

Patients Discharged From the Emergency Department After Referral for Hospitalist Admission

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There are approximately 136.3 million emergency department (ED) visits in the United States each year; 16.2 million of these visits result in a hospital admission.¹ Hospitalization is expensive: The average cost per hospital stay in 2012 was \$10,400² and more than one-third of healthcare spending within the United States is attributable to hospital care.³ Hospitalization is also associated with potential harms. A 2013 study estimated that 7% of hospitalizations are associated with a “highly undesirable event.”⁴ Additionally, approximately 20% of hospitalized patients will experience an injury related to medical management within a month of discharge.⁵ Some authors argue that hospitalization itself has deleterious health consequences, an acquired transient condition of increased generalized health risk dubbed “posthospital syndrome.”⁶

Unnecessary hospitalizations, therefore, expose patients to unnecessary costs and risks. Hospitalist physicians are well positioned to evaluate the need for admission for patients referred from the ED. Recent efforts have focused on finding safer and more efficient ways of caring for patients who come to the hospital through the ED^{7,8} and improving collaboration between ED physicians and hospitalists.⁹ However, the characteristics and outcomes of patients discharged from the ED after referral for admission have not yet been explored. In this report, we describe the demographics, diagnoses, and healthcare outcomes of patients discharged from the ED after referral for hospital admission at an academic medical center.

METHODS

We conducted a retrospective cohort study at an 804-bed tertiary academic medical center, the University of North Carolina Hospitals. We received institutional review board approval for this study (UNC IRB #14-2559). The Division of Hospital Medicine at the University of North Carolina School of Medicine is responsible for approximately 25% of all patients admitted through the ED. Occasionally, ED patients referred for admission are evaluated by a hospitalist

ABSTRACT

OBJECTIVES: To describe the characteristics and outcomes of patients discharged from the emergency department (ED) by hospitalist physicians.

STUDY DESIGN: Retrospective cohort study at a tertiary academic medical center.

METHODS: We used consultation Current Procedural Technology codes to identify patients discharged from the ED after referral for hospitalist admission from April 2011 to April 2014. We report patient demographics and primary diagnoses. Main outcome measures included return to the ED, hospitalization, or mortality, all within 30 days.

RESULTS: There were 710 discharges from the ED for 670 patients referred for hospitalist admission; 21.7% returned to the ED, 12.3% were hospitalized, and 0.4% died within 30 days. Chest pain was the most common diagnosis (38.2%); 18.1% of these patients returned to the ED within 30 days. Patients with the following 3 diagnoses returned to the ED most frequently: sickle cell disease (82.4%), alcohol-related diagnoses (43.5%), and abdominal pain (35.7%). In multivariate analysis, abdominal pain (odds ratio [OR], 3.2; $P < .001$) and alcohol dependence (OR, 3.1; $P = .003$) increased the odds of ED revisits, whereas syncope (OR, 0.23; $P = .049$) reduced the odds. Chest pain reduced the odds of hospitalization (OR, 0.37; $P = .005$).

CONCLUSIONS: A majority of patients discharged from the ED after referral for hospitalist admission did not return to the ED within 30 days, and the 30-day hospitalization rate was low. Our data suggest that hospitalists can safely aid patients by reducing the costs and adverse outcomes associated with unnecessary hospitalization.

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physician and deemed safe for discharge without hospitalization. The consulting hospitalist assumes responsibility for providing discharge instructions, documentation of a consult note, and any necessary follow-up arrangements and prescription medications.

Consults performed in the ED by hospital medicine physicians over the 3-year period between April 1, 2011, and April 1, 2014, were identified via Current Procedural Terminology consult codes 99241 through 99245 and 99281 through 99285. One investigator reviewed the medical record of each patient to ensure accuracy of the data. Patients were included if they were: 1) referred for admission to our hospital medicine group or general medical teaching service with a hospitalist attending and 2) were discharged from the ED after medical consultation. We excluded patients who were admitted to any hospital service after the index consultation.

We collected demographic data, including age, race, sex, and type of insurance. Primary and secondary diagnoses were identified using *International Classification of Diseases, Ninth Revision (ICD-9)* codes assigned to the index consultation. All diagnoses were categorized into common or related diagnosis groups (eg, all ICD-9 codes related to chest pain).

The primary outcome measures were rates of return to the ED within 30 days, hospitalization within 30 days, and mortality within 30 days of an index consultation. Mortality data were verified for each patient by manual chart review and via search of the US Social Security Death Index, which contains mortality data through February 28, 2014, due to record availability and legislative ruling.^{10,11} Rates of ED returns, hospitalizations, and mortality within 30 days were calculated as percentages for all patients, as well as for the 6 most common diagnosis groupings. Unadjusted and adjusted analyses (using multivariate logistic regression) were used to describe demographic (age, gender, race/ethnicity, and insurance type) and clinical (diagnosis at index consult) predictors of return to the ED and hospitalization within 30 days after the index consult. Statistical calculations were performed using Stata/SE 13.1 (StataCorp; College Station, Texas).

RESULTS

Patient Characteristics

There were 710 patient encounters identified during the study period for 670 unique patients (eAppendix [available at [ajmc.com](#)]). The mean age was 52.1 years. More than half of the patients (61.0%) were white, and almost 30% were black. Approximately 75% of the patients had some form of insurance, with Medicare making up the largest single insurance type.

TAKEAWAY POINTS

Hospitalists are uniquely positioned to help avoid unnecessary admissions. Among 710 emergency department (ED) discharges for 670 patients referred for hospitalist admission:

- ▶ Four of 5 patients did not return to the ED and 9 of 10 patients did not require hospitalization within 30 days.
- ▶ Chest pain was the most common diagnosis.
- ▶ Those with alcohol-related diagnoses, abdominal pain, and sickle cell disease with crisis were more likely to return to the ED, whereas those presenting with chest pain were less likely.
- ▶ Those with Medicare and Medicaid were more likely to return to the ED compared with those who were privately insured.

Diagnoses

There were 178 diagnoses. The most common diagnosis was unspecified chest pain (34.1%), followed by unspecified abdominal pain (9.0%). The 6 most common diagnosis groups, shown in [Table 1](#), made up 68.2% of the total patient encounters analyzed. After categorization, chest pain was the largest diagnosis group (38.2%).

30-Day ED Revisit Rates

Of all patient encounters in the study, 21.7% returned to the ED within 30 days of the index consultation. For the patient encounters with chest pain, 18.1% returned to the ED within 30 days. There was large variability in the 30-day revisit rates based on diagnosis ([Table 1](#)). The 3 diagnosis groups that returned to the ED most frequently were sickle cell disease with crisis, alcohol-related diagnoses, and abdominal pain. These diagnoses made up 18.7% of the total cohort of patient encounters evaluated.

In adjusted analysis ([Table 2](#)), a diagnosis of abdominal pain (odds ratio [OR], 3.23; 95% CI, 1.75-5.94) or alcohol-related diagnoses (OR, 3.10; 95% CI, 1.49-6.45) increased the likelihood of return to the ED within 30 days. Syncope (OR, 0.23; 95% CI, 0.05-0.99) decreased that likelihood. Among insurance types, patients with Medicaid had the highest likelihood of returning to the ED within 30 days (OR, 4.54; 95% CI, 2.27-9.49). Patients with private insurance and other forms of healthcare coverage (ie, liability, TRICARE, worker's compensation) were least likely.

30-Day Hospitalization Rates

We found that 12.3% of all patients were hospitalized within 30 days ([Table 1](#)). Of those who initially presented with chest pain, 6.3% were hospitalized within 30 days, including 1 (0.1%) who returned to the hospital with an ST-segment elevation myocardial infarction (STEMI); the patient was successfully treated and had an uncomplicated hospital course. In adjusted analysis ([Table 2](#)), patients with chest pain had a reduced likelihood of hospitalization (OR, 0.37; 95% CI, 0.19-0.74). Similar to the ED revisit results, the patients most frequently hospitalized within 30 days were initially diagnosed with sickle cell disease with crisis, alcohol-related diagnoses, and abdominal pain. In addition, patients with Medicaid

TRENDS FROM THE FIELD

TABLE 1. Primary Diagnosis Groups With Rates of ED Revisit and Hospitalization Within 30 Days

	n (%)	Rate of 30-Day ED Revisit	Rate of 30-Day Hospitalization
All diagnoses	710 (100%)	21.7%	12.3%
Specific diagnosis group ^a			
Chest pain	271 (38.2%)	18.1%	6.3%
Abdominal pain	70 (9.9%)	35.7%	14.3%
Alcohol-related diagnoses	46 (6.5%)	43.5%	19.6%
Syncope	45 (6.3%)	2.2%	2.2%
Nausea/vomiting	35 (4.9%)	25.7%	8.6%
Sickle cell disease	17 (2.4%)	82.4%	58.8%

ED indicates emergency department.

^aDiagnosis groups (*International Classification of Diseases, Ninth Revision* codes): chest pain (786.50, 786.59), abdominal pain (789.x, 577.x), alcohol-related diagnoses (303, 291.81), syncope and collapse and/or dizziness and giddiness (780.2, 780.4), nausea and/or vomiting (787.01, 787.02), sickle cell disease (282.69, 282.62, 282.6).

had the highest likelihood of hospitalization among insurance types (OR, 3.94; 95% CI, 1.59-9.74).

Mortality Within 30 Days

Of all patients evaluated, 3 (0.4%) died within 30 days of an index consultation. Two of the patients were receiving hospice care, one with a diagnosis of terminal metastatic bladder cancer and the other with terminal metastatic prostate cancer. The third patient was diagnosed with pneumonia and ultimately found to have progressive renal cell carcinoma.

DISCUSSION

Our study found that the majority of patients discharged from the ED after referral for hospitalist admission did not have subsequent acute healthcare utilization, with 4 of 5 patients avoiding an ED return visit and 9 of 10 patients avoiding hospitalization within 30 days. These numbers were similar to our ED's 30-day revisit rate, which was slightly less than 20% at the beginning of 2016, and our own hospital medicine group's readmission rate, which was around 10% during the time period of our study. The 30-day ED revisit rate for our study was likely slightly higher than our ED's 30-day revisit rate due to the higher proportion of patients with sickle cell disease and alcohol-related diagnoses that the ED asks our hospitalists to evaluate for admission. Mortality for this cohort, identified via manual record review for all patients and the US Social Security Death Index for the majority, was well below 1%. Given the known harms associated with hospitalization, these results suggest that hospitalist physicians are able to safely benefit patients and the healthcare system by identifying unnecessary hospitalizations.

Patients with chest pain made up the largest diagnosis grouping, and these patients returned to the ED with the same frequency as

the entire cohort. Recent literature has shown that the risk of having a cardiac event after a negative ED evaluation for cardiac chest pain is extremely low. For example, the HEART Pathway, a prospectively validated study that combined the HEART risk stratification score with serial cardiac biomarker testing at 0 and 3 hours, identified a large group of patients presenting to the ED who were at very low risk (~1%) of having a major adverse cardiac event within 30 days.¹² In our study, although there was 1 patient who initially presented with chest pain and had a nonfatal STEMI within 30 days, those who presented with chest pain had reduced odds of hospitalization within 30 days of an index consultation compared with the rest of the cohort. Admission for further risk

stratification with a stress test for low-risk patients has not been shown to confer greater benefit and does not identify preventable bad outcomes.^{13,14}

We identified several diagnoses with a higher risk of return to the ED: alcohol-related diagnoses, abdominal pain, and sickle cell disease with crisis. Two of these groups, patients with alcohol-related diagnoses and sickle cell disease, are known to have high rates of healthcare utilization, especially those covered by Medicaid.¹⁵ Our hospitalist group has published clinical protocols for evaluating and caring for both of these groups of patients.^{16,17} In this study, patients presenting with alcohol-related diagnoses and abdominal pain had more than 3 times the odds of returning to the ED within 30 days compared with the entire cohort. We suspect that sickle cell disease with crisis also likely conveys a higher risk of return to the ED, although the total number of patient encounters was low and the adjusted OR did not reach statistical significance.

There was substantial variation in the likelihood of healthcare utilization within 30 days of the index consultation based on insurance type. Patients with Medicaid had more than 4 times the odds of returning to the ED within 30 days and nearly 4 times the odds of hospitalization within 30 days compared with patients with private insurance. Patients with Medicare or no health insurance had more than twice the odds of returning to the ED within 30 days compared with patients who had private insurance. This may reflect the trend noted over the past 10 years in which the ED has acted as a safety net for medically underserved patients, specifically those patients with Medicaid.^{18,19} High repeat utilization in these patients could also be due to other factors, such as higher rates of chronic illness, especially in those patients with Medicare.

Mortality within 30 days of an index consultation was well below 1%, and all patients who died carried a diagnosis of malignancy. Two of the patients who died had terminal malignancies and, upon chart review, were receiving palliative care and were expected to die

within weeks of their ED encounter and evaluation by a hospitalist. The third patient had a newly diagnosed renal cell carcinoma, and the patient and family focused on quality-of-life measures after discharge. Although it may be reasonable to hospitalize patients at the end of life with high care needs, many patients and families prefer to avoid hospitalization in this setting if possible.²⁰

Limitations

Although our data were limited to a single tertiary academic medical center ED, the patients we identified had many characteristics similar to those identified by national survey data of ED patients in the United States. For example, the majority of our patients were white (61.0%) and female (52.5%), comparable to national data of 72.0% and 54.7%, respectively. Similarly, chest pain was one of the most frequent presenting complaints among adult patients admitted to the ED nationally, matching our cohort.¹ Because our data were limited to a single center, we were unable to determine how frequently patients were seen at other institutions after discharge from our ED. We also did not have a clear way of knowing if patients were initially evaluated at another ED prior to our index consult. It is possible that we did not account for all patient deaths, although our manual chart review supplemented by use of a national database (complete through all but the final month of our study) makes this unlikely. In terms of the diagnosis groupings, they were organized based on primary ICD-9 codes for a single primary and a single secondary diagnosis, and so we may have missed some other associated health conditions. We had some smaller diagnosis groupings with frequent encounters by the same patients (ie, sickle cell disease), which thus may not have provided an accurate or sufficient representation for those diagnoses. The final limitation of our study is that it was not designed with a control group of patients whom hospitalist consultants decided to admit to the hospital. Future studies should compare characteristics of patients discharged home by hospitalist consultants with patients admitted to the hospital. The comparison could be used to develop risk scores based on patient characteristics that facilitate standardized evidence-based risk stratification for safe discharge from the ED.

TABLE 2. Unadjusted and Adjusted ORs for ED Revisits and Hospitalizations Within 30 Days By Demographic Characteristic and Diagnosis Group (N = 670)^a

Characteristic	Unadjusted OR (95% CI)	P	Adjusted OR (95% CI)	P
ED Revisits				
Female	0.63 [0.42-0.94]	.023*	0.60 [0.39-0.93]	.021*
≥50 years	0.66 [0.45-0.98]	.041*	0.77 [0.47-1.25]	.289
Black	1.10 [0.72-1.69]	.664	0.85 [0.53-1.37]	.512
Insurance				
Private	Reference		Reference	
Medicare	1.03 [0.68-1.56]	.892	2.95 [1.50-5.77]	.002*
Medicaid	2.68 [1.66-4.33]	.001*	4.54 [2.27-9.49]	.001*
Self-pay	1.10 [0.70-1.73]	.669	2.27 [1.14-4.52]	.020*
Primary diagnosis group				
Chest pain	0.61 [0.40-0.93]	.023*	0.85 [0.53-1.37]	.503
Abdominal pain	3.06 [1.79-5.25]	<.001*	3.23 [1.75-5.94]	<.001*
Alcohol-related	3.43 [1.79-6.57]	<.001*	3.10 [1.49-6.45]	.003*
Syncope	0.19 [0.05-0.79]	.022*	0.23 [0.05-0.99]	.049*
Nausea/vomiting	1.05 [0.42-2.61]	.917	–	–
Sickle cell disease	4.66 [1.15-18.89]	.031*	3.25 [0.72-14.67]	.125
Hospitalizations				
Female	0.64 [0.37-1.10]	.109	0.57 [0.32-0.99]	.046*
≥50 years	0.92 [0.53-1.57]	.747	0.80 [0.42-1.52]	.486
Black	0.82 [0.45-1.52]	.532	0.74 [0.39-1.40]	.351
Insurance				
Private	Reference		Reference	
Medicare	1.58 [0.92-2.72]	.096	2.95 [1.24-7.02]	.014*
Medicaid	2.69 [1.46-4.95]	.002*	3.94 [1.59-9.74]	.003*
Self-pay	0.45 [0.21-0.96]	.039*	1.05 [0.37-2.93]	.931
Primary diagnosis group				
Chest pain	0.34 [0.18-0.68]	.002*	0.37 [0.19-0.74]	.005*
Abdominal pain	1.21 [0.53-2.79]	.648	–	–
Alcohol-related	1.81 [0.73-4.49]	.202	–	–
Syncope	0.21 [0.03-1.56]	.128	–	–
Nausea/vomiting	0.32 [0.04-2.41]	.270	–	–
Sickle cell disease	4.66 [1.15-18.89]	.712	–	–

ED indicates emergency department; OR, odds ratio.

*P < .05 (statistically significant).

^aAll demographic variables were included in the multivariate model, and all clinical variables with a P ≤ .2 in unadjusted analyses were included in the multivariate model. To avoid oversampling patients with frequent ED visits and multiple hospitalist consults, we randomly selected a single index consult for patients with multiple consults for inclusion in our analyses.

CONCLUSIONS

Our study adds to the literature by describing the characteristics of patients discharged from the ED after referral for hospitalist admission. Given the overall low rates of subsequent healthcare utilization for these patients, there are substantial opportunities for improved care and cost savings with this practice if applied at other

institutions. In 2012, Medicare paid an average of \$1741 per hospital observation stay.²¹ If we extrapolate this cost to our patients who were not admitted to this hospital within 30 days, we could have avoided over \$1 million in healthcare spending during the 3-year study period. These figures do not take into account the 20% of cost the patient would be responsible for, expenses not covered by Medicare Part B, or the potential cost of harm to the patient during a short hospital stay.

Areas for potential future study include the development of a prediction tool that could help to inform decisions about discharging patients referred for admission. This may lead to the creation of a standardized approach, improving 30-day outcomes by optimizing who is selected for discharge. Ultimately, understanding the characteristics of this population will provide hospitalists a better approach to caring for these patients and their disease process. ■

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eAppendix. Patient Demographics (N = 670)

Characteristic	n (%)
Mean age (years)	52.1
Sex	
Female	352 (52.5%)
Race	
White	409 (61.0%)
Black	194 (29.0%)
Other	46 (6.5%)
Asian	8 (1.2%)
Native American	2 (0.3%)
Unknown	11 (1.6%)
Insurance	
Medicare	228 (34.0%)
Self-pay	167 (24.9%)
Private	162 (24.2%)
Medicaid	97 (14.5%)
Other	16 (2.4%)