The Association between Hospitalist Physician Workload and Hospital Length of Stay

Daniel J. Elliott¹, Robert Young², Paul Kolm³, Joanne C. Brice¹ ¹ Christiana Care Health System, Newark, DE, United States. ² Northwestern University, Chicago, IL, United States. (Control ID: 1339782)

Background: Hospitalist physicians are in increasingly high demand, largely because of perceived improvements in the efficiency of care. However, little data exist to determine the association between hospitalist workload and overall efficiency as measured by length of stay (LOS). The objective of this study is to determine the association between daily hospitalist physician workload and overall LOS.

Methods: We conducted a retrospective cohort study of inpatients over 18 admitted to a large, private hospital medicine service between February 1, 2008 and January 31, 2011. We excluded patients who were admitted directly to an intensive care unit, were not discharged prior to the end of the study period, or had a hospital length of stay (LOS) <0.5 or >100 days. The exposure was the average physician workload on the day of a billed visit for each physician who billed a visit during the patient’s hospitalization. Daily workload was calculated for each physician as the total Relative Value Units (RVU) generated each day. We standardized RVU values to 2011 CMS guidelines. The primary outcome was overall hospital LOS. Key covariates included patient demographics, the fragmentation of care index of physician continuity, and hospital characteristics including occupancy. We included all diagnoses and used severity-adjustment algorithms from Thomson-Reuters. We used linear mixed-effects models clustered by patient to determine the association of daily workload and LOS. LOS was log-transformed for all analyses to account for skewed data.

Results: Overall, 20,406 hospitalizations met study criterion. Mean daily workload was 32.5 RVU. Mean LOS was 5.4 days. The figure shows the results of the adjusted analyses. LOS was shortest when workload was in the lowest quintile (p<0.001). LOS increased significantly as workload increased, with a maximum LOS between 31 to 37 RVUs per physician per day. The average LOS decreased for patients in the highest quintile of workload (>37 RVUs/day).

Conclusions: Hospitalist Physician workload is strongly associated with LOS, even after adjusting for patient and hospital factors. Importantly, LOS decreases at the highest levels of physician workload, which may reflect changes in practice that occur at the extremes of workload. Further studies to determine the impact of these LOS changes on quality and safety should be conducted, with particular attention to potential cost shifting that may occur with LOS reductions at the highest levels of physician workload.
Intervention reduces inpatient ordering of cardiac enzymes at Johns Hopkins Bayview Medical Center

Marc Larochelle, Amy Knight, Jeff Trost Internal Medicine, Johns Hopkins Bayview Medical Center, Baltimore, MD, United States. (Control ID: 1333625)

Background: Inpatient diagnostic testing is overused. Modifying physician ordering behavior has the potential to reduce costs and improve patient care. Physicians for Responsible Ordering (PRO), a multi-departmental, physician-led committee was organized to understand and improve physician ordering of diagnostic tests at Johns Hopkins Bayview Medical Center. As an initial target, we set out to influence cardiac enzyme test ordering.

Methods: Based on a review of clinical evidence and guidelines, and discussions with cardiologists, criteria for appropriate ordering of cardiac enzymes for the diagnosis of acute coronary syndromes (ACS) were identified. At an academic hospital in Baltimore, we conducted an assessment of an inpatient intervention that promoted appropriate cardiac enzyme ordering. Presentations were made to faculty and housestaff to outline the project objectives and communicate the guidelines. A quick reference card summarizing appropriate ordering was developed and disseminated in September 2011. Changes to the computerized provider order entry system were made in October 2011 to facilitate adherence to the guideline. Cross-sectional analysis was performed on all inpatients admitted to JHBMC in November 2010 (pre-intervention) and November 2011 (post-intervention). Primary outcome was mean number of orders per patient for total creatine kinase (CK), CK-MB, and troponin I. Secondary outcomes were total charges for CK, CK-MB, and troponin I. The number of patients with a primary diagnosis of ACS (ICD-9 codes 410x or 411x) was also tracked in the pre- and post-intervention groups. Subgroup analysis was conducted for patients admitted to a medicine service as medicine services admit the majority of patients with possible ACS and are more likely to order cardiac enzymes.

Results: Orders were compared for 1,881 patients in the pre period and 1,865 patients in the post period. Mean age was 49 years in both groups, and 52% of patients were female in both groups (both p > 0.05). There was no difference in the incidence of ACS between groups, with 20 (1.06%) patients in the pre period and 21 (1.13%) patients in the post period (p=0.85). The mean numbers of tests per patient for the pre and post groups respectively were: 1.23 and 0.26 for total CK (p<0.0001); 1.08 and 0.14 for CK-MB (p<0.0001); and 1.06 and 0.74 for troponin I (p<0.0001). 774 (41%) of the pre group and 781 (42%) of the post group were admitted to a medicine service. In this medicine subgroup, the mean numbers of tests per patient for the pre and post groups respectively were: 2.41 and 0.42 for Total CK (p<0.0001); 2.15 and 0.22 for CK-MB (p<0.0001); and 2.05 and 1.45 for troponin I (p<0.0001). The total number of cardiac lab tests (total CK, CK-MB, and troponin I) declined from 6,329 during the pre period to 2,125 during the post period, a 66% reduction. This change corresponds to a decrease in charges of $109,946 for the one month of this analysis.

Conclusions: The multi-faceted intervention changed physician behaviors to be consistent with guidelines. The new practice patterns resulted in substantive savings without affecting the incidence of ACS. This approach is scalable to other diagnostic tests and institutions and represents an opportunity to improve care quality and reduce costs nationwide.
An Educational Intervention to Improve Discharge Summaries in a Community Hospital

Nicole Gill-Duncan1, Philippe Leveille1, Dean Luu1, Julie M. Pearson2, Julie Kanevsky1, Daniel Giaccio1
Internal Medicine, Lutheran Medical Center, Brooklyn, NY, United States. 2 Clinical Research, Lutheran Medical Center, Brooklyn, NY, United States. (Control ID: 1330276)

Background: The quality of discharge summaries significantly affects the ability of primary care providers to adequately care for patients after hospital discharge. As the pressure on hospitals to decrease length of stay rises, so too does the percentage of patients discharged with significant test results still pending. Relaying information about the hospital course and pending test results to the primary care provider is crucial to ensure patient safety.

Methods: We developed an assessment tool for rating the quality of discharge summaries. It incorporated ratings of the narrative of the history of present illness and hospital course, as well as scoring the presence of important elements that affect post-hospital care, such as primary and secondary diagnoses, medication reconciliation, and appropriate follow-up. Our educational intervention consisted of two parts. The first was a morning conference teaching residents how to write an effective discharge summary. The second was a noon conference simulation exercise in which a long, detailed description of a hospital course was provided, and residents were asked to write discharge summaries in real time using the guidelines provided in the morning conference. These discharge summaries were then anonymously submitted, and a selection of the best and worst examples were reviewed with the group. Discharge summaries dictated before and after the educational intervention were then compared using the assessment tool. Two members of the research team rated each discharge summary. The interrater reliability was moderate (Cronbach alpha = 0.50). The average absolute difference between the reviewers’ scores was 21%. Discharge summaries with an absolute difference greater than 30% (fourth quartile) were reviewed by a third reviewer and then all three scores were averaged. Paired t-tests were used to assess the differences in final weighted averages between pre-/post-test scores.

Results: A total of 104 discharge summaries were assessed from 26 residents. The weighted average score for discharge summaries significantly increased from 52% to 67% after the educational intervention (p < 0.01). 70% of the post-intervention discharge summaries were rated as being effective overall (agree or strongly agree), compared to 47% of the pre-intervention discharge summaries. The elements of the discharge summaries that were rated the poorest pertained to medication reconciliation; more than 90% of the summaries from both the pre- and post-intervention groups were missing information on medications that were changed or discontinued.

Conclusions: Our educational intervention improved the quality of hospital discharge summaries written by Internal Medicine residents. Medication reconciliation was rated the poorest. Computer-generated discharge summary forms with specific fields for medication reconciliation may help to improve discharge summaries.
Relationship of timing and quality of discharge summaries to clinical experience

Leora I. Horwitz¹, Christine Chen², Grace Y. Jenq¹, Sandhya V. Kanade², Katy Araujo¹, Peter Van Ness¹, Boback Ziaeian², John Moriarty¹¹ Yale University, New Haven, CT, United States. ² Yale New Haven Hospital, New Haven, CT, United States. (Control ID: 1338260)

Background: Discharge summaries are an essential component of a safe transition from hospital to home, yet timeliness and content are known to be suboptimal. Whether clinical experience affects the quality of the discharge summary is unknown.

Methods: A prospective cohort of patients admitted to the medical service with pneumonia, heart failure or acute myocardial infarction and discharged home was enrolled. Discharge summaries were reviewed by trained nurse abstractors for timeliness of summary dictation and the presence of individual content, including data related to hospitalization and data related to transitional care. Two summary scores were created, one for six content elements recommended by the Joint Commission (reason for hospitalization, significant findings, procedures and treatment provided, patient’s discharge condition, patient and family instructions and attending physician’s signature), and one for seven elements recommended by a multispecialty group (principal diagnosis and problem list, medication list, transferring physician name and contact information, cognitive status of the patient, test results, and pending test results). Timeliness and content were compared by training level (hospitalist, second or third year house staff, and cardiology advanced practice RNs [APRNs]).

Results: The study cohort included 377 patients. Included patients had a mean age of 77 years; 54% were male. A total of 195 (52%) had acute coronary syndrome, 146 (39%) had heart failure, and 91 (24%) had pneumonia. Discharge summaries were completed for 376/377 patients. A total of 114 (30%) had discharge summaries dictated by hospitalist attendings, 123 (33%) had discharge summaries dictated by house staff, and 140 (37%) had discharge summaries dictated by APRNs. The median days to dictation was 1 day after discharge (IQR 0-7, range 0-95 days); 255 (67.4%) were dictated within 48 hours of discharge. Summaries dictated by hospitalists were most likely to be done within 48 hours of discharge (81.6% hospitalists, 65.9% house staff, 57.6% APRNs, Chi-square test, 2 df, p<0.001). Diagnosis, hospital course and tests/procedures performed during admission were included in >97% of discharge summaries. However, data related to post-discharge care such as social support (39.3%), functional capacity (26.3%), physical exam at discharge (16.5%) and whether any test results were pending (13.0%) were rarely included. Only 6.1% of summaries included a call-back number for the inpatient physician; only 4% of summaries for patients with heart failure included the discharge weight. On average, summaries included 5.6 of the 6 elements required by the Joint Commission and 4.0 of the 7 elements recommended by a multispecialty group. Hospitalists, APRNs and house staff included the same average number of Joint Commission elements (5.6), but hospitalists on average included slightly more multispecialty elements (4.3) than did house staff (4.0) or APRNs (3.8), Kruskal-Wallis test, 2df, p<0.001.

Conclusions: Discharge summaries lack key information relevant to post-discharge care and are hospitalization-focused rather than transition-focused. Hospitalists produce more timely summaries that include slightly more key content than house staff or APRNs; however, no group produced consistently timely or high quality summaries. Medical training should specifically include discharge summary skills focused on transition rather than documentation.
Impact on Length of Stay and Costs in Patients Admitted to an Observation Unit with Chest Pain, Syncope and Abdominal Pain

Aziz Ansari1, Elizabeth Schulwolf1 1 Division of Hospital Medicine, Loyola University Medical Center, Maywood, IL, United States. (Control ID: 1339798)

Background: Hospitals are focusing more on patient admission status as inpatient or observation due to changes in reimbursement and increased scrutiny from regulatory agencies. Observation units allow for more efficient and appropriate care for patients admitted under observation status. Implementation of these units may decrease resource utilization, length of stay (LOS) and costs.

Methods: We compared data of patients admitted under observation status either to the general floor in Quarter 4 of 2009 or to the observation unit in Quarter 4 of 2010. The data was obtained from our administrative database and included primary diagnosis, LOS and total charges. We excluded patients who were classified as inpatient at any time during the admission, regardless of the patients’ length of stay. All patients were cared for by a hospitalist. Patient cohorts were compared overall and then by primary diagnosis: chest pain, syncope and abdominal pain. Continuous variables were compared using the Student’s t-test. Dichotomous variables were compared using the chi-square test. All data was analyzed using Stata 11, College Station, TX and Microsoft Excel.

Results: The overall mean LOS significantly decreased in the OBS unit (19.04 hours vs. 29.55 hours, P<0.001). Overall mean total charges also significantly decreased ($7,230 vs. $8,709, P<0.001). The percentage of patients staying beyond 24 hours was reduced from 42.9% baseline to 21.9% post implementation of the OBS unit (P<0.001).

In chest pain patients, significant decreases were seen in LOS (17.92 hours vs. 26.71 hours, P<0.001) and total charges ($7,157 vs. $8,920, P<0.001). Significantly fewer patients were hospitalized for more than 24 hours (19.5 % vs. 35.7%, P<0.001).

In syncope patients, LOS for patients admitted to the OBS unit significantly decreased (23.00 hours vs. 43.44 hours, P<0.05). There was no significant difference in total charges but a significantly lower proportion were hospitalized for more than 24 hours (28.7% vs. 66.6%, P=0.003).

In abdominal pain patients, no statistically significant differences were seen in any of the metrics.

Readmission rates were negligible both pre and post implementation.

Conclusions: There was an improvement in overall LOS, total charges and percentage of patients staying longer than 24 hours. In subgroup analyses, patients admitted with chest pain or syncope had a significant reduction in all metrics. The lack of effect in abdominal pain patients is likely due to small sample size and variability in clinical presentation and evaluation needs. Our comparison shows that implementation of an observation unit improves key metrics in hospital efficiency without affecting readmission rates. Additional studies are needed to assess other metrics such as patient satisfaction, ER throughput of patients admitted to the observation unit, effects of incorporating case managers into the triaging process to determine admission classification, and the use of standardized clinical protocols.
Perceived Control & Sleep in Hospitalized Adults: A Sound Hypothesis?

Marie Adachi1, Paul G. Stasiunas1, Kristen Knutson1, David Meltzer1, Eve Van Cauter1, Vineet Arora1 1
University of Chicago, Chicago, IL, United States. (Control ID: 1320135)

Background: Although sleep is important for recovery from acute illness, it is often hampered by noise in hospitals. Interestingly, some patients are more vulnerable to noise disruptions, which is now a publicly reported quality measure by Medicare for hospitals. Perceived control over sleep, or the belief of personal ability to bring about a health outcome related to sleep, could be responsible for this variation. High perceived control is associated with fewer hospitalizations and lower mortality rates in older patients, warranting its study in the context of sleep. The aim of this study was to assess the association between perceived control over sleep and inpatient sleep time after controlling for noise levels.

Methods: All non-institutionalized patients over age 50, who were ambulatory on admission and admitted to a general medicine ward were eligible. Patients with prior sleep disorders, in the hospital greater than 72 hours, with prior ICU stay or in respiratory isolation were excluded. Perceived control over sleep was measured using the Sleep Self-Efficacy Scale (SSE) which is a 9 item scale which ranges from 9 to 45 and asks patients to report their confidence ranging from 1 (Not Confident) to 5 (Very Confident) of one’s ability to carry out activities related to sleep (i.e. lie in bed, feeling mentally relaxed). Baseline sleep habits were assessed using the Epworth Sleepiness Scale. Patients were also asked daily about whether their sleep was disrupted by noise the night before. Sleep in hospital was measured nightly using wrist actigraphy (Actiwatch). Noise level was measured nightly in dB using bedside Larson Davis sound meters. Descriptive statistics and multivariate linear regression were used to discern the association between perceived control and sleep duration controlling for noise and clustered by subject.

Results: From April 2010 to Aug 2011, 76 patients (61%) were enrolled whose mean age was 67+/12 years. Two thirds were African American and 57% were female. Over two-thirds of subjects (67%) were characterized as “average” or “above average” sleepers at baseline with Epworth Sleepiness Scale scores ≤9. Mean in-hospital sleep time was 329±123 mins, which was significantly shorter than the self-reported sleep duration of 393±119 mins prior to admission (p<0.0001). Roughly half (46%) of patients complained of noise. Noise levels in the loudest tertile rooms ranged from 37dB (conversation) to 94db (chainsaw). Median sleep self-efficacy was 35 (IQR 26-41). In unadjusted analyses, patients with above median SSE had almost an hour (58 min) more sleep (95% CI [15-100], p=0.009). This effect remained significant after controlling for noise level and routine demographics. Of note, the loudest noise levels were associated with nearly an hour less sleep (-52 minutes). Patients with high SSE also had 70% lower odds of reporting noise-disrupted sleep [OR 0.31 (0.13, 0.73), p<0.05] in both adjusted and unadjusted analyses. Sensitivity analysis using raw SSE scores showed similar findings.

Conclusions: Controlling for noise levels, high Sleep Self-Efficacy among hospitalized older patients is associated with longer sleep duration and fewer complaints of noise. In addition to noise control, hospitals should consider interventions (coaching, empowerment) to boost perceived control over sleep to improve the sleep of hospitalized adults.