ARIC Manuscript Proposal #966

PC Reviewed: 10/07/03  Status: A  Priority: 2
SC Reviewed: 10/08/03  Status: A  Priority: 2

1.a. Full Title: Impact of Admission Time on Short-term Mortality and Length of Hospital Stay in Acute Coronary Syndrome Patients

b. Abbreviated Title (Length 26 characters): Admission Time and Outcome

2. Writing Group (list individual with lead responsibility first):

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   Writing group members: Herman Taylor Jr., Jun Pan, Gregory Wilson, Daniel Sarpong, Hui Han, Wayne Rosamond

3. Timeline:

   Complete analysis                     Spring 2004
   Submit first draft to publications committee    Summer, 2004

4. Rationale: Several lines of investigation suggest that clinical outcomes of emergency medical conditions may be significantly related to the time of admission to the hospital. Higher mortality on weekends has been noted for several serious clinical conditions, including ruptured abdominal aortic aneurysm and motor vehicle crash (1 - 3). Also, physician activities are significantly diminished at night (4). Proposed explanations for this observation include both systemic features of American health care delivery and individual characteristics of the providers. Senior physicians are less likely to be present at night and during weekends, decreasing supervision and increasing the possibility that significantly less experienced physicians and non-physician providers will be called upon to make critical early management decisions and occasionally perform difficult or risky procedures. These decisions and actions often occur during the night when mental and motor abilities are likely to decline (5 - 8).

   There is evidence suggesting that higher error rates occur during nights and weekends in both medical and non-medical occupations (9 - 11). This information raises the concern about the impact of complex medical care provided by hospitals during weekends and nights on the mortality of patients with acute coronary syndrome. The objective of this study is to examine the possible association between the time of admission, length of hospital stay and short-term mortality rates in patients with validated acute coronary syndrome after controlling for a variety of potentially confounding factors that might affect these end points.
5. **Main Hypothesis/Study Questions:**

1. We hypothesize that in-hospital mortality is higher in acute coronary syndrome patients admitted after working hours compared with those admitted during regular working hours.

2. We hypothesize that the mortality rate within 1 month after discharge is higher in acute coronary syndrome patients admitted after working hours compared with those admitted during regular working hours.

3. We hypothesize that the length of hospital stay is longer in acute coronary syndrome patients admitted after working hours compared with those admitted during regular working hours. Length of hospital stay is the time of admission to the time of discharge.

6. **Data (variables, time window, source, inclusions/exclusions):**

**Study population:**
Community surveillance database (1987 through 2000) will be used for this study. Participants from ARIC surveillance that were admitted to the hospitals with acute coronary syndrome will be included in this study. The total number of participants in the surveillance is about 55,000, of which one third is the eligible acute coronary syndrome patients. Acute coronary syndrome is defined as acute MI or unstable angina defined by the ICD-9 or ICD-10 code at the admission. For patients who have multiple occurrences of acute coronary syndrome, only the first occurrence of acute MI or acute coronary syndrome will be investigated.

**Independent variable:** two levels of admission based on time.
Regular-hour admission is admission during daytime working hours (8:00 AM to 5:00 PM) on weekdays (Monday through Friday). After-hour admission is admission during nighttime (5:01 PM to 7:59 AM) on weekdays, anytime during the weekend (Saturday through Sunday), and anytime during US federal holidays (Thanksgiving, Christmas, Memorial Day, Labor Day, Independence Day, etc).

**Outcome variables:**
1) In-hospital mortality, defined as a discharge disposition of the deceased. This is the primary mortality of interest. 2) Mortality within one month after discharge. This is the secondary mortality of interest. 3) Length of in-hospital stay, which is defined as the number of days between the date of arrival and the date of discharge for patients who did not die in the hospital.

**Analysis plan:**
Logistic regression will be used to address hypothesis 1 and 2 while linear regression will be used to test hypothesis 3. The comparative effect on in-hospital mortality, mortality within one month after discharge, and length of stay by regular-hour admission relative to after-hour admission will be assessed using both logistic and linear regression, adjusting for important confounders. Major clinical and demographic variables available in the database that are significant predictors of the outcome variables will be adjusted for as covariates in the logistic and linear regression models. Possible variables include age, gender, race, geographic site of
hospital, type of hospital (teaching, non teaching), utilization of procedures, concurrent chronic diseases, medication usage, etc. Patients with missing information on admission time, discharge status, and death status will be excluded. To reduce bias, we will exclude, from the analysis, the length of in-hospital stay for patients who died in the hospital (12).

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 ICTDER02 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  X No
(This file ICTDER02 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 ICTDER02 must be used to exclude those with value RES_DNA = “No use/storage DNA”? ____ Yes  X 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://bios.unc.edu/units/csc/ARIC/stdy/studymem.html  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)?

#085 Medical care and survival. Rosamond.
#531 Trends in pre-hospital delay time. Rosamond.

11. 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.

12. References:


