Effect of Comorbidities on Clinical Outcomes in Low-Risk CURB-65 Patients

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**Background:** The CURB-65 score is widely-used to risk stratify patients with community-acquired pneumonia (CAP). When the score is less than 3, the patient is considered to have a low mortality risk and current recommendations suggest that treatment may be provided in the outpatient setting. However, this tool only considers acute findings that reflect severity of illness; whether pre-existing clinical conditions significantly alter the risk of adverse outcomes in pneumonia patients is unknown. Our objective was to evaluate the effect of comorbidities on clinical outcomes in patients admitted with low-risk CURB-65.

**Methods:** The medical records of consecutive patients admitted with CAP to a tertiary referral teaching hospital were reviewed to obtain the required clinical information to calculate the CURB-65 score and the age-adjusted Charlson Comorbidity Index (CCI). The performance of CCI in predicting 30-day mortality was plotted on a receiver operator characteristic (ROC) curve, from which a cutoff value was derived to define low and high-risk CCI. Patients with low-risk CURB-65 were stratified into low and high-risk CCI. The rates of 30-day mortality, 30-day readmission, intensive care unit (ICU) transfer, and length of stay (LOS) > 7 days were compared between the two groups using Chi-square tests.

**Results:** 538 patients were included in the analysis, 399 (74.16%) had low-risk CURB-65. A CCI value of 7 was determined as the cutoff for the CCI risk groups based on the point of maximal sensitivity and specificity on the ROC curve for mortality. Of the patients with low-risk CURB-65, 269 (67.42%) had CCI scores less than 7 and were classified as low-risk CCI; 130 (32.58%) had CCI scores of at least 7 and were considered high-risk CCI. The rates of 30-day readmission and ICU transfer during the index admission were similar in both risk groups. The 30-day mortality rate was 19.2% in high-risk CCI and 4.5% in low-risk CCI (RR 4.31, 95% CI 2.24 to 8.30, p < 0.001). Prolonged hospitalization (LOS > 7 days) was 35.4% in high-risk CCI and 24.9% in low-risk CCI (RR 1.42, 95% CI 1.04 to 1.94, p = 0.029).

**Conclusions:** Among patients admitted with community-acquired pneumonia with low-risk acute clinical findings, the presence of pre-existing comorbidities significantly increases the risks of mortality and of prolonged hospitalization. The age-adjusted Charlson Comorbidity Index appears to be a useful tool in further risk-stratifying patients that were identified to be low-risk based on their CURB-65 scores.
Disability Better Predicts Length of Stay than Comorbidity in Patients Admitted to Internal Medicine

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Background: Clinical management and resource allocation for Internal Medicine (IM) patients are currently based on their presenting diagnosis, with little attention paid to the impact of disability and comorbidity. The primary aim of this study was to examine the association of disability and comorbidity with the length of stay (LOS) and their relative importance.

Methods: Over 2 consecutive years, the study recruited consecutive unselected patients from an academic tertiary hospital who were admitted to the IM Department under a single medical team for a month. Explanatory variables charted included demographic, disease type, biochemical markers, social factors (e.g., financial difficulties and caregiver availability), comorbidities and functional disability. Our measure for functional disability was the Functional Independence Measure (FIM) recorded at inpatient discharge, a standardized measure consisting of 13 motor and 5 cognitive items ranging from 18 (totally dependent) to 126 (totally independent). Comorbidity was measured using the Charlson Comorbidity Index (CCI). Multiple regression analysis was conducted to examine independent associations of FIM and CCI with the length of hospital stay controlling for confounders such as demographics and social factors.

Results: Among 248 patients included in the study (age 65.9 ±18.4, male 51.5%), the mean LOS was 11.2 ± 32.9 days with the median of 4.0 days. The average inpatient total FIM score was 92.3 ±37.2 with the mean motor FIM and cognitive FIM scores being 64.7±28.5 and 28.0±9.8, respectively. The mean unadjusted and adjusted CCI was 2.51±2.60 and 4.47±3.66 respectively. Sixty-three (34.1 %) patients had various social issues including financial difficulties and caregiver availability. The majority of patients (79.4%) were discharged home. Multiple regression analysis results showed that greater functional dependence represented by a lower total FIM score (p=.006) and the presence of social issues (p=.001) were positively and statistically significantly associated with the length of stay, while age (p=.119), gender (p=.555) and the CCI (p=.931) were not.

Conclusions: Disability may be a better predictive factor than comorbidity for the length of stay in IM patients. Optimal health care management could consider the benefit of incorporating disability in resource allocation in addition to the presenting diagnosis.
Support For Hospital To Home For Elders: A Randomized Control Trial Of An In-Patient Discharge Intervention Among A Diverse Elderly Population

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Background: Nearly 20% of hospitalized older adults are readmitted to the hospital within 30 days, costing Medicare more than $17 billion annually. Hospital-based transitional care programs with post-discharge follow-up have reduced readmissions and emergency department (ED) visits among selected populations. It is unclear how a hospital-based nurse-led transitional care intervention affects 30 day acute care use (emergency department (ED) visits and hospitalizations) among ethnically diverse adults age 55 and older hospitalized in a safety-net setting.

Methods: We conducted a randomized control trial of a hospital-based transitional care intervention versus usual care among English, Spanish, and Chinese (Mandarin and Cantonese)-speaking patients 55 and older admitted to an urban public hospital. Intervention-group participants received supplementary inpatient nurse coaching provided by study nurses regarding medications and follow-up plans, a tailored language-concordant, literacy-appropriate discharge care written plan with medications, follow-up planning, and anticipatory guidance, and received 2 follow-up telephone calls from a nurse practitioner at 1-2 and 7-10 days post-hospitalization. We compared rates of 30-day post-hospitalization ED visits and readmissions to the index hospital using hospital administrative data and 30-day mortality using hospital administrative data and follow-up 30-day telephone calls. Further work to expand the analysis to include results from other area hospitals and linkage to vital statistic data is underway.

Results: We enrolled 700 individuals reflecting an ethnically diverse, low income population with limited educational attainment (mean age = 66). Twenty-five percent were African American, 20% Latino/Hispanic, 19% White, 25% Chinese, 6% Filipino, and 5% reported other race/ethnicities. Less than 11% had a household income of greater than $20,000 per year, and 66% had limited health literacy. At baseline, 85% of the enrolled population reported a usual source of health care and, 80% had used the ED and/or had been hospitalized in the past 6 months. Randomization was successful for characteristics including demographics, socioeconomic variables, activities of daily living, and pre-hospitalization health care usage between intervention and control group (p>0.1 for all). Of the 700 enrolled, outcomes at 30 days were available in administrative data for 670 (96%), including 14 (2%) who died. Thirty days after hospital discharge 45 patients (13.6%) in the usual care group and 39 (11.9%) in the intervention group were readmitted to the index hospital (p = 0.51), and 28 (8.5%) of the usual care group compared to 28 (8.6%) of the intervention group visited the ED (p= 1.0).

Conclusions: Among a diverse population of adults age 55 and older admitted to an urban public hospital, there was no difference in the 30-day rate of post-hospitalization ED visits and readmissions to the index hospital between an intervention group who received a hospital-based nurse-led transitional care intervention with telephone follow-up and tailored patient education materials and the usual care group. Nurse-led hospital-based discharge interventions for transitional care may not be effective among diverse populations age 55 and older with high pre-admission health care usage and usual source of care. Populations with complex medical and social needs may require transitional-care interventions that partner with outpatient providers and/or include home-based visits.
(Re)turning the Pages of Residency: the impact of localizing resident physicians to hospital units on paging frequency

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Background: Pagers are ubiquitous, yet fundamentally flawed, as they do not prioritize, lead to communication errors, and interrupt patient care and educational activities. Given duty hour restrictions, there is concern that residents experience increased workload due to having fewer hours to do the same amount of work. Geographic localization of physicians to patient care units is thought to improve communication and agreement on goals of care, and also to reduce workload by decreasing paging and other inefficiencies attributable to traveling throughout the hospital. We investigated whether interns on geographically localized teams received fewer pages than interns on teams that were not localized.

Methods: We conducted a retrospective analysis of the number of pages received by interns on 5 general medicine teams from Oct. 17 - Nov. 13, 2011 at New York Presbyterian Hospital/Weill Cornell. Two teams were in a Geographically Localized Model (GLM), two in a Partial Localization Model (PLM), and one Standard Model (SM) team admitted patients irrespective of their assigned bed location. ANOVA and standard multivariate linear regression techniques were used to analyze the relationship between the number of pages received per intern and the type of team.

Results: Over 28 days, 10 interns on 5 teams received 6652 pages. 85% of patients in the GLM were on the designated unit, compared to 45% in the PLM, and 37% in the SM.

The number of pages received per intern per hour, adjusted for team census and number of admissions, was 2.18 in the GLM, 2.77 in the PLM, and 3.87 in the SM. All of these differences were statistically significant in the linear regression analysis (p<0.0001).

Figure 1 shows the pattern of paging for the three types of teams.

Conclusions: Geographic localization of resident teams to patient care units is associated with significantly fewer pages received by interns during the day. Previous research suggests that geographic localization decreases perceived paging frequency. We show a statistically significant relationship with a dose-response effect. We also demonstrate that interns whose patients are scattered throughout the hospital may experience five pages per hour, or an interruption by pager every 12 minutes.

Geographically localized patient care models may improve resident workload in part by mitigating paging. Decreased resident workload has potential to improve both clinical and educational outcomes. A working environment that facilitates in-person communication decreases not only pager interruptions, but the latent communication errors inherent in unidirectional alpha-numeric paging, which may improve patient safety.
Identifying and Reducing Barriers to Pain Management: A Unique Hospitalist/Pain Medicine Collaboration

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\textbf{Background:} Patient satisfaction scores will soon affect hospital reimbursement, and effective pain control is a key element of satisfaction with an inpatient experience. A recent study at a large urban hospital estimated that 40\% of inpatients have moderate-to-severe pain at least once during their stay. Despite many strategies devised to manage these episodes, inpatient pain remains a persistent challenge for hospitals. Categories of barriers to pain control have been identified, but the frequency of individual barriers has not been quantified. We describe the prevalence of barriers and their change over time.

\textbf{Methods:} A Nurse Practitioner (NP) with experience in pain management visited inpatient units where most patients were cared for by hospitalists. For every patient with uncontrolled pain (defined as three scores greater than five in the past 24 hours), the NP spoke with the attending physician, resident, and nurse, and reviewed the chart. This data was coded into discrete barriers to pain control.

\textbf{Results:} Between February and April, 499 patients had pain on one or more days. 52\% were female, and the average age was 55. 44\% had a history of chronic pain, 18\% had a history of psychiatric disease, and 12\% had a history of substance abuse. A total of 56 potential barriers to pain control were initially identified. The most frequent barrier, “Presence of a pre-existing chronic pain syndrome,” was recorded 256 times in February and 253 times in May 2012 (1.2\% decline). The second most frequent barrier, “Pain medication not changed due to need to observe current therapy” dropped from 113 occurrences to 2 (99.9\% decrease). 158 patients had uncontrolled pain for three or more days. During the study, the number of patients with uncontrolled pain for three or more days dropped from 47 in February to 33 in May (34\% decline, \(p=0.083\)). The total number of unique barriers declined from 32 in the first month of the study to 21 in the final month (34\%).

\textbf{Conclusions:} The presence of a dedicated pain management NP making rounds on patients was associated with a decrease in the recorded barriers to pain control. The large decline in physicians choosing to “observe current therapy” before escalating care has several possible explanations. Informal discussion with a NP experienced in pain management may have given the primary team confidence to more rapidly escalate care. There may also have been a Hawthorne effect, in which providers who know they are being observed are more attentive to pain control. Further research is needed to evaluate the association between change in barriers and pain scores.