 617 | Evaluation of international classification of diseases codes to identify hospitalized heart attack patients with acute congestive heart failure: the ARIC Study | | Goff | Withdrawn |
| 667 | Comparability of ICD-9 and ICD-10 for underlying cause of death | | Rosamond | |
| 713 | Effect of troponin on the assessment of trends in coronary heart disease | | Rosamond | |

**ARIC Manuscript Proposals using CHD Community Surveillance Data
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|------|---|--|-----------|---|
| 725 | Prognosis of hospitalized myocardial infarction according to degree of myocardial injury assessed by biochemical markers and other risk indicators | | McNeill | Withdrawn |
| 892 | A Method for Adjusting Population Event Rates for Dynamic Changes in Cardiac Biomarkers Over Time: An Application in the Atherosclerosis Risk in Communities (ARIC) Study | | Chambless | Rejected by AJE 2007. Hasn't been resubmitted |
| 965 | Characteristics and outcome of troponin elevation in the absence of other criteria for myocardial infarction | | Manolio | |
| 966 | Impact of admission time on short-term mortality and length of hospital stay in acute coronary syndrome patients | | Brunson | |
| 983 | Impact of insurance status and types on inequities in hospital care of acute coronary syndrome | | Taylor | Withdrawn |
| 1084 | Trends in CHD in Mississippi: do the ARIC community surveillance data explain statewide mortality trends? | | Penman | |
| 1103 | Socioeconomic characteristics and variation in rates and temporal trends in the use of invasive coronary procedures in ARIC community surveillance | | Rose | |
| 1106 | Investigating the effect of the AHA 2003 definition of CHD on CHD incidence rates in ARIC community surveillance | | Couper | |
| 1150 | Eliminating diagnostic drift in the validation of acute in-hospital myocardial infarction and associated short and long term mortality trends | | Crow | Withdrawn |
| 1163 | Trends in Duration of Hospitalization for Acute Myocardial Infarction in Community Surveillance | | Couper | |

**ARIC Manuscript Proposals using CHD Community Surveillance Data
Dec 2011**

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|------|--|--|-----------|------------------------------------|
| 1330 | Community Trends in CHD Mortality, MI incidence, and case fatality from 1987 to 2008 | | Rosamond | Submitted to <i>JAMA</i> 2011 |
| 1648 | Survival after treatment during hospitalization for myocardial infarction: A community-based perspective | | O'Brien | |
| 1649 | Long-term Community Based Trends in Medical Care in the Setting of Hospitalized Myocardial Infarction, 1987 to 2007: The Atherosclerosis Risk in Communities (ARIC) Study | | O'Brien | |
| 1670 | The Impact of Health Care Availability on Hospitalized MI Incidence Rates and CHD Mortality Rates: The ARIC Surveillance Study | | Allen | From Chicago Workshop. In analysis |
| 1752 | 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 | | Newton | From Chicago Workshop. In analysis |
| ### | Association of MI biomarkers and survival following CABG | | | |
| ### | Validation of death certificates for classifying sudden cardiac death in the ARIC community surveillance | | Newton | Proposal drafted, never submitted |
| ### | Association of co-morbid conditions risk factors (e.g.DM, HTN, smoking) on case fatality after hospitalized MI | | | |
| ### | Estimate of trends in interrupted myocardial infarction | | Chambless | |
| ### | Trends in use of and prognosis after CPR among hospitalized MI events (pre and during hospitalization) | | Rosamond | N=4964 events (unweighted) |
| ### | Associations of BNP with survival after hospitalize MI | | | |

**ARIC Manuscript Proposals using CHD Community Surveillance Data
Dec 2011**

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|-----|---|---|----------|---|
| ### | Associations of serum creatinine with survival after MI | | | |
| ### | Trends in the witnessed out of hospital fatal CHD events | 1. Trends in the proportion of out of hospital fatal CHD events where witness was present and close enough to hear them 2. Time, race, gender patterns | | |
| ### | Trends in the location of out of hospital fatal CHD | 1. Trends in location of death such as work, home, nursing home, public place 2. Time, race, gender patterns | | |
| ### | Trends in the type of symptoms within 3 days of death prior to out of hospital fatal CHD | | | |
| ### | Trends in the proportion of out of hospital fatal CHD were EMS is called | 1. Describe trends in EMS use by time, race, gender, location of death | | |
| ### | Trends in the time from last episode of symptoms to time medical attention called and delay to arrival for out of hospital fatal CHD deaths | | Rosamond | |
| 16 | Community surveillance of CHD: designs, methods and applications | | White | White AD, Folsom AR, Chambless LE, et al. Community surveillance of coronary heart disease in the ARIC Study: methods and initial two years' experience. <i>J Clin Epidemiol.</i> 1996;49(2):223-233 |
| 97 | Gender, racial and geographic differences in the performance of cardiac diagnostic and therapeutic procedures for hospitalized acute myocardial infarction in four states | | Weitzman | Weitzman S, Cooper L, Chambless LE, Rosamond W, Clegg L, Marcucci G, Romm F, White A. Gender, racial and geographic differences in the performance of cardiac diagnostic and therapeutic procedures for hospitalized acute myocardial infarction in four states. <i>Am J Cardiol</i> 1997;79:722-6. |
| 111 | Validation of death certificate diagnosis for coronary heart disease: the Atherosclerosis Risk in Communities (ARIC) Study | | Coady | Coady SA, Sorlie PD, Cooper LS, Folsom AR, Rosamond WD, Conwill DE. Validation of death certificate diagnosis for coronary heart disease: the Atherosclerosis Risk in |

**ARIC Manuscript Proposals using CHD Community Surveillance Data
Dec 2011**

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|------|--|--|----------|--|
| | | | | Communities (ARIC) study. <i>J Clin Epidemiol</i> 2001;54:40-50. |
| 123 | Sex and race differences in short-term prognosis after acute coronary heart disease events: the Atherosclerosis Risk in Communities (ARIC) Study | | White | White A, Rosamond W, Chambless L, Thomas N, Cooper L, Folsom A. Gender and race differences in short-term prognosis following acute coronary heart disease events. <i>Am Heart J</i> 1999;138(3):540-548. |
| 210 | Trends in the sensitivity, positive predictive value, false- positive rate, and comparability ratio of hospital discharge codes for acute myocardial infarction in four United States communities. | | Rosamond | Rosamond W, Chambless L, Sorlie P, Bell E, Weitzman S, Smith J, Folsom A. Trends in the sensitivity, positive predictive value, false-positive rate, and comparability ratio of hospital discharge diagnosis codes for acute myocardial infarction in four US communities, 1987 to 2000. <i>Am J Epidemiol</i> 2004;160(12):1137-46. |
| 210A | Rosamond et al. respond to are heart attacks gone with the century | | Rosamond | Rosamond W, Chambless L, Sorlie P, Bell E, Weitzman S, Smith J, Folsom A. Rosamond's response to "Are heart attacks gone with the century?" <i>Am J Epidemiol</i> 2004;160(12):1150-1. |
| 226 | Educational achievement recorded on certificates of death compared with self-report | | Rosamond | Rosamond WD, Tyroler HA, Chambless LE, Folsom AR, Cooper L, Conwill D. Educational achievement recorded on certificates of death compared with self-report. <i>Epidemiology</i> 1997 Mar;8(2):202-4. |
| 283 | Fourteen-year (1987 to 2000) trends in the attack rates of, therapy for, and mortality from non-ST elevation acute coronary syndromes in four United States Communities | | Watkins | Watkins S, Thiemann D, Coresh J, Powe N, Folsom A, Rosamond W. Fourteen year (1987-2000) trends in attack rates of, therapy for, and mortality from non-ST elevation acute myocardial coronary syndromes in four United States Communities. <i>Am J Cardiol</i> 2005;96:1349-1355. |
| 338 | Trends in the incidence of myocardial infarction and in mortality due to coronary heart disease, 1987 to 1994 | | Rosamond | Rosamond W, Chambless L, Folsom A, Cooper L, Clegg L, Wang CH, Conwill D, Heiss G. Trends in incidence of myocardial infarction and in mortality due to coronary heart |

**ARIC Manuscript Proposals using CHD Community Surveillance Data
Dec 2011**

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|------|---|--|----------|---|
| | | | | disease, 1987 to 1994. <u>N Engl J Med</u> 1998;339(13):861-867. |
| 338A | Letter to the Editor. Rates of death from coronary heart disease | | Rosamond | Rosamond W, Chambless L, Folsom A. International trends in coronary heart disease. <u>Lancet</u> 1999; 354(9181):864-865. |
| 338B | Letter to the Editor: Trends in coronary heart disease incidence rates and case-fatality: 1987-1994 | | Rosamond | Rosamond W, Chambless L, Folsom A. Rates of death from coronary heart disease. <u>N Engl J Med</u> 1999;340(9):731 |
| 338C | Coronary heart disease trends in four United States communities: the Atherosclerosis Risk in Communities (ARIC) Study 1987-1996 | | Rosamond | Rosamond W, Folsom A, Chambless L, Wang C. Coronary heart disease trends in four United States communities, 1987-1996. <u>Int J Epidemiol</u> 2001;30:S17-S22. |
| 440 | Trends in severity of hospitalized myocardial infarction: the Atherosclerosis Risk in Communities (ARIC) Study, 1987-1994 | | Goff | Goff D, Howard G, Wang C, Folsom A, Rosamond W, Cooper L, Chambless L. Trends in severity of hospitalized myocardial infarction: The ARIC Study, 1987-1994. <u>Am Heart J</u> 2000;139:874-880. |
| 528 | Is diabetes an independent risk factor for mortality after myocardial infarction? The ARIC (Atherosclerosis Risk in Communities) Surveillance Study | | Weitzman | Wietzman S, Wang L, Rosamond W, Chambless L, Shahar E, Goff D. Is diabetes an independent risk factor for mortality after a myocardial infarction? The ARIC Surveillance Study. <u>Acta Diabetol</u> 2004;41:77-83. |
| 531 | Trends in pre-hospital delay time and use of emergency medical services for acute myocardial infarction | | McGinn | McGinn A, Rosamond W, Folsom A, Chambless L, Taylor H, Miles S. Trends in delay from onset of acute MI symptoms to hospital arrival, 1987-2000: The ARIC Study. <u>Am Heart J</u> 2005;150:392-400. |
| 535 | Trends in sudden coronary death, 1987-1995 | | Ni | Ni H, Coady S, Rosamond W, Folsom A, Chambless, Sorlie P. Trends from 1987 to 2004 in Sudden Death Due to Coronary Heart Disease: The ARIC Study. <u>Am Heart J</u> 2009; 157(1):46-52. |
| 541 | (V) Incidence trends in myocardial infarction: comparison between US and | | Rosamond | Rosamond W, Broda G, Kawalec E, Rywik S, Pajak A, Cooper L, |

**ARIC Manuscript Proposals using CHD Community Surveillance Data
Dec 2011**

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|------|--|--|---------|--|
| | Poland population | | | Chambless L. A comparison of medical care and survival of hospitalized patients with acute myocardial infarction in Poland and the United States. <u>Am J Cardiol</u> 1999;83:1180-1185. |
| 963 | Update in trends of severity of hospitalized myocardial infarction: The ARIC Study, 1987-2000 | | Myerson | Myerson M, Coady S, Taylor H, Rosamond W, Goff D. Declining Severity of Myocardial Infarction 1987-2002: The Atherosclerosis Risk in Communities (ARIC) Study <u>Circulation</u> 2009; 119(4):503-14 |
| 971 | Use of invasive and noninvasive cardiac diagnostic procedures for hospitalized myocardial infarction; disparities, trends, and outcomes. The Atherosclerosis Risk in Communities study | | Pearte | Pearte C, Myerson M, Coresh J, McNamara R, Rosamond W, Manolio T. Variation and Temporal trends in the Use of Diagnostic Testing during Hospitalization for Acute Myocardial Infarction: The ARIC study. <u>Amer J Cardiol</u> 2008;101 (9):1219-1225. |
| 1060 | The relationship of trends in ARIC community coronary heart disease surveillance to changes in risk factors distribution based on the ARIC cohort | | Paynter | Paynter NP, Sharrett AR, Louis TA, Rosamond W, Folsom A, Coresh J. Paired comparison of observed and expected coronary heart disease rates over 12 years from the ARIC Study. <u>Ann Epidemiol</u> 2010;20(9):683-690. |
| 1102 | Neighborhood SES disparities in rates and temporal trends in rates of MI in ARIC surveillance | | Rose | Rose K, Suchindran C, Forker R, Whitsel E, Rosamond W, Heiss G, Wood M. Neighborhood Disparities in Incident Hospitalized Myocardial Infarction in Four US Communities: The ARIC Surveillance Study. <u>Ann of Epidemiol</u> 2009; 19(12):867-74. |
| 1179 | Neighborhood of residence and individual insurance status: Influence on pre-hospital delay time for acute myocardial infarction | | Foraker | Foraker R, Rose K, McGinn A, Suchindran C, Whitsel E, Rosamond W. Neighborhood socioeconomic status, health insurance, and prehospital delay time for acute MI: ARIC Study. <u>Arch Intern Med</u> . 2008;168(17):1874-9. |

**ARIC Manuscript Proposals using CHD Community Surveillance Data
Dec 2011**

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|------|---|--|---------|---|
| 1292 | Neighborhood Socioeconomic Status, Health Insurance, and Evidence-Based Pharmacologic Treatment of Myocardial Infarction: ARIC Community Surveillance | | Foraker | Foraker RE, Rose KM, Whitset EA, Suchindran CM, Wood JL, Rosamond WD. Neighborhood socioeconomic status, Medicaid coverage and medical management of myocardial infarction: Atherosclerosis Risk in Communities (ARIC) community surveillance. <i>BMC Public Health</i> . 2010 Oct 21;10(1):632. [Epub] |
| 1533 | Neighborhood Socioeconomic Status and Out-of-hospital Fatal Coronary Heart Disease: ARIC Community Surveillance | | Foraker | Foraker RE, Rose KM, Kucharska-Newton AM, Ni H, Suchindran CM, Whitset EA. Variation in rates of fatal coronary heart disease by neighborhood socioeconomic status: the atherosclerosis risk in communities surveillance (1992-2002). <i>Ann Epidemiol</i> . 2011 Aug;21(8):580-8. Epub 2011 Apr 23. PubMed PMID: 21524592; PubMed Central PMCID: PMC3132297. |

ARIC HF Manuscript Proposals using Heart Failure Community Surveillance (2005-onward) Version Mar 2011

The following table list ideas for **Community HF Surveillance** manuscript proposals. See Notes below.

| MS # ¹ | Proposed Title | General Study Questions | Lead Author ² | Priority ³ & Status |
|-------------------|---|--|--------------------------|---|
| 1282 | Outpatient Surveillance of Heart Failure | <ol style="list-style-type: none"> 1. Estimate the reproducibility of self-reported HF versus medical reports from medical providers or hospital discharges. 2. Estimate the association of self-report of HF symptoms and physician diagnosis of HF 3. Estimate feasibility of simple H classification validated by a physician questionnaire | Heiss/ Anthony | |
| 1331 | Comparison of Hospitalized Heart Failure Diagnostic Criteria | <ol style="list-style-type: none"> 1. How does the ARIC classification agree with the Framingham, Boston, Gothenburg and NHANES? 2. Using ARIC as a gold standard, what is the sensitivity and specificity of Framingham, Boston, Gothenburg, and NHANES criteria? 3. How does knowledge of the classifications from computer application of Framingham, Boston, Gothenburg, and NHANES effect ARIC classification? | Rosamond | High- In Press <i>JACC</i> . <i>Circ-Heart Failure</i> 2011 |
| 1477 | A novel heart failure classification scheme for hospitalized patients: The Atherosclerosis Risk in Communities (ARIC) Study | <p>The study questions apply to the following (6) HF classification schema: Framingham, Boston, NHANES, ARIC, HF Trialists, and Gothenburg.</p> <ul style="list-style-type: none"> - Estimate the agreement between the 6 HF classification schema on 2005-2006 HF Surveillance data in ARIC. - Examine a performance of a simplified classification algorithm that includes hospital discharge (ICD) codes, BNP, ejection fraction, signs/symptoms and diuretics use in terms of its agreement with each of the 6 classification schema. | Heiss | High- Presented @ AHA Epi 3/10. |
| 1489 | Surveillance of heart failure hospitalizations requires more than just the ICD-9 code: rates of acute decompensation versus chronic disease | <ol style="list-style-type: none"> 1. What is the prevalence of chronic heart failure? 2. What is the incidence of acute decompensated heart failure? 3. What is the hospitalization rate of acute decompensated heart failure? 4. What is case-fatality rate for patients with chronic stable heart failure and for patients with acute decompensated heart failure? 5. What is each of these estimates for all HF cases, and separately for systolic HF and HF with preserved EF? 6. What is the relationship of each of these estimates to the ICD-9 codes most commonly used for case identification? 7. What is the relationship of each of these estimates to common demographics (age, gender, race) and clinical characteristics (risk factors for heart failure or common comorbidities, such coronary heart disease, hypertension, diabetes)? | Chang | High- Presented @ HFSA 9/09. Paper approved by Pubs Committee Submitted to <i>JAMA</i> , <i>Reviews</i> <i>received from</i> <i>JAMA</i> . <i>MS will be</i> <i>revised and</i> <i>resubmitted to</i> <i>JAMA</i> |
| 1490 | Utilization of optimal medical therapy for hospitalized heart failure | <ol style="list-style-type: none"> 1. What is the rate of appropriate medical therapy for Systolic HF (SHF)? 2. What is the rate of similar medical therapy for HF with preserved EF (HFpEF)? 3. For HF that cannot be differentiated as SHF or HFpEF, what is the rate of medications used for SHF? 4. What is the relationship of each of these estimates to common demographics, health insurance status, common clinical characteristics, and whether the patient has a hospitalization for acute decompensation? | Chang | Medium- Analysis started |

ARIC HF Manuscript Proposals using Heart Failure Community Surveillance (2005-onward) Version Mar 2011

| MS # ¹ | Proposed Title | General Study Questions | Lead Author ² | Priority ³ & Status |
|-------------------|--|--|--------------------------|--------------------------------|
| 1537 | Echocardiographic Predictors of Incident CHF and Cardiovascular Events in African Americans | <ol style="list-style-type: none"> 1. To estimate the association of echo LV wall thickness and LV mass with incident heart failure 2. To estimate the association of echo LV geometry with incident heart failure 3. To estimate the association of echo parameters of systolic LV function with incident heart failure 4. To estimate the association of echo parameters of diastolic LV function with incident heart failure | Fox | |
| 1551 | Characteristics, treatment and outcome in heart failure with preserved vs. reduced ejection fraction: The Atherosclerosis Risk in Communities (ARIC) Study | <ol style="list-style-type: none"> 1. To estimate the proportion of hospitalized HF patients, and case fatality with reduced vs. preserved ejection fraction using two aforementioned ejection fraction thresholds and the above mentioned (n =4) HF classification criteria. 2. To compare the clinical and socio-demographic differences of patients admitted with acute heart failure (HF) with preserved vs. reduced ejection fraction using 'ARIC criteria' to define HF and $\geq 50\%$ threshold to define preserved function. 3. To evaluate the differences in the in-hospital care received by HF patients with preserved vs. reduced ejection fraction using 'ARIC criteria' to define HF and $\geq 50\%$ threshold to define preserved function. 4. To estimate the differences in, and predictors of case fatality among HF patients with preserved vs. reduced ejection fraction using 'ARIC criteria' to define HF and $\geq 50\%$ threshold to define preserved function. | Loehr | Analysis pending |
| 1607 | Heart failure diagnostic schemes in hospitalized patients and follow up mortality | <ol style="list-style-type: none"> 1. Compare the mortality rates for various classification of heart failure? <ul style="list-style-type: none"> • Evaluate if prognosis by each classification differ by ejection fraction and BNP levels category. • Examine mortality at 30 days, 6 months and a year. 2. Compare the CVD-specific mortality rates for various classification scores of heart failure? <ul style="list-style-type: none"> • Evaluate if prognosis by each classification differ by ejection fraction and BNP levels category. • Examine mortality at 30 days, 6 months and a year. 3. Compare the hospital readmission rates (overall and heart failure specific) for various classification scores for the ARIC cohort participants? | Rosamond | High/ Medium |
| 1657 | Enumerating the community burden of heart failure | | Avery | |

ARIC HF Manuscript Proposals using Heart Failure Community Surveillance (2005-onward) Version Mar 2011

| MS # ¹ | Proposed Title | General Study Questions | Lead Author ² | Priority ³ & Status |
|-------------------|---|--|--|--|
| # | ARIC Heart Failure Survival Score | (As a follow-up to W.Rosamond's mortality paper) 1. What are the most common causes of death for HF patients (systolic heart failure vs heart failure with preserved EF; by age, race and gender)? 2. What are the most important predictors for mortality in HF patients (SHF vs HFpEF; by age, race and gender)? 3. Can we create our own ARIC HF prediction model ("survival score") based on these predictors? 4. How would the ARIC Survival Score compare to the currently available survival prediction models (e.g., Heart Failure Survival Score, Seattle Heart Failure Model, ADHERE registry) in the ARIC study population? | Chang | Low (will take a few years to get enough mortality events) |
| 1709 | Racial and geographic comparisons in the presentation, co-morbid conditions and treatment in acute decompensated heart failure | Racial and gender differences in co-morbid conditions in patients hospitalized with heart failure | Loehr (Deswal) | Proposal deferred by ARIC Pubs Committee 10/10 |
| 1826 | Effect of continuity of care on outcomes among patients with heart failure in the ARIC Surveillance communities | | Kucharska-Newton | Active |
| 1881 | Quality of care for hospitalized patients with chronic heart failure. The Atherosclerosis Risk in Communities (ARIC) Surveillance Study | | Blecker | Active |
| # | | What happens during a heart failure hospitalization? Length of stay, # that get echos or other tests, how many get po versus IV diuretics, etc | Russell | |
| # | | Seasonal variation in rates of hospitalization for decompensated HF | Miller | |
| # | | Renal disease & HF: differentiating renal failure vs HF vs both; epidemiology of "cardiorenal syndrome" | Blecker, Bertoni | |
| # | | Comparison of Medical therapy regimens between Outpatient versus Hospitalized heart failure (2005-onward) = Gender differences (cohort, community) - differences by type of heart failure, age, gender, race. | Konety | |
| # | | COPD & HF: how often are they both present? | (suggested in 9/09) ⁴ | |
| | | Prognostic value of changes in cardiac biomarkers (BNP, troponin) on rehospitalization and mortality - differences by type of heart failure, age, gender, race. | | |
| | | Black-white and gender differences in precipitating factors in heart failure exacerbation requiring hospital admission (2005 events only so far) | (suggested by LL in 2008) ⁴ | |

ARIC HF Manuscript Proposals using Heart Failure Community Surveillance (2005-onward) Version Mar 2011

| MS # ¹ | Proposed Title | General Study Questions | Lead Author ² | Priority ³ & Status |
|-------------------|----------------|--|--|--------------------------------|
| | | Predictors of length of stay in prevalent heart failure - Differences between SHF vs HFpEF and by age, gender, race | (suggested by LL in 2008) ⁴ | |
| | | Frequency of chest X-ray and electrocardiogram findings in hospitalized acute versus chronic HF - Differences between SHF and HfpEF | (suggested by LL in 2008) ⁴ | |
| | | Association of abnormal chest x-ray findings with symptoms of dyspnea in hospitalized HF patients | (suggested by LL in 2008) ⁴ | |
| | | Risk prediction model for incidence of HF (build on S. Agrawal's current work on cohort's "nonvalidated" HF events) | | |
| | | Impact of SES on case-fatality rate and rehospitalization rate - Differences by race, gender, HF type (build on R.Foraker's current work on cohort's "nonvalidated" HF events) | | |
| | | Incidence of acute MI with and without acute decompensated (validated) HF, compared to incidence of acute decompensated HF with and without troponin elevation | | |
| | | Presence of documented classic abnormal physical exam findings with acute decompensated heart failure - Differences by type of HF, age, race, gender | | |
| | | Diagnostic testing validated heart failure cases (e.g., heart function/EF assessment) - differences in acute vs chronic HF, by race, gender, SES. How this compares to national averages across hospitals during similar time periods. (build on R.Foraker's current work on cohort's "nonvalidated" HF events) | | |
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Notes:

¹ Column 1: Proposals that have a manuscript number (MS #) have already been approved by the ARIC Publications Committee.

S = a proposal that has been submitted. # = a proposal not yet submitted but raised. (no #) = potential ideas.

² Column 4. The lead author is spelled out for those proposals that have been already approved or for those ideas suggested by a particular individual who wants to take the lead. If manuscript idea is noted as "(suggested by XX...)", this means a particular individual, by initials "XX", has proposed this idea but has not declared interest in pursuing it. "Blank" are other brainstorm (from Patty or others).

³ Column 5. The priority score is based on a combination of time-urgency, importance of the topic, and availability of the data at current time.

⁴ Although this potential topic was suggested by a specific person, no one has claimed primary lead/authorship for it.

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=== Will Include separate list/tables for papers re: OUTCOMES, COST-ISSUES, CMS-ISSUES ===

The following table list ideas for **HF CMS data** manuscript proposals.

| MS # ¹ | Proposed Title | General Study Questions | Lead Author ² | Priority ³ & Status |
|-------------------|--|--|--------------------------|--------------------------------|
| #1528 | Concordance of heart failure diagnostic codes comparing medical records and Medicare administrative claims in ARIC cohort participants | 1. To what extent is there agreement among heart failure diagnostic codes found in ARIC cohort hospital records with those found in linked Medicare claims. 2. Where disagreement exists, what are the sources of this disagreement? Hypotheses: This is a descriptive study with no specific hypotheses to be tested. | Massing | |