

Associations With Reduced Length of Stay and Costs on an Academic Hospitalist Service

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Background: Prior studies of hospitalist services have suggested improved efficiency and quality of care compared with traditional inpatient services.

Objectives: To compare outcomes of patients on a new hospitalist service with those on traditional inpatient services and to determine the impact of hospitalists on particular patient subgroups.

Study Design: Prospective, quasiexperimental, observational.

Methods: The study was conducted on the general medicine service at an academic teaching hospital, staffed by hospitalist physicians (HP) and nonhospitalist physicians (NHP), and included 1706 consecutive, directly admitted patients over 1 year.

Results: The 447 HP patients and 1259 NHP patients had similar rates of in-hospital mortality (1.3% vs 2.1%, respectively; $P = .29$) and 30-day readmission (7.8% vs 8.7%, respectively; $P = .55$). Mean hospital length of stay (LOS) was 1 day shorter for HP patients in unadjusted analyses (5.5 vs 6.5 days, respectively; $P = .009$) and in multivariable analyses adjusting for clustering and patient factors. Physician experience was not correlated ($P < .2$) with LOS. In stratified analyses, differences in LOS between HP and NHP patients were greater for patients residing closer to the hospital. Mean total costs were \$917 less for HP patients ($P = .08$) and 10% less ($P = .04$) in multivariable analyses. Decreases in costs were significant ($P < .05$) for nursing (\$604; $P = .002$) and laboratory services (\$126; $P = .04$). Nonetheless, mean costs per day were \$122 higher ($P = .003$) for HP patients.

Conclusions: Patients managed by hospitalists had shorter LOS and lower costs than patients managed by nonhospitalists, but had higher costs per day. These results suggest that hospitalists increase the intensity of care and may have their greatest impact on specific types of patients and classes of hospital costs.

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satisfaction.”⁶ Although multiple studies have shown reductions in hospital LOS and costs, the number of studies and hospitals upon which the above conclusions were based are limited. In addition, hospitals are actively restructuring inpatient care services including the expansion of hospitalist services, nurse case management, and other concurrent interventions that may affect LOS and costs. Evidence of the impact of hospitalists on individual hospitals is still needed.

An important determination to make is the factors that contribute to this shorter LOS and lower costs. Prior studies have not provided insight into the mechanisms by which hospitalist services achieved this improved efficiency. Some have argued that “practice makes perfect,” although the relationship between experience and efficiency has not been proven. Reductions in laboratory and radiology testing or drug use may be another mechanism for reductions in costs of care. In addition, the relative impact of the cost associated with nursing care and excess LOS has not been well described. Finally, patient-specific factors have not been evaluated for associations with outcomes and resource utilization on hospitalist services.

Herein we report the findings from an observational study of the first year of a hospitalist program at an academic medical center, and compare outcomes and resource utilization for patients managed by hospitalist and nonhospitalist physicians. Whereas the primary aim of the study was to add to the body of evidence about the effect of hospitalist programs, we also sought to provide greater detail than prior studies on the nature of cost differences and whether differences were consis-

Since the term hospitalist was coined 7 years ago¹ to describe physicians who provide inpatient care in place of primary care physicians or academic 1-month-per-year attendings, several studies have compared outcomes of patients managed by hospitalist and nonhospitalist physicians. These comparisons have typically revealed that hospitalist care reduced length of stay (LOS) by approximately 1 day and costs by 10% to 15%.¹⁻⁵ In a recent review of the growing hospitalist movement, Wachter and Goldman concluded that “research supports the premise that hospitalists improve inpatient efficiency without harmful effects on quality or patient

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tent across different cost categories (eg, nursing, laboratory). We further sought to examine whether particular patient groups were somehow more or less affected by the hospitalist model.

METHODS

Hospital

The study was conducted at the University of Iowa Hospitals and Clinics, an 831-bed academic teaching hospital and tertiary referral center. The general internal medicine ward service has 4 teams consisting of 1 attending physician, 1 senior resident, 1 intern, and 1 or 2 medical students. Residents and students are randomly assigned to the 4 teams. All teams admit patients to the same hospital floors, have the same nursing staff, and work with the same social service and other hospital personnel.

Intervention

In July 2000, the Division of General Internal Medicine implemented a hospitalist physician (HP) service for inpatient general internal medicine. The service was developed to meet the professional interests of faculty. No implicit or explicit goals for resource use, clinical outcomes, or patient satisfaction were set. During the 2000-2001 academic year, 3 "hospitalist" faculty staffed 1 of the 4 general internal medicine services in month-long blocks and were provided with coverage for 2 to 3 weekends per month by 12 other general internal medicine faculty in an effort to prevent burnout. Each hospitalist faculty staffed for 3 to 6 months.

Thirty-four faculty from various divisions in internal medicine staffed the nonhospitalist physician (NHP) services for the same year. Of the 3 NHP services, 1 was staffed by 7 endocrinologists; 1 by 12 nephrologists; and 1 by a combination of 2 rheumatologists, 6 infectious disease specialists, and 7 general internists. The NHP services varied in their approach to weekend coverage. Some staff attended for the entire month ($n = 9$; 26%), others split the month in half ($n = 9$; 26%), and all the others had variable coverage throughout the month ($n = 16$; 47%). Of the 34 nonhospitalist faculty, 1 spent 3 months on the service, 5 others spent a range of 5 to 8 weeks, and the remainder 1 month or less on the service.

Study Sample

The eligible sample included all 1887 consecutive discharges between July 1, 2000, and June 30, 2001, from the 4 general internal medicine services. All patients were sequentially admitted in a quasiexperimental manner to one of the teaching teams in an alter-

nating manner without regard to diagnosis or to complexity. The teams took "long-call" every fourth day, during which teams admitted up to 10 patients overnight. In addition, on weekdays teams took up to 4 admissions during the day on "short-call," which occurred 2 days before and after long-call. All admissions to general internal medicine from university- and community-based physicians were assigned to the 4 teaching services, including admissions from primary care physicians. During the study period, there was no "nonteaching" service. Patients requiring an intensive care unit (ICU) bed were admitted to a closed medical or cardiovascular ICU. Separate cardiology and hematology/oncology teams also existed.

Of the 1887 consecutive admissions, 1706 (90%) patients were admitted directly to the general internal medicine service (ie, direct admissions) from either the emergency room ($n = 801$) or from university clinics, referring physicians' offices, or other acute care hospitals ($n = 905$). The remaining 181 (10%) admissions were transferred to general internal medicine (ie, transfer admissions) from the medical ICU ($n = 105$) or from surgical or other nonmedicine services ($n = 76$). Because costs incurred by transfer admissions prior to their transfer to general internal medicine could not be separated from costs after the transfer, our primary analyses were conducted in the 1706 direct admissions.

Data

All study data, including outcome variables and measures of resource utilization, were obtained from the hospital's information systems. The principal outcome variables were hospital mortality and 30-day readmission rate. Resource utilization was measured using hospital LOS and hospital costs. Because of the potential bias introduced by outlier LOS values, all patients with a LOS of longer than 60 days were truncated at 60 days. This truncation included 1 patient in the hospitalist group and 5 in the nonhospitalist group.

Hospital costs were measured using the TSI cost accounting system (Transition Systems, Inc, Boston, Mass). This widely used methodology determines the fixed and variable costs of all billable hospital services. This system also allocates to these services indirect costs associated with nonbillable services giving a total cost by category (eg, nursing, physicians, medications) and a total cost for the hospital stay. Separate analyses were performed on nursing, laboratory, pharmacy, and radiology services, as these cost categories represented the top 4 categories in total cost and together more than 70% of all inpatient costs in our study sample. Total costs were reported in the analyses because of the complexities of determining direct and indirect costs and

what proportion may be attributed as fixed and variable. Total costs are more generalizable to other hospitals and systems.

Demographic and clinical variables available included age, sex, race, health insurance status, admission source (eg, home, nursing home), discharge destination (ie, home, home healthcare, other hospital, nursing home, died, against medical advice, or other care facility), admission and discharge date, discharge diagnosis-related group (DRG), and principal diagnosis (as measured by taxonomy of the *International Classification of Diseases, Ninth Revision, Clinical Modification* [ICD-9-CM]) In addition, for each patient, distance from the hospital was determined using a function that mathematically estimates the "straight line" distance between 2 coordinates (longitude and latitude).⁷ Coordinates used in the calculation included the longitude and latitude of the hospital and the centroid of the zip code of a patient's residence.

Analysis

The primary analyses compared outcomes of patients discharged from the HP service with outcomes of patients discharged from the 3 NHP services. Categorical variables were analyzed using the chi-square statistic; continuous variables were analyzed using the Student *t* test or Wilcoxon rank-sum, depending on whether the data were normally distributed. Multiple linear regression was used to evaluate differences in continuous outcome variables (ie, LOS, costs) and logistic regression for dichotomous variables (ie, death, 30-day readmission). To account for the skewed distribution of costs and LOS, we used generalized linear models, assuming that the effects of the covariates were proportional using a logarithmic link function.⁸ To control for potential differences in patient characteristics, the following independent variables were included in the regression models: age, sex, type of health insurance, and admission month. Because of the potential effect of physician-level clustering⁹ on observed differences, we performed analyses using the PROC GENMOD function with SAS software, which accounts for clustering by physician. Additional multivariable analyses of costs and LOS were performed that adjusted for principal diagnosis using the technique of absorption in the PROC GLM function of SAS.¹⁰ This technique is computationally similar to creating indicator variables for individual ICD-9-CM codes, but does not allow for the concurrent use of techniques to account for clustering. Results of these analyses yielded similar estimates of the coefficients associated with hospitalist care, and were not reported. No further case-mix adjustment was performed due to the quasirandom allocation of

patients and the similar distribution of diagnoses based on DRGs. No other indicators of differences in case-mix were observed that were considered to potentially bias the results.

Further stratified analyses were performed to determine whether the impact of hospitalist care was similar in subgroups defined by distance from the hospital, need for postacute care nursing services, and admission source. Need for postacute care nursing services included home healthcare, intermediate nursing care, or skilled nursing care. Specific factors examined in these analyses were selected on the basis of discussions with hospitalists. Lastly, relationships between LOS and several physician characteristics, including the number of years since completion of residency and the number of days on the inpatient service during the academic year, were examined using the Pearson correlation coefficient. All analyses were performed using SAS for Windows, version 8.0 (SAS Institute, Cary, NC).

RESULTS

Patients admitted to HP and NHP services were nearly identical in mean age, sex, race, type of health insurance, admission source, discharge destination, and distance from the home to hospital. (Table 1). Proportions of patients in each group were similar for 9 of the 10 most common DRGs (Table 2).

In-hospital mortality was similar for direct admission patients on HP and NHP services (1.3% vs 2.1%, respectively; $P = .29$; Table 3), as were 30-day readmission rates (7.8% vs 8.7%, respectively; $P = .55$). Results were similar in analyses of transfer patients and in analyses of all admissions (ie, direct plus transfer admissions). Mean hospital LOS was roughly 1 day shorter in patients on the hospitalist service for direct admissions (5.5 vs 6.5 days, respectively; $P = .009$). In contrast, relationships between LOS and the number of years since attending physicians' completed residency ($R = 0.10$; $P = .53$) and number of days on service during the academic year ($R = -0.01$; $P = .95$) were not significant (data not shown).

Mean total costs for direct admissions were \$917 (11%) lower for patients in the HP group, although this difference was only of borderline statistical significance ($P = .08$). The relative decline in LOS was greater than the relative declines in costs, such that the mean cost per hospital day was \$122 higher in the HP group ($P = .003$).

In addition to total costs, nursing, laboratory, pharmacy, and radiology costs are reported for the HP and NHP groups in Table 3. For direct admissions, mean nursing costs were \$604 less for the HP patients ($P =$

Table 1. Characteristics of Patients Admitted to General Internal Medicine by Hospitalist and Nonhospitalist Service

Characteristic	Hospitalist (n = 447)	Nonhospitalist (n = 1259)	P
Age, mean \pm SD, y	54.7 \pm 19	55.2 \pm 19	.62
Male, %	52.8	51.2	.53
Race, %			.45
White	84.3	87.7	
Black	6.0	4.6	
Hispanic	2.7	2.0	
Other	7.0	5.7	
Type of health insurance, %			.21
Medicare	42.0	46.0	
Private insurance	24.8	25.6	
State aid	13.2	10.7	
Medicaid	10.7	10.7	
Self-pay	7.8	6.7	
Other	1.5	0.3	
Admission source, %			.18
Home	64.2	65.1	
Other acute care hospital	26.4	27.7	
Skilled nursing care	2.2	1.7	
Other	7.2	5.5	
Discharge destination, %			.67
Home	65.6	66.1	
Home healthcare	13.4	12.9	
In-hospital boarding	7.2	4.9	
Skilled nursing facility	5.8	5.9	
Intermediate care facility	4.5	5.2	
In-hospital death	1.3	2.1	
Left against medical advice	1.1	1.7	
Other acute care hospital	1.1	1.2	
Mean distance from home to hospital, miles \pm SD	63.5 \pm 84	64.4 \pm 116	.79

Total number of admissions = 1706.

.002) and laboratory costs were \$126 less ($P = .04$). Differences in pharmacy and radiology costs were not significant.

Additional analyses were performed on the entire cohort of "all admissions" ($n = 1887$) and "transfers" ($n = 181$), as reported in Table 3. The difference in LOS, nursing costs, and costs per day persisted in the "all admissions" cohort, but no significant differences were observed among the "transfer" patients.

In multivariate analyses, adjusting for age, sex, admission month, and type of insurance, the odds of death for patients on the HP service were similar to that for patients on NHP services (odds ratio [OR] 0.65, 95% confidence interval [CI] 0.26 to 1.63; $P = .37$). Adjusted LOS was 16.2% lower (95% CI -31.2% to -1.6%; $P = .03$)

for patients on the HP service, while adjusted total costs were 9.7% lower (95% CI -19.3% to -0.5%; $P = .04$) (data not shown).

Exploration of Associations with Length of Stay

In stratified analyses, differences in LOS between patients on HP and NHP services tended to be largest for patients residing 25 miles or less from the hospital (Table 4). Absolute differences in LOS were also greater among patients discharged with home nursing care or to skilled nursing facilities (1.7 days) than those who did not require nursing services (0.8 days). Absolute differences in LOS between HP and NHP patients were also similar in patients admitted from home (1.0 days) and from other acute care hospitals (1.2 days), although only the differences in patients admitted from home were statistically significant. In contrast, LOS was nearly identical in HP and NHP patients among patients admitted from other sources.

DISCUSSION

During the first year of an academic hospitalist program at a large university teaching hospital, mean LOS was 1 day (16%) shorter among patients on the hospitalist service. Based on these results, we could extrapolate that the hospitalist service resulted in approximately 450 fewer days of care during fiscal 2001, compared with the nonhospitalist services, before and after adjustment for potential differences in case-mix.

Similarly, mean costs were approximately \$900 lower for patients on the hospitalist service. Roughly two thirds of the cost differences were attributable to reductions in nursing costs. Cost savings were also observed for laboratory service, although differences in pharmacy and radiology services were not significant. The lower nursing cost was likely driven primarily by

Table 2. Top 10 Diagnoses by DRG for Hospitalist and Nonhospitalist Services

Diagnosis, DRG Number	Total, n	Hospitalist n (% of discharges)	Nonhospitalist n (% of discharges)	P
Cirrhosis (alcoholic), 202	80	10 (2.2%)	70 (5.6%)	< .01*
Pneumonia, 089	74	25 (5.6%)	49 (3.9%)	.12
Esophagitis with CC, 182	74	22 (4.9%)	52 (4.1%)	.48
Disorders of pancreas, 204	72	21 (4.7%)	51 (4.1%)	.55
COPD, 088	69	15 (3.4%)	54 (4.3%)	.39
GI hemorrhage with CC, 174	62	20 (4.5%)	42 (3.3%)	.27
Renal failure, 316	58	17 (3.8%)	41 (3.3%)	.58
Cellulitis, 277	50	11 (2.5%)	38 (3.0%)	.26
Other liver disease, 205	47	9 (2.0%)	38 (3.0%)	.26
Esophagitis without CC, 183	43	11 (2.6%)	32 (2.5%)	.92

CC indicates complication or comorbid condition; COPD, chronic obstructive pulmonary disease; DRG, diagnosis-related group; GI, gastrointestinal.

*P value is significant.

the shorter hospital LOS. Lower laboratory costs might have been due to more prudent use of laboratory testing, or simply a function of the shorter LOS. The lack of difference in pharmacy and radiology costs may be that these services are less discretionary for inpatients and less dependent on physician practice style.

Interestingly, the mean cost per day of care on the HP service was \$122 more than on the NHP service. This result may suggest that the greater availability of hospitalists or their style of care may lead to quicker or more intense evaluation of patients.

The cost data suggest that our hospitalist service resulted in savings to our institution of more than \$370 000 (\$835 per patient \times 447 patients) during the first year of its implementation. The results also suggest that if patients managed by nonhospitalist physicians were cared for with the same efficiency as the hospitalist physicians, our hospital could have appreciated an additional savings of more than \$1 million. This reduction in cost on the HP service was attained with similar quality of care, as measured by hospital mortality and readmission rate. Of note, no additional resources were expended in the development of this hospitalist program. Although dedicated hospitalists were hired, this endeavor was part of the expansion of the General Internal Medicine Division and allowed other department faculty to spend less time on the inpatient service. In addition, no additional support staff were hired for the hospitalist program.

The near-random allocation of patients allowed for this retrospective analysis to mimic a prospectively

designed clinical trial. In some ways, our observational analysis may be superior to a prospectively designed trial because none of the physicians knew they were being measured or compared. Therefore our results may be more reflective of the potential effectiveness of a hospitalist service rather than the efficacy found in a randomized controlled trial. Of further importance is that our hospitalist physicians were not directly charged with reducing resource utilization. Had this

objective been a stated goal, the differences may have been greater.

The significant findings were limited to the "direct" admissions, excluding the 10% of "transfer" patients. This result may be due to the fact that patients transferred in to the general medicine service received a large percentage of their care in another setting (ie, surgery service, intensive care unit) in which the general medicine team was not involved in their care, and therefore could not affect outcomes or resource utilization.

Our findings of an approximately 16% reduction in LOS and 10% reduction in hospital costs are consistent with the results of other prior studies of the impact of hospitalists in other academic medical centers. In a seminal study by Wachter et al,¹¹ the first year of a hospitalist service resulted in a 12% reduction in hospital LOS and a 10% reduction in hospital costs. Mortality, readmission rates, and satisfaction of patients, residents, and students were unaffected. More recently, Meltzer et al⁵ evaluated an academic hospitalist service over 2 years and found no difference in HP and NHP services in the first year, but by the second year found a 0.5-day shorter LOS (10%) and \$740 lower cost (8%) ($P < .01$). Similar results were found by Auerbach and colleagues⁴ in a community hospital where hospitalists had a 0.61-day shorter LOS and \$822 less cost of care in the second year of the program. In their recently published review of studies of hospitalist services, Wachter and Goldman⁶ reported that of 19 studies that reported hospital cost and LOS, they found an average decrease in cost of 12.4% and average decrease in LOS of 16.6%.

Table 3. Unadjusted Outcomes and Resource Utilization for Direct Admissions, All Admissions, and Transfers to the General Internal Medicine Service by Hospitalist and Nonhospitalist Services

	Hospitalist	Nonhospitalist	Difference	P
Direct admissions (n = 1706)				
Discharges, n	447	1259		
Mortality rate, %	1.3	2.1	-0.8	.29
30-day readmission rate, %	7.8	8.7	-0.9	.55
Mean LOS, days	5.5	6.5	-1.0	.009*
Mean total costs, \$ [†]	7694	8611	-917	.08
Mean nursing costs, \$	2601	3205	-604	.002*
Mean laboratory costs, \$	834	960	-126	.04*
Mean pharmacy costs, \$	1179	1307	-128	.27
Mean radiology costs, \$	672	664	+8	.90
Mean cost per day, \$	1476	1354	+122	.003*
All admissions (n = 1887)				
Discharges, n	498	1389		
Mortality rate, %	2.4	2.5	-0.1	.96
30-day readmission rate, %	7.6	8.7	-1.1	.46
Mean LOS, days	6.2	7.1	-0.9	.03*
Mean total costs, \$	9417	9726	-308	.66
Mean nursing costs, \$	2837	3421	-584	.005*
Mean laboratory costs, \$	957	1066	-109	.17
Mean pharmacy costs, \$	1450	1480	-30	.82
Mean radiology costs, \$	793	756	+37	.61
Mean cost per day, \$	1524	1386	+138	< .001*
Transfers (n = 181)				
Discharges, n	51	130		
Mortality rate, %	3.3	3.9	-0.6	.13
30-day readmission rate, %	5.9	8.5	-2.6	.56
Mean LOS, days	12.7	13.0	-0.3	.90
Mean total costs, \$	24 525	20 526	+4269	.32
Mean nursing costs, \$	4901	5513	-612	.54
Mean laboratory costs, \$	2034	2091	-51	.89
Mean pharmacy costs, \$	3828	3155	+673	.35
Mean radiology costs, \$	1847	1652	+195	.56
Mean cost per day, \$	1946	1707	+239	.06

*P value for difference is significant.

[†]Nursing, laboratory, pharmacy, and radiology cost categories represent only the top 4 categories in total cost, therefore the total costs are higher. The cost per day calculations are not exactly the mean total cost divided by the mean LOS due to the 6 patient outliers who had LOS truncated at 60 days. It was not possible to truncate the cost data for costs that were incurred after 60 days. LOS indicates length of stay.

Our findings for in-hospital mortality and 30-day readmission rates are similar to those in previously published studies.^{3,11-15} Two studies have shown a decrease

In addition, we found that LOS differences tended to be greater among patients who resided closer to the hospital. This finding may indicate that the effect of hospi-

in mortality in hospitalist groups,^{4,5} whereas 11 have shown no difference.⁶ Similarly, of 12 studies reporting 30-day readmission rate, 1 showed a decrease in readmission rate,² 1 an increase,¹⁶ and the other 10 showed no difference.^{3-5,11-15,17,18} In-hospital mortality and 30-day readmission rates were lower in our hospitalist cohort, but the differences were not significant, and the data were likely not powered to detect a difference, due to the low frequency of these events.

Our analyses may also provide further insights into factors underlying the greater efficiency of hospitalists. We observed no correlation between LOS and measures of physician experience, which does not appear to support the hypothesis that “practice makes perfect” or that simply having more time on service improves efficiency, per se. What may be more noteworthy is the fact that hospitalists are self-selected to focus their careers on inpatient medicine and may be more satisfied in this role and more invested in working collaboratively with nursing and other personnel.

talists is greater in settings in which it is easier to ensure follow-up outpatient care after discharge. Although our a priori hypothesis was that hospitalists would have a greater effect on patients who required nursing care after discharge because of greater ease in working with nurses and social workers, relative differences in LOS were similar among patients who were discharged with and without nursing care. It is possible that any greater effect on the patients discharged to nursing care was obscured by general delays in waiting for skilled nursing beds for patients with certain conditions that made placement difficult.

In interpreting our results it is important to consider several potential limitations. First, the study was limited to a single academic medical center and may not be generalizable to all medical centers and patient populations. Second, although our analysis accounted for clustering of patients among physicians and variation across physicians, the study examined only 3 hospitalist physicians. However, our analysis was conducted during the first year of our program. Based on prior studies, cost savings associated with hospitalist programs often increase over time.⁵ Thus, the differences we observed may increase as our hospitalists gain more experience and familiarity with hospital personnel. Another possibility is that the management practice of hospitalists that lead to improved efficiency will diffuse to nonhospitalist services through interactions with house staff and nonhospitalists. Third, although we believe that our patient allocation approximated randomization, we nonetheless cannot exclude unmeasured selection bias in patients admitted to the hospitalist and nonhospitalist services. Fourth, the hospitalists received consistent weekend coverage for 2 to 3 weekends per month, whereas the nonhospitalists had inconsistent coverage for weekends, and many attended for less than 1-month blocks of time. This inconsistent coverage on the nonhospitalist teams may have led to inefficiencies of care. Also, patients admitted on weekends that hospitalists had coverage were counted as hospitalist patients, in case the different case-mix admitted on

Table 4. Factors Associated With Reductions in LOS on the Hospitalist Service Compared With the Nonhospitalist Service for Direct Admissions

	Mean Length of Stay, Days			P
	Hospitalist	Nonhospitalist	Difference	
Distance from home to hospital				
0–25 miles (n = 484)	4.8	6.4	–1.6	.04*
26–50 miles (n = 325)	4.8	6.0	–1.2	.11
51–75 miles (n = 512)	5.6	6.8	–1.2	.58
> 75 miles (n = 385)	6.2	7.1	–0.9	.42
Discharge source				
To nursing service [†] (n = 521)	8.3	10.0	–1.7	.04*
To no nursing service (n = 1185)	4.2	5.0	–0.8	.02*
To home (n = 1125)	4.1	4.8	–0.7	.02*
Admission source				
From home (n = 1107)	5.0	6.0	–1.0	.03*
From acute care hospital (n = 467)	6.7	7.9	–1.2	.13
From other source (n = 132)	5.6	5.8	–0.2	.86

Direct admissions, n = 1706.

*P value for difference is significant.

[†]Discharge to home healthcare, intermediate or skilled care, or other nursing care level.

LOS indicates length of stay.

weekends biased outcomes. Fifth, 27 of the 34 nonhospitalist physicians were subspecialists. It is unknown whether this would bias the results in favor of subspecialists because they had more formal training, or against them because they may not have the same breadth of experience as a general internist. Finally, we were not able to adjust for severity of illness using administrative data, but due to the quasirandom allocation of patients and similar case-mix based on DRG, there should be no systematic bias against 1 group based on severity of illness. Future studies are needed to better understand these and other limitations.

In sum, our findings add to the growing body of literature that support the increased efficiency of inpatient care delivered by hospitalists and that such improvement in efficiency may be observed during the first year of a hospitalist program with newly recruited faculty. Our findings also indicate that hospitalists may increase the intensity of care by focusing similar evaluation and treatment into a shorter LOS. Moreover, to the extent that hospitalists have a greater impact in patients with particular characteristics (eg, patients who reside closer to the hospital), our findings provide insight into possible explanatory factors for the greater efficiency of hospitalists. Conversely, these findings may help identify subgroups in which the opportunities are greatest for further improving the efficiency of hospital care.

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