

independence. Results: Smoothed rates of documentation of EF varied from 35-85% and of ACEI prescription from 65-87% by HRR. Among 32,882 patients eligible for the EF QI, advanced age (OR 0.64, 95% CI 0.61-0.69), female gender (OR 0.87, 95% CI 0.82-0.92), low income (OR 0.77, 95% CI 0.73-0.82), hospital with invasive cardiac capabilities (OR 1.58, 95% CI 1.42-1.74), hospital with a medical school affiliation (OR 1.45, 95% CI 1.32-1.59), rural location (OR 0.50, 95% CI 0.45-0.56) and cardiologist as attending physician (OR 1.38, 95% CI 1.26-1.52) were independently associated with documentation of EF. Among 9,388 patients eligible for the ACEI QI, female gender (OR 0.81, 95% CI 0.73-0.89), higher serum creatinine (OR 0.54, 95% CI 0.50-0.57), black race (OR 1.34, 95% CI 1.13-1.59) and hospitalization at a teaching facility (OR 1.36, 95% CI 1.17-1.59) were independently associated with ACEI prescription. Conclusions: Patient, provider and hospital characteristics contribute to but do not fully explain variation in quality of care for elderly heart failure patients.

9:15 a.m.

849-4

**Effectiveness of Quality Improvement Initiative (Guidelines Applied to Practice[GAP] Project) in Improving the Care of Medicare Patients and Women With Acute Myocardial Infarction**

**Rajendra H. Mehta,** Cecelia K. Montoyo, Meg Gallogly, Patricia Baker, Angela Blount, Steven Borzak, Eva Kline-Rogers, Thomas LaLonde, Michele Orza, Robert Parrish, Stuart Winston, Arthur A. Riba, Kim A. Eagle, On Behalf of GAP Investigators, *University of Michigan Health System, Ann Arbor, Michigan.*

**Background:** Quality of care of patients with acute myocardial infarction (AMI) has been shown to be particularly suboptimal in the Medicare population and in females. Hence, improving care in this cohort prone to be deprived of key indicators for AMI care is of intense interest.

**Methods:** To assess if a quality improvement initiative is effective in improving adherence to evidence-based therapies in Medicare beneficiaries and women, we evaluated patients from the Guidelines Applied to Practice (GAP) project sponsored by the American College of Cardiology. The GAP design consisted of baseline measurement, implementation of improvement strategies (including among other components the use of tools designed to facilitate the adherence to key quality indicators); remeasurement; and comparison of pre- and post samples. A random sample of Medicare and non-Medicare patients admitted for the treatment of confirmed AMI to 10 acute care hospitals in Southeast Michigan at baseline (n=735) and following intervention (n=914) constituted the study population.

**Results:** See table. # =test indicators, \* = p < 0.05, pre =pre-intervention, post =post-intervention.

**Conclusions:** The quality of care for Medicare beneficiaries and women with AMI was less optimal than for non-Medicare patients and men in the pre-GAP phase. A greater improvement was observed for most quality indicators for Medicare patients and women as opposed to non-Medicare patients and men, thereby ameliorating the 'GAP' in the care among these subgroups.

Quality Indicators	Non-Medicare		Medicare		Men		Women	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
N (%)	220 (29.9)	251 (27.5)	515 (70.1)	663 (72.5)	409 (55.6)	505 (55.3)	326 (44.4)	409 (44.7)
Early aspirin %	90.6	88.0	76.6	87.1*	85.7	87.6	75.5	87.2*
Early betablockers %	70.1	75.8	62.5	73.3*	71.4	73.4	55.0	75.5*
Late aspirin %	86.8	92.8	82.0	91.7*	84.4	91.8*	83.0	92.6*
Late betablockers %	90.7	93.4	87.3	92.9	90.1	92.5	85.7	93.9*
Discharge ACE inhibitors %	79.4	90.5	80.8	84.7	79.8	91.2*	80.0	78.9
Smoking cessation %	70.2	79.7	27.7	50.4*	56.3	63.6	44.7	68.8*
Early ACE inhibitors %#	35.0	42.2	33.7	43.7*	35.5	43.2	32.2	43.3*
Diet counseling %#	75.5	80.0	61.7	65.5	70.8	73.2	60.3	65.7
LDL assessment %#	72.2	75.8	58.4	67.1	66.2	67.2	61.1	72.3
Cholesterol management %#	70.5	86.4	66.2	69.9	64.3	76.7	73.8	73.0

9:30 a.m.

849-5

**Strategies to Improve Guideline Adherence: A Randomized Clinical Trial**

Maria N. Ansari, Michael G. Shlipak, Paul A. Heidenreich, **Barry M. Massie,** *San Francisco VA Medical Center, San Francisco, California, UCSF, San Francisco, California.*

**Background** Clinical practice guidelines are designed to translate medical research and expert opinion into recommendations for everyday practice; however their ability to affect clinician behavior has been limited. **Objective** To evaluate interventions for implementing a new practice guideline, which advocates beta-blockers (BBs) for patients (pts) with heart failure (HF). **Design and setting** This study was a clinical trial that randomized providers at the San Francisco VA Medical Center to one of 3 groups on 2/1/00: 1) **Control:** provider education (n= 25 providers, 51 pts); 2) **Alert:** computerized reminders to providers and letters advocating BBs to pts (n=24 providers, 64 pts); and 3) **Nurse Management:** supervised nurse practitioner to initiate and titrate BBs with provider consent (n=25 providers, 54 pts). The primary outcome was the proportion of pts identified as appropriate BB candidates who were initiated and maintained on BBs after 1 year of intervention or at the study endpoint on 4/16/01. Secondary outcomes included hospitalizations and

adverse events. **Participants** Inclusion criteria for pts were an ICD-9 HF diagnosis, EF≤45% and clinical evidence of HF. Exclusions included prior intolerance to BBs, BB use at target doses, lack of primary care at the VA, HR<60, SBP<90, severe COPD, asthma, diabetes with hypoglycemic events, and terminal comorbidities. **Results** Characteristics of providers (specialty, training level) and pts (age, EF, HF etiology, comorbidities) were similar in the 3 intervention arms. Providers assigned to the Nurse Management arm initiated and maintained BBs in 61% of candidate pts compared with 29% (p<.01) in the Control group and 12% (p<.001) in the Alert group. The Nurse Management group also had the highest proportion of pts reaching target BB doses (43% vs. 1.5% and 10%, p<0.001 for both) compared to the Alert and Control arms. There was no difference in adverse events (ER visits, hospitalizations, or deaths) during follow-up. **Conclusions** The use of a nurse manager was a successful and safe approach for implementing a BB guideline in HF pts. The use of provider education, clinical reminders, and patient education were of limited benefit in this setting.

9:45 a.m.

849-6

**Quality Improvement Over Time: Hospital Characteristics Associated With Increased Usage of Beta-Blockers After Myocardial Infarction**

**Jennifer A. Mattera,** Jeph Herrin, Elizabeth H. Bradley, Eric S. Holmboe, Paul Frederick, Hal V. Barron, Katherine A. Littrell, Nathan R. Every, Harlan M. Krumholz, *Yale University, New Haven, Connecticut.*

**Background:** National organizations have focused on improving quality of care by increasing the use of beta-blockers (BB) at hospital discharge after acute myocardial infarction (AMI). Little is known about the factors associated with hospital performance improvement. Our objective was to determine the hospital characteristics independently associated with increasing the use of BB over time.

**Methods:** We examined data on 325,510 discharges at 665 hospitals in the United States collected for the National Registry of Myocardial Infarction from 1996 to 1999. Using logistic hierarchical modeling techniques we examined the hospital-level characteristics associated with increasing use of BB after AMI over a time period. The likelihood of use of BB was adjusted at the patient level for age, gender, ethnicity, comorbidities, and insurance. Change in hospital rate over time was then modeled as a function of hospital ownership, teaching status, urbanity, annual AMI volume, catheterization lab status, and the baseline rate.

**Results:** We observed marked variability in the change in BB use over time at the hospitals with an absolute mean improvement of 6% (standard deviation (SD) 10.2%). After adjusting for patient characteristics and baseline rate, urban teaching hospitals (P=0.003) and higher volume (P=0.017) were found to be significantly associated with increased use of BB over time. Hospital ownership and catheterization lab status were not independently associated with change over time.

**Conclusion:** Hospitals increased use of BB during the study period at different rates. We identified hospital location and volume as independent markers of larger increases in the use of BB. The heterogeneity in performance by hospital type may provide an opportunity to investigate successful strategies to accelerate improvement.

POSTER SESSION

**1168 Various Topics in Outcomes Research**  
 Tuesday, March 19, 2002, 9:00 a.m.-11:00 a.m.  
 Georgia World Congress Center, Hall G  
 Presentation Hour: 10:00 a.m.-11:00 a.m.

1168-163

**Racial and Gender Differences in Refusal of Coronary Angiography**

**Paul Heidenreich,** Michael Shlipak, Jeffrey Geppert, Mark McClellan, *VA Palo Alto Health Care System, Palo Alto, California.*

**Background.** Racial and gender differences in the use of cardiovascular procedures are well documented. It is unclear to what extent patient refusal contributes to the difference in procedure use. **Methods.** To determine the effect of patient refusal on racial and gender differences in coronary angiography utilization we identified patients of age 65 or older admitted to hospitals performing coronary angiography from the Cooperative Cardiovascular Project Database, which includes nearly all Medicare beneficiaries admitted with an acute myocardial infarction (MI) from February 1994 through July 1995. In-hospital use and refusal of coronary angiography adjusted for patient comorbidities, severity of infarction, hospital, physician, and socio-economic status.

**Results.** Of 124,691 patients with acute MI 53,671 (43%) patients underwent angiography and 2,881 (2.4%) patients refused during hospitalization. Patients refusing angiography were more likely to be female (odds ratio 1.37, 95% confidence interval 1.23 - 1.53), black (odds ratio 1.26 versus whites, 1.02-1.56) and older (odds ratio 2.25 per 10 year increase, 2.05-2.43) when compared to patients that received angiography. Angiography use was lower for blacks (odds ratio 0.78, 0.72-0.83) compared with whites, and for women (odds ratio 0.83, 0.80-0.86) compared with men. Increased refusal explained 6% (-3% to 15%) of the difference in angiography use between whites and blacks and 16% (10% to 22%) of the difference between males and females. Patients who refused were twice as likely to die during the year following MI (31% vs. 16%), but this mortality difference disappeared after adjustment for patient-related variables.

**Conclusions.** Elderly females and black patients are more likely to refuse angiography than are male and white patients. However, patient refusal is relatively uncommon and accounts for only a small fraction of the racial and gender differences in angiography utilization after MI.