Abstract Session G3: Hospital-Based Medicine

Emergency Department Utilization by Primary Care Patients at an Urban Safety-Net Hospital

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BACKGROUND: Patient Centered Medical Homes seek to reduce emergency department (ED) utilization by primary care patients. Few data are available on such utilization at safety-net hospitals.

METHODS: We analyzed data on patients who had ≥1 primary care visit in the past year (July 1, 2009-July 1, 2010) to Boston Medical Center. Using ICD-9 codes for the principal ED visit diagnosis, we defined ED utilization according to a modified version of the NYU ED algorithm, categorizing ED visits as high, intermediate, and low severity. Such classification has a strong association with future hospitalization or death. We defined a frequent ED utilization group with ≥4 ED visits in the past year, and an occasional ED utilization group with 1-3 ED visits in the past year. Medical and psychiatric diagnoses were obtained from the EMR problem list and billing data. We used t-tests and chi-square tests to compare demographic characteristics of patients with and without any ED use. Controlling for age, gender, language, insurance, and the presence of medical and psychiatric diagnoses, we used multiple logistic regression to analyze predictors of frequent vs. occasional ED utilization.

RESULTS: Among 39,593 patients who had seen their primary care provider in the past year, 65.4% had no ED visits over that period. The 34.6% (13,710/39,593) with ≥1 ED visit made 30,048 ED visits, with a mean of 2.2 visits (IQR 1-2). Frequent utilizers, accounting for 14.1% of all primary care patients with any ED use, made 41% of all ED visits by primary care patients. Most ED visits made by high utilizers were categorized as low severity (72.2%); 8.8% were high severity, and the remaining 19% were indeterminate severity. Patients with and without any ED use did not differ by language (79% spoke English) or gender (57% female). Patients with ED use were older (mean age 46.9) than persons without ED use (mean age 45.8; t<0.0001). A higher proportion of blacks (43.2%) and Hispanics (42.9%) used the ED, relative to Asians (17.7%) and whites (20.1%; p<0.0001). ED utilization by privately insured patients (21.3%) was less than that by patients with Medicaid and Free Care (44.9% and 46.0%, respectively; p<0.0001). Among patients with any ED use, frequent ED utilizers were of similar age (mean 47) yet had a higher burden of medical and psychiatric comorbidity compared to occasional utilizers. In multivariable analyses, frequent (vs. occasional) ED utilizers were more likely to be under age 50 (odds ratio [OR] 1.2; 95% confidence interval [CI], 1.1-1.3), to have COPD (OR 1.8; 95% CI, 1.6-2.0), diabetes (OR 1.3; 95% CI, 1.1-1.4), CHF (OR 2.1; 95% CI, 1.8-2.5), bipolar disorder (OR 1.6; 95% CI, 1.3-2.0), anxiety (OR 1.3; 95% CI, 1.1-1.5), schizophrenia (OR 1.6; 95% CI, 1.2-2.1), depression (OR 1.7; 95% CI, 1.5-1.8) and PTSD (OR 1.6; 95% CI, 1.3-1.8).

CONCLUSION: ED utilization by primary care patients at an urban safety-net hospital was high, though most visits were low-severity. A medical home model which provides adequate access to psychiatric as well as primary care, and chronic disease management, has the potential to decrease non-emergent ED utilization.
Payment Source as an Adjustment for Hospital Readmission Rates John S. Hughes, Richard Fuller; Elizabeth McCullough; James Vertrees. 1Yale School of Medicine, New Haven, Connecticut; 23M Health Information Systems, Silver Spring, Maryland. (Proposal ID # 10844)

BACKGROUND: Preventable readmissions are among the measures increasingly used to evaluate the quality of hospital care. Current risk-adjustment methods may not be sufficient to account for the susceptibility of low-income individuals to more frequent hospitalizations, which can result in disproportionately higher than expected readmission rates for safety-net hospitals. We therefore examined the residual effect of payment source, a surrogate for socio-economic status and age, on predicted readmission rates after adjustment for casemix and severity of illness.

METHODS: We used administrative data from January 2005 through April 2007 from 165 Florida hospitals with at least 2,000 eligible admissions, comprising 4,626,909 hospitalizations. Each admission was linked at the patient level so that readmissions to any hospital could be identified. We identified 30-day preventable readmissions to any hospital using Potentially Preventable Readmissions (PPR), a method that determines preventability of repeat hospitalizations based on whether there is a plausible causative relationship between the reason for the initial admission (IA) and the readmission (RA). We used All Patient Refined Diagnosis Related Groups (APR DRGs) to categorize reasons for hospitalization, and to adjust for severity of illness (SOI). Each eligible admission was assigned to a base APR DRG and to one of 4 SOI levels within the APR DRG. We calculated an expected readmission rate for each hospital using indirect standardization of statewide average rates within each APR DRG and severity level. We then examined overall expected and actual PPR rates within categories of patient age, the presence of a major mental health or substance abuse diagnosis, and categories of payer source. We used regression analysis to examine the influence of each of these factors on the accuracy of the PPR rate, and to generate modifications to the APR DRG risk adjustment.

RESULTS: Actual PPR rates for individual hospitals ranged from 2.27% to 20.79%, and ranged from 2.42% below to 8.18% above the expected rates derived from statewide averages. In the examination of payer source, the PPR model underestimated the statewide rate for Medicare patients (10.3% predicted versus 11.2% actual) and Medicaid patients (7.7% predicted versus 9.0 actual), while it overestimated the PPR rate for commercial insurance (6.7% predicted v. 5.1% actual). We used coefficients derived from regression analysis to create adjustment factors for payment source and applied them to the standard APR DRG model, yielding predicted overall PPR rates much closer to the actual values for Medicare (11.16% v. 11.24% actual), Medicaid (8.88% v. 8.98% actual), and Commercial insurance (5.08% v. 5.10%).

CONCLUSION: There appear to be additional risks for preventable readmissions associated with payment source that are not measured in the PPR risk adjustment mechanism using APR DRGs. This study shows that adjustments for payment source, and likely for other socio-demographic variables (education, income), when available, can be readily incorporated into a risk-adjustment model. Not adjusting for payment source, and implicitly for the effects of poverty (Medicaid) and age (Medicare) could unfairly penalize hospitals that care for disproportionate shares of Medicare and Medicaid patients, while simultaneously favoring hospitals with larger numbers of privately insured patients.
Hyperglycemia and Short-Term Outcomes in Patients with Acute Pulmonary Embolism

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BACKGROUND: Hyperglycemia is associated with poor outcomes in acute cardiorespiratory diseases, such as myocardial infarction, heart failure, and pneumonia. The prognostic value of serum glucose at admission in patients with acute pulmonary embolism (PE) is unknown. We sought to examine the association between admission glucose levels and mortality and hospital readmission rates for patients hospitalized with PE.

METHODS: We studied patient discharges with a primary diagnosis of PE from 185 acute care hospitals in Pennsylvania (1/2000-11/2002). Levels of admission glucose were analyzed as a categorical (smaller than or equal to 110, >110 to 140, >140 to 170, >170 to 240, >240 mg/dL) variable. The study outcomes were 30-day all-cause mortality and hospital readmission. We used random-intercept logistic regression to assess the independent association between admission glucose levels and mortality and hospital readmission, adjusting for patient (age, gender, race, insurance, severity of illness using the Pulmonary Embolism Severity Index, use of thrombolytic therapy, troponin, hemoglobin, creatinine, and sodium) and hospital factors (region, size, teaching status).

RESULTS: Among 13,621 patient discharges with PE, hyperglycemia (glucose >110 mg/dL) was present on admission in 8666 patients (63.6%). The majority (80.6%) of hyperglycemic patients did not have recognized diabetes mellitus. Patients with a glucose level smaller than or equal to 110, >110 to 140, >140 to 170, >170 to 240, >240 mg/dL had a cumulative 30-day mortality of 5.6%, 8.4%, 12.0%, 15.6%, and 18.3%, respectively (P smaller than 0.001). Compared to patients with a glucose level smaller than or equal to 110 mg/dL, the adjusted odds of dying were significantly greater for patients with a glucose >110 to 140 mg/dL (OR 1.20, 95% CI: 1.01-1.44), >140 to 170 mg/dL (OR 1.42, 95% CI: 1.16-1.76), >170 to 240 mg/dL (OR 1.53, 95% CI: 1.24-1.88) and >240 mg/dL (OR 1.65, 95% CI: 1.32-2.06), with no difference in the odds of hospital readmission.

CONCLUSION: In this large, statewide sample of unselected patients with acute PE, hyperglycemia was common in patients presenting with PE and was an independent predictor of short-term mortality. Given that hyperglycemia is a potentially harmful and correctable abnormality, whether glucose lowering with insulin has a positive clinical impact in patients with PE needs to be further examined.
Variation in Triage Practices among Veterans Administration Hospitals Lena M Chen 1; Marta Render 2; Anne E. Sales 3; Edward H. Kennedy 3; Wyndy L. Wiitala 4; Timothy P. Hofer 4. 1 Ann Arbor Veterans Affairs Medical Center and Division of General Medicine, University of Michigan, Ann Arbor, Michigan ; 2VA Inpatient Evaluation Center, Cincinnati, Ohio ; 3Veterans Affairs Health Services Research and Development Center of Excellence, Ann Arbor, Michigan ; 4Veterans Affairs Health Services Research and Development Center of Excellence; Division of General Medicine, Department of Internal Medicine, University of Michigan, Ann Arbor, Michigan . (Proposal ID # 10014)

BACKGROUND: Variation in the use of critical care for patients at the end of life has been described and identified as a major source of rising health care costs. However, such patients make up only a fraction of all hospital admissions, and hospital triage practices are central to appropriate resource use for all patients. No prior work has examined variation in hospital triage practices within a national healthcare system, and among a broad array of medical patients. In this context, we examined three questions using Veterans Administration (VA) data: 1) on average, does the probability of triage to the intensive care unit (ICU) increase as a patient's predicted mortality on admission increases?, 2) among patients with high predicted mortality, how much do hospitals vary in their use of the ICU?, and 3) among patients with low predicted mortality, how much do hospitals vary in their use of the ICU?

METHODS: We used retrospective data from the VA Inpatient Evaluation Center (IPEC), which collects clinical information for inpatient admissions from all VA hospitals, and has developed a validated model for assessing risk of mortality using this data. We constructed a cohort of adult admissions to any VA acute care hospital between July 2009 and June 2010. We included the first admission for all non-surgical patients who were admitted from the Emergency Department or Outpatient Clinic. We excluded VA hospitals with less than 10 ICU admissions. For each admission, we estimated predicted mortality using the IPEC validated inpatient severity score (ISS), based on clinical, laboratory, and demographic variables collected in the 24 hours surrounding admission. We measured the proportion of patients that each hospital admitted directly to the ICU, stratified by categories of ascending mortality risk.

RESULTS: During the study period, 283,976 unique non-surgical patients were admitted to 120 VA hospitals. Of these patients, 31,073 (10.9%) were initially admitted to the ICU and 252,903 (89.1%) were admitted elsewhere. Predicted mortality varied by initial triage assignment: direct ICU admissions (ISS=0.082, 30-day mortality=7.7%), and non-ICU ward admissions (ISS=0.042, 30-day mortality=3.5%). Increased predicted mortality was directly associated with an increased likelihood of ICU admission (ascending categories of predicted mortality: 9%, 12%, 14%, 19%, and 28%). At all levels of predicted mortality, hospitals varied significantly in the proportion of patients directly admitted to the ICU. In the lowest category of predicted mortality, 1-49% of patients were admitted to the ICU; in the next highest, 3-50%, then 0-55%, 0-52% and 0-72%.

CONCLUSION: For a broad array of patients at all levels of predicted mortality, hospitals vary widely in their use of critical care, suggesting that there are opportunities for improved efficiency. The causes and consequences of this variation remain to be explored.
Impact of Hospital Teaching Intensity on the Quality of Care in Hospitals

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BACKGROUND: Studies examining the quality of care that a patient receives in teaching versus non-teaching hospitals have demonstrated mixed results and many were conducted prior to the implementation of the Accreditation Council for Graduate Medical Education (ACGME) residency work hour restrictions. Thus, a more current examination of the association between hospital teaching intensity and quality of care is overdue.

METHODS: We linked 2008 Hospital Quality Alliance (HQA) and 2007 American Hospital Association (AHA) data for each medical and surgical hospital in the U.S. Main outcome measures included 30 day readmission rate and mortality rate for 3 conditions: acute myocardial infarction (AMI), congestive heart failure (CHF), and pneumonia. The predictor of interest was teaching intensity, defined as number of residents-to-bed ratio and classified into either: (1) non-teaching (zero residents/bed), (2) low teaching intensity (0-0.25 residents/bed), (3) medium teaching intensity (0.25-0.6 residents/bed) and (4) high teaching intensity (> 0.6 residents/bed). We utilized linear regression to examine the relationship between teaching intensity and each clinical outcome adjusted for hospitals’ geographic location, ownership, urban versus rural setting, nursing intensity (nurses/1000 patient days), presence of an ICU, insurance mix, hospital size and presence of hospitalists.

RESULTS: Of the 2423 hospitals reporting quality outcome data, 1528 (63%) were non-teaching, 699 (29%) were low teaching intensity, 116 (5%) were medium teaching intensity, and 80 (3%) were high teaching intensity. After adjustment for hospital characteristics, increasing teaching intensity was significantly linearly associated with readmission rates for all three conditions and conversely associated with mortality rates for AMI and CHF (see Table).

CONCLUSION: In this nationally-representative sample of medical and surgical hospitals we found that increased teaching intensity is associated with higher readmission rates but lower mortality for the most common of inpatient medical diagnoses. Our findings suggest that teaching intensity may be associated with higher quality of inpatient care, but poorer quality transitions of care.
Higher Quality Discharge Summaries of Hospitalized Older Adults are Associated with Reduced Risk of Readmission: Instrument Development and Outcomes Vishnu Laalitha Surapaneni; Karen Chen; Kathryn Eubank; Bruce Leff; Alicia Ines Arbaje. 1Johns Hopkins University, Baltimore, Maryland; 2University of Texas at Southwestern, Dallas, Texas . (Proposal ID # 12293)

BACKGROUND: The communication between the care providers at the sending and receiving ends of a care transition, in the form of the discharge summary, may influence the quality of a care transition and subsequent events such as hospital readmission. However, there are few data on essential components of high-quality discharge summaries for older adults, especially those with complex, chronic illnesses. The objective of our study is to develop and evaluate an instrument to rate the quality of discharge summaries of hospitalized older adults.

METHODS: In the development phase, we identified core domains of high-quality hospital discharge summaries through a review of the literature and guided by the results from prior qualitative study of a multi-disciplinary group of providers caring for older adults in four care settings: hospital, skilled nursing facility, home health care, and ambulatory care. The core domains, delineated in Table 1 along with their respective components, were: plan of care (PC), admission information (AI), discharge status (DS), hospital course (HC), and communication and timeliness (CT). We created an instrument and scoring system to rate the quality of discharge summaries based on the identified components of the core domains. In scoring one discharge summary, each component of the core domains was given a score and these scores were aggregated for each core domain, which in turn were aggregated to provide the overall discharge summary score (DC Score) for a discharge summary. The DC Score of each discharge summary ranged from 0-26 points with 0 representing no components present and 26 representing all components present. In the evaluation phase, we performed a retrospective cohort study. We applied our instrument and scored 626 discharge summaries of adults, aged 70 years and older, hospitalized on a general medical service at an academic medical center and discharged to the community. We performed exploratory data analysis and then used linear regression to model the relationship between the DC Score and two outcomes: 1) older adults’ scores on the Care Transitions Measure (CTM), a self-reported measure of the quality of care transition. Low CTM scores have been found in other work to be related to higher readmission rates, and; 2) older adults’ readmission to the hospital for same condition within 14 days.

RESULTS: The development phase yielded an instrument comprised of five core domains of a high-quality discharge summary. The core domains and their relative contribution to the DC Score are: plan of care (PC)-35%, admission information (AI)-27%, discharge status (DS)-19%, hospital course (HC)-12%, and communication and timeliness (CT)-up to 8%. Table 1 outlines the components within each core domain. The mean (SD) and median score of each of the core domains and the DC Score for the 626 discharge summaries reviewed are described in Table 2. 54% of the discharge summaries were high-quality. All discharge summaries were lacking at least one component in all domains: 60% of the discharge summaries did not document a follow-up appointment (PC); 27% did not document allergies (AI); 60% did not document baseline functional status (DS); 23% did not document primary diagnosis (HC); and 52% were not documented as having been copied to the primary care provider (CT). Higher DC Scores were associated with higher CTM scores (p<0.05), as were presence of the core domains, plan of care, admission information, and communication and timeliness, related individually to higher CTM scores. Higher DC Scores were associated with reduced readmissions for the same condition within 14 days (p<0.05).

CONCLUSION: This study defines core domains of high-quality discharge summaries for hospitalized older adults and a method to rate the quality of hospital discharge summaries. Only a minority of discharge summaries studies in this study was found to be of high-quality. High-quality discharge summaries were associated with reduced readmissions at 14 days for the same condition. These data should be used to inform development of quality improvement efforts to improve discharge summary quality and to determine if such efforts could improve clinical outcomes for older adults.