BRIEF REPORT

Implementation of a Hospitalist-Run Observation Unit and Impact on Length of Stay (LOS): A Brief Report

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BACKGROUND: While the impact of hospitalists on length of stay (LOS) for inpatient medicine services has been studied, there has been little work on the impact of hospitalist involvement in short-stay or observation units.

OBJECTIVE: The primary objective was to examine the impact of a hospitalist-run observation unit on LOS. The secondary objective was to assess utilization of the unit through examining case-weight and LOS.

DESIGN: Retrospective cohort study with a preimplementation/postimplementation analysis.

SETTING: University Hospital, the 604-bed teaching hospital for Bexar County, San Antonio, Texas.

PATIENTS: All patients discharged from the inpatient medicine and observation units with diagnoses of chest pain, asthma, syncope, cellulitis, and pyelonephritis.

INTERVENTION: Creation of a hospitalist-run, nonteaching, 10-bed "Clinical Decision Unit" (CDU).

MEASUREMENTS: The overall LOS of the "top 5" most common diagnoses was compared for the 12 months preimplementation and postimplementation of the unit.

RESULTS: The overall LOS for all patients decreased from 2.4 to 2.2 days ($P = 0.05$) between the 12 months preimplementation and postimplementation. The greatest decreases were seen for cellulitis (2.4-1.9 days; $P < 0.001$) and asthma (2.2-1.2 days; $P < 0.001$).

CONCLUSIONS: Implementation of a hospitalist-run observation unit was associated with a significantly decreased LOS for all patients regardless of location, suggesting that the unit has led to more efficient care. *Journal of Hospital Medicine* 2010;5:E2–E5. © 2010 Society of Hospital Medicine.

KEYWORDS: asthma, chest pain, clinical, outcomes measurement.

Hospitalists play key roles in many types of clinical services, including teaching, nonteaching, consultative, and comanagement services.[1–4] While the impact of hospitalist programs on LOS for inpatient medicine services has been studied,[5–8] less work has focused on the impact of hospitalists in other types of service delivery, such as in short-stay or observation units.

While many hospitals now have short-stay units to care for observation patients, most are adjuncts of the emergency department. A Canadian hospitalist-run "short-stay unit" that targeted patients with an expected LOS of less than 3 days has been described.[9] The experience of a single, chest-pain–specific service has also been reported.[10]

In August 2005, we introduced a hospitalist-run observation unit, the "Clinical Decision Unit (CDU)," at University Hospital, the primary teaching affiliate of the University of Texas Health Science Center at San Antonio (San Antonio, TX). The rationale was that observation-level care in a dedicated short-stay unit would be more efficient than in an inpatient general medicine service. Through the creation of this unit, we consolidated the care of all medical observation patients, including patients previously evaluated in a cardiology-run chest pain unit.

In this brief report, we present a description of the unit as well as a preliminary analysis of the impact of the unit on LOS for the most common CDU diagnoses.

Methods

CDU Structure

University Hospital is the Bexar County public hospital. It contains 604 acute care beds, and averages 70,000 emergency visits annually. The CDU is a geographically separate, 10-bed unit, staffed with dedicated nurses in 8-hour shifts and 24/7 by hospitalists in 12-hour shifts. Four to five hospitalists rotate through the CDU monthly. About 30% of

Diagnosis	Guidelines
Chest pain	Patients without EKG changes or positive troponins, but for whom stress test was indicated based on history or risk factors
Asthma	Patients with oxygen saturation >90% and demonstrating improvement in with ED nebulizer treatment
Syncope	Patients without known structural heart disease based on past medical history or exam findings
Cellulitis	Patients without suspicion for abscess or osteomyelitis
Pyelonephritis	Patients without change from baseline renal function; kidney transplant recipients excluded

Abbreviations: CDU, clinical decision unit; ED, emergency department; EKG, electrocardiography.

shifts are staffed through moonlighting by hospitalist faculty or fellows.

For admissions, through examining hospital LOS data, we targeted diagnoses for which patients might be expected to stay less than 24 hours. Potentially appropriate diagnoses were discussed by the group, and general admission guidelines were created based on consensus. These diagnoses included chest pain, cellulitis, pyelonephritis, syncope, asthma exacerbation, chronic obstructive pulmonary disease exacerbation, hyperglycemia, and hepatic encephalopathy. Table 1 lists these guidelines.

If a patient's stay exceeded 23 hours, the hospitalist could transfer the patient from the CDU to a general medicine team. Formal transfer guidelines were not created, but if patients were expected to be discharged within 12 hours, they generally remained in the CDU to minimize transitions. The census of the general medicine teams could also be a factor in transfer decisions: if they were at admitting capacity, the patient remained in the CDU.

Patients admitted to the general medicine units were cared for by 5 teaching teams, staffed exclusively by hospitalists.

Assessment of CDU Implementation on LOS

To examine the impact of unit implementation on LOS, we performed a retrospective, preimplementation/postimplementation comparison of the LOS of patients discharged 12 months before and after the unit opening on August 1, 2005. To ensure a comparison of similar patients, we identified the "top 5" most common CDU discharge diagnoses, and identified people discharged from general medicine with the same diagnoses. Specifically, we compared the LOS of patients discharged from the general medicine units from August 1, 2004 to July 31, 2005, vs. those with the same diagnoses discharged from either the CDU or general medicine units from August 1, 2005 to July 31, 2006.

The 5 most common CDU discharge diagnoses were identified using hospital administrative discharge data. All *International Statistical Classification of Diseases and Related*

Health Problems, 9th edition (ICD-9) codes associated with CDU discharges were identified and listed in order of frequency. Related ICD-9 codes were "grouped." For example, "angina (413.0)" and "chest pain (786.50, 786.59)" were considered related, and were included as "chest pain." These ICD-9 codes were then used to identify patients discharged with these diagnoses in the pre-CDU and post-CDU periods. Patients on general medicine units were identified using admission location and admitting attending. Only patients admitted by a hospitalist to a general medicine floor were included. Patients were analyzed according to their admission location. All patients with relevant ICD-9 codes were included in the analysis. None were excluded. For each patient identified, all data elements were present.

The acuity of patients admitted in the preimplementation and postimplementation periods was compared using the case-mix index calculated by 3M Incorporated's All Patient Refined–Diagnosis-Related Group methodology (3M APR-DRG; 3M, St. Paul, MN). This adjusts administrative data for severity of illness and mortality risk based on primary diagnoses, comorbidities, age, and procedures. Patients are assigned to mortality classes with corresponding scores of 0 or higher.

Statistical Analysis

Statistical analyses were performed using STATA 8.0. LOS and acuity differences were assessed using 2-sample t tests with equal variances.

Results

Clinical Experience with the CDU

The 5 most common CDU discharge diagnoses accounted for 724 discharges, and included chest pain, asthma, syncope, cellulitis, and pyelonephritis. The ICD-9 codes, as well as the numbers of patients discharged from the general medicine units and CDU with each diagnosis are listed in Table 2. The average daily census in the unit was 7.2 patients with a standard deviation of 0.8. Overall, 22% of CDU admissions were changed from observation to admission status.

Impact of CDU Implementation on LOS

The overall LOS for patients with the 5 most common diagnoses decreased from 2.4 to 2.2 days ($P = 0.05$) between the 12-month preimplementation and postimplementation periods. A significant decrease was seen for patients with cellulitis (2.4-1.9 days; $P < 0.001$) and asthma (2.2-1.2 days; $P < 0.001$). Differences in LOS for patients with chest pain, pyelonephritis, and syncope were not statistically significant. These results are summarized in Table 3. The acuity of patients admitted in the pre-CDU and post-CDU implementation, shown in Table 4, was not significantly different.

Discussion and Conclusions

Implementation of a hospitalist-run observation unit was associated with an overall decreased LOS for patients with

TABLE 2. Numbers of Patients Discharged from General Medicine Units and CDU in the 12 Months Pre-CDU (2004-2005) and Post-CDU (2005-2006) Implementation for the 5 Most Common Diagnoses

Diagnosis	ICD-9 Codes	Pre-CDU	Post-CDU	Post-CDU Admitted to CDU	Post-CDU Admitted to Ward Team
"Top 5" diagnoses		2240	2148	724	1424
Cellulitis	681.0, 682.0-682.9	1002	819	48	771
Asthma	493.02, 493.12	199	176	71	105
Chest pain	786.50, 786.59, 413.0	837	917	520	397
Pyelonephritis	590.1, 590.8	143	163	61	102
Syncope	780.2	59	73	24	49

Abbreviations: CDU, clinical decision unit; ICD-9, International Statistical Classification of Diseases and Related Health Problems, 9th edition.

TABLE 3. Average Length of Stay and Standard Deviation for All Patients Discharged from Any Location in 12-Month Periods Before and After CDU Implementation

Diagnosis	Pre-CDU	Post-CDU	P Value
"Top 5" diagnoses	2.4 (3.8)	2.2 (2.8)	0.05
Cellulitis	2.4 (3.2)	1.9 (2.6)	<0.001
Asthma	2.2 (1.9)	1.2 (0.7)	<0.001
Chest pain	1.5 (1.3)	1.6 (2.4)	0.75
Pyelonephritis	3.3 (4.9)	2.7 (2.8)	0.27
Syncope	2.0 (2.9)	2.2 (2.0)	0.68

Abbreviation: CDU, clinical decision unit.

TABLE 4. Patient Case-mix Index as Assessed by 3M APR-DRG

Diagnosis	All Patients–2005	All Patients–2006
"Top 5" diagnoses	0.6987	0.7240
Cellulitis	0.7393	0.7630
Asthma	0.4382	0.4622
Chest pain	0.7428	0.7545
Pyelonephritis	0.7205	0.6662
Syncope	0.6769	0.6619

Abbreviation: 3M APR-DRG, 3M Incorporated's All Patient Refined–Diagnosis-Related Group methodology.

the 5 most common CDU discharge diagnoses of chest pain, cellulitis, asthma, pyelonephritis, and syncope. The lack of statistically significantly differences in patient acuity in the preimplementation and postimplementation periods suggests this result is not due to acuity differences, but rather to unit implementation. We believe this reduction resulted from the greater efficiencies of care that occur from clustering observation patients in a geographically separate unit with dedicated nursing staff and efficient workflow. The reduction of 0.2 days over 2148 patients (total number of postimplementation discharges) led to an additional 429.6 days of capacity without adding additional beds. Thus, what might appear to be a modest LOS reduction has a larger impact when patient volume is considered.

For individual diagnoses, significant differences in LOS were seen for patients with cellulitis and asthma The lack of a difference for chest pain may be related to the fact that these patients were cared for in a chest pain unit prior to CDU creation, which likely fostered similar efficiencies. This finding may suggest that hospitalists are as efficient as cardiologists in assessing patients with chest pain. The lack of a difference in LOS for syncope may have reflected a bottleneck in obtaining echocardiogram tests. Finally, the lack of a difference for pyelonephritis may indicate that it is not a diagnosis for which observation is beneficial.

While our use of administrative data over the year-long preimplementation and postimplementation periods allows for the inclusion of a large number of discharges, the retrospective study design limits the strength of our results. A prospective study would more definitively reduce the possibility of bias and ensure the validity of our finding of reduced LOS.

The creation of a hospitalist-run observation unit may represent an alternative to emergency department–run units. It allows physicians with greater expertise in inpatient medicine to make admission and discharge decisions, allowing emergency department physicians to concentrate on the care of other patients. This can be particularly critical for high-volume emergency departments. The CDU also offers an alternative to specialist-run chest pain units. Because patients either stay for only the observation period or are admitted and typically moved off the unit, there is little need for provider continuity, and the discontinuous shift staffing model works well.

In addition to the geographic localization, several aspects of the CDU model may be critical to the successful implementation of similar hospitalist-run observation units. Dedicated nursing staff with expertise in caring for high-turnover patients with a more limited spectrum of diagnoses may be a factor. Another factor may be that the lack of less-experienced trainees in a nonteaching service leads to more efficient care.

A potential area of further exploration includes understanding the differences between CDU patients who are discharged within 23 hours and those who are later admitted. This understanding may help us better differentiate patients appropriate for CDU admission, allowing the creation of more formal admission criteria.

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References

1. Whitcomb WF, Nelson JR. The role of hospitalists in medical education. *Am J Med.* 1999;107(4):305–309.
2. Wachter RM, Katz P, Showstack J, Bindman AB, Goldman L. Reorganizing an academic medical service: impact on cost, quality, patient satisfaction, and education. *JAMA.* 1998;279:1560–1565.
3. Huddleston JM, Long KH, Naessens JM, et al., Hospitalist-Orthopedic Team Trial Investigators. Medical and surgical comanagement after elective hip and knee arthroplasty: a randomized, controlled trial. *Ann Intern Med.* 2004;141(1):28–38.
4. Auerbach AD, Wachter RM, Katz P, Showstack J, Baron RB, Goldman L. Implementation of a voluntary hospitalist service at a community teaching hospital: improved efficiency and patient outcomes. *Ann Intern Med.* 2002;137:859–865.
5. Lindenauer PK, Rothberg MB, Pekow PS, Kenwood C, Benjamin EM, Auerbach AD. Outcomes of care by hospitalists, general internists, and family physicians. *N Engl J Med.* 2007;357(25):2589–2600.
6. Southern WN, Berger MA, Bellin EY, Hailpern SM, Arnsten JH. Hospitalist care and length of stay in patients requiring complex discharge planning and close clinical monitoring. *Arch Intern Med.* 2007;167(17):1869–1874.
7. Everett G, Uddin N, Rudloff B. Comparison of hospital costs and length of stay for community internists, hospitalists, and academicians. *J Gen Int Med.* 2007;22(5):662–667.
8. Meltzer D, Manning WG, Morrison J, et al. Effects of physician experience on cost and outcomes on an academic general medicine service: results of a trial of hospitalists. *Ann Intern Med.* 2002;37:866–875.
9. Abenhain HA, Kahn SR, Raffoul J, Becker MR. Program description: a hospitalist-run, medical short-stay unit in a teaching hospital. *CMAJ.* 2000;163(11):1477–1480.
10. Myers JS, Bellini LM, Rohrbach J, Shofter FS, Hollander JE. Improving resource utilization in a teaching hospital: development of a nonteaching service for chest pain admissions. *Acad Med.* 2006;81(5):432–435.