

Third-Year Medical Students' Evaluation of Hospitalist and Nonhospitalist Faculty During the Inpatient Portion of Their Pediatrics Clerkships

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BACKGROUND: Although the data on the impact of hospitalist programs on the inpatient education of medical students during their internal medicine clerkships are favorable, the data is limited on the inpatient educational experience of medical students during their pediatric clerkships. The purpose of this study was to compare the evaluations of hospitalist and nonhospitalist faculty of third-year medical students during their inpatient pediatrics rotations.

METHODS: We performed a retrospective study of the evaluations of third-year medical student of hospitalist and nonhospitalist faculty during their inpatient pediatrics rotations at Penn State Children's Hospital from July 1999 through September 2000. Using a 4-point scale, students gave an overall evaluation and also rated the hospitalist and nonhospitalist faculty on effectiveness as teachers, effectiveness as pediatricians, and effectiveness as student advocates. Using the same 4-point scale, students rated the following aspects of the rotation: ward rounds, sick newborn care, well newborn care, outpatient clinics, private physician's office, noon conferences, and morning report.

RESULTS: A total of 67 students rotated on the pediatric inpatient service during the study period; 35 students rotated with 2 hospitalists, and 32 students rotated with 8 nonhospitalists. All 67 students (100%) submitted an evaluation. The hospitalists received higher scores than nonhospitalists on effectiveness as teachers (3.87 vs. 2.91; $P < 0.001$), effectiveness as pediatricians (3.94 vs. 3.25; $P < .001$), effectiveness as student advocates (3.76 vs. 2.97; $P < .001$), and in the overall evaluation (3.93 vs. 3.06; $P < .001$). Ward rounds were rated as more beneficial when conducted by hospitalists than when conducted by nonhospitalists (3.15 vs. 2.58; $P < .006$).

CONCLUSIONS: Hospitalists were perceived by third-year medical students as providing more effective teaching and more satisfying overall rotations than were nonhospitalists during the inpatient portion of the students' pediatric clerkships. Further studies that examine inpatient systems, particularly as they relate to the acquisition of knowledge and the development of effective communication skills in medical learners, are needed. *Journal of Hospital Medicine* 2007;2:17–22.

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In 1996 Wachter and Goldman anticipated the emergence of hospitalists,¹ physicians who are responsible for the care of hospitalized patients in place of their primary care physicians. The number of physicians who identify themselves as hospitalists has grown rapidly since 1996 and is currently estimated to be 10,000–12,000, with the potential to reach as high as 30,000 in the next decade.² This growth includes academic medical centers. In sur-

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veys of chairs of internal medicine and pediatric departments, 50% have hospitalists employed at their institutions.^{3,4}

Hospitalists in academic institutions are playing an increasingly prominent role in the medical education of both residents and medical students. The implications of adopting a hospitalist model on medical education has been discussed.⁵⁻⁷ Despite such concerns as fragmented continuity of care; decreased exposure to primary care physicians, subspecialists and physician-scientists; reduced autonomy; and fewer educational opportunities to observe the natural histories of illnesses because of improved efficiency,⁵⁻⁷ the overall impact of hospitalists on medical and resident education has generally been favorable.⁸⁻¹⁸ Internal medicine residents have rated the teaching skills of hospitalists comparable to traditional academic physicians,^{8,9} and believe the addition of hospitalists has contributed to an improved educational experience.^{10,11,14} In addition, a survey of third-year medical students at a single academic teaching hospital concluded that hospitalists were able to provide at least as positive an educational experience during their inpatient medicine rotations as highly rated nonhospitalist teaching faculty.¹³

The role of hospitalists as educators in pediatrics has been studied much less. Pediatric resident satisfaction has improved in institutions that have used a hospitalist model.¹⁶⁻¹⁸ In another study, hospitalists were rated by pediatric residents as more effective teachers than nonhospitalists.¹⁵ Because we are unaware of any study that has evaluated hospitalists in the education of medical students during their inpatient pediatric rotation, the purpose of our study was to compare hospitalist and nonhospitalist faculty on the educational experience of third-year medical students during the inpatient portion of their pediatric clerkships at a single university children's hospital.

METHODS

Study Design

We conducted a retrospective study using evaluations of third-year medical students comparing hospitalist and nonhospitalist faculty during the inpatient portions of their pediatrics clerkships at a single academic children's hospital over a 15-month period (July 1999-September 2000).

Setting and Sample

We conducted our study at Penn State Children's Hospital (PSCH), a 120-bed tertiary-care facility within the 504-bed Hershey Medical Center, the main teaching hospital affiliated with the Penn State College of Medicine, Hershey, Pennsylvania. The pediatric hospitalist program commenced on July 1, 1999, and during the 15-month study period the hospitalist staff consisted of 2 physicians who attended a total of 8 months, whereas the nonhospitalist staff consisted of 4 academic general pediatricians and 4 academic pediatric subspecialists who attended the remaining 7 months.

The inpatient clinical responsibilities of both groups of physicians during each month were similar. Both groups of physicians conducted daily rounds with a team that included a senior resident (postgraduate year 3), 2 to 4 interns (postgraduate year 1), 1 acting intern (fourth-year medical student), and 2 to 4 third-year medical students. This team was responsible for all admissions to the general pediatrics service, which averages 100 admissions per month. Both the hospitalists and nonhospitalists had outpatient responsibilities during the time they served as inpatient attendings.

During the 15-month study period, 131 students completed their third-year pediatrics clerkships. Students at the Penn State College of Medicine may complete their pediatrics clerkship at PSCH or at one of several alternative sites. Because of variability in the structure of the rotation from site to site, it was considered valid only to analyze evaluations completed by students who rotated at PSCH. Sixty-seven students rotated at PSCH during the study period. Students spent 3 weeks of the 6-week rotation on the inpatient general pediatrics service. The remaining 3 weeks occurred in multiple outpatient pediatric practice settings and in the newborn nursery. During the 3 weeks the students spent on the inpatient service they did not have outpatient clinic responsibilities, so they did not interact with either the hospitalists or nonhospitalists in the outpatient setting. At the end of the rotation, students were asked to rate the effectiveness of the faculty as teachers, pediatricians, and student advocates and overall on a 4-point scale (1 = inadequate; 2 = adequate; 3 = very good; 4 = excellent). Students were also asked to evaluate 7 components of the clerkship on the same 4-point scale (Table 1). Finally, students were asked to pro-

TABLE 1
Results of Third-Year Medical Student Survey at Penn State University Children's Hospital

Evaluation item	Hospitalist mean score (32 evaluations)	Nonhospitalist mean score (35 evaluations)	P value	No. of evaluations rated adequate or inadequate (%) ^b	
				Hospitalist	Nonhospitalist
Effectiveness as teacher ^c	3.87	2.91	< .001 ^a	1 (2.9)	13 (40.6)
Effectiveness as pediatrician ^d	3.94	3.25	< .001 ^a	0 (0.0)	5 (15.6)
Effectiveness as student advocate ^e	3.76	2.97	< .001 ^a	2 (5.7)	13 (40.6)
Overall evaluation	3.93	3.06	< .001 ^a	0 (0.0)	10 (31.3)
Ward rounds	3.15	2.58	< .006 ^a	5 (15.6)	12 (37.5)
Morning report	3.16	3.14	0.923		
Sick newborn	2.79	2.60	0.518		
Well newborn	2.89	3.13	0.211		
Outpatient department clinics	2.96	3.06	0.425		
Private physician's office	2.97	3.01	0.794		
Noon conference	3.03	3.13	0.512		

Student responses based on a 4-point scale (1 = inadequate, 2 = adequate, 3 = very good, 4 = excellent)

^aStatistically significant response ($P < .05$)

^bAdequate and inadequate responses were not calculated in the remaining evaluation items, as hospitalists and nonhospitalists did not have specific responsibilities in these areas.

^cStudents were to consider the following skills in rating this category: knowledge, effectiveness of instruction, and intellectual stimulation.

^dStudents were to consider the following skills in rating this category: pediatric knowledge, patient management, and role model.

^eStudents were to consider the following skills in rating this category: availability to students, supervision of students, interest in students, and guidance of students.

vide additional written comments in an unstructured format.

After reviewing the literature concerning faculty evaluation forms and their components, an evaluation form was created for students to indicate their reactions to clerkship components. All the medical students' faculty evaluations were anonymous, and the faculty was not able to review student evaluations prior to assigning grades. Students were required to turn in an evaluation at the end of their rotations. The study was limited to 15 months, as the format of the evaluation form was changed after September 2000 and the general pediatrics service was in the process of transitioning to an exclusively hospitalist-run service, thereby limiting the number of nonhospitalists available as a comparison group. Demographic characteristics of the hospitalist and nonhospitalist faculty were collected from a faculty database. The study was approved by the Penn State Milton S. Hershey Medical Center's Institutional Review Board.

Statistics and Analysis

For all questions, a Wilcoxon rank sum test was used to evaluate whether the responses for nonhospitalists were different than those for hospitalists. Differences in response by group whose 2-tailed P values were less than .05 were considered statisti-

cally significant. All analyses were performed using the SAS statistical software, version 8.2 (SAS Institute Inc., Cary, NC).

RESULTS

All 67 of the students who completed a pediatrics clerkship at PSCH returned evaluation forms, which were the data for further analysis. Thirty-five students rotated with the hospitalist faculty, and 32 students rotated with the nonhospitalist faculty. There were no significant demographic differences between the hospitalist and nonhospitalist faculty in age, sex, academic rank, specialty, and years since completing training (Table 2). All the hospitalist faculty fulfilled the definition of a hospitalist,² whereas none of the physicians in the nonhospitalist group did.

The hospitalists were rated significantly higher than the nonhospitalist faculty in all 4 of the attending characteristics measured (Table 1): teaching effectiveness (3.87 vs. 2.91; $P < .0001$), effectiveness as a pediatrician (3.94 vs. 3.25; $P < .001$), student advocacy effectiveness (3.76 vs. 2.97; $P < .0001$), and overall evaluation (3.93 vs. 3.06; $P < .001$).

Analysis of specific aspects of the rotation showed the only feature that hospitalists were rated significantly higher on was quality of ward rounds (3.15 vs. 2.58, $P < .006$). There was no significant

TABLE 2
Demographic Characteristics of Hospitalist and Nonhospitalist Faculty

Characteristic	Hospitalists (n = 2)	Nonhospitalists (n = 8)	P value
Age, mean (range)	36.0 (31-41)	46.5 (30-63)	0.30
Male/Female	1/1	6/2	0.95
Academic rank			
Instructor	0	1	
Assistant professor	2	3	
Associate professor	0	0	0.56
Professor	0	4	
Specialty			
General pediatrics	1	4	
Nephrology	1	1	
Genetics	0	1	0.95
Infectious diseases	0	1	
Rheumatology	0	1	
Years since training, mean (range)	4.0 (0-8)	13.8 (0-30)	0.43

difference between the hospitalists and nonhospitalists on features that were not specifically part of the inpatient rotation, including various conferences, outpatient clinics, and newborn care (Table 1).

DISCUSSION

Our study demonstrates that pediatric hospitalists had a positive impact on the overall educational experience of third-year medical students during the inpatient portions of their pediatrics clerkships. Hospitalists were rated more favorably than nonhospitalists as teachers, as pediatricians, as student advocates, and overall. Medical students also rated the value of ward rounds more favorably when hospitalists conducted them. In addition, higher percentages of nonhospitalists than hospitalists were rated as adequate or inadequate for the above items. When other aspects of the clerkship were analyzed, there were no statistically significant differences between the students who rotated with hospitalists and the students who rotated with nonhospitalists. This suggests that the higher scores for hospitalists were specifically related to their interactions with students, rather than with an overall more positive view of the rotation.

It has been suggested that forces promoting the use of hospitalists in adult medicine are even more persuasive in the pediatric population, as the difference in severity of illness between the inpatient and outpatient setting is greater, and the average

pediatrician has less experience than the average internist in managing hospitalized patients.¹⁹ In a recent systematic review of the literature, Landrigan et al.²⁰ reported that 6 of 7 studies demonstrated hospitalist systems had decreased hospital length of stay compared to systems in which a primary pediatrician served as the physician of record. This improved efficiency, if combined with the pressure to see more patients while trying to balance teaching and research demands, may have a negative impact on the quality of medical education.

Several factors may have contributed to the students' satisfaction with hospitalists. Studies have demonstrated that students rate clinical teachers more favorably with whom they have greater involvement.²¹ Hospitalists may be more likely to spend time on the inpatient wards given that is the primary site of their clinical activity. This increased presence may have contributed to more favorable evaluations for the hospitalist faculty, whereas the additional outpatient workload for nonhospitalist faculty may have reduced inpatient teaching opportunities, accounting for their lower teaching score. Included in the pediatrician category was the attribute of being a role model. In a study by Wright et al.,²² spending more than 25% of the time or 25 or more hours per week teaching and conducting rounds was independently associated with being considered an excellent role model. Again, the increased availability of the hospitalists on the inpatient wards may have led to more teaching opportunities, contributing to their higher score.

Our study had several limitations. First, it was a retrospective study conducted at a single institution with only 2 hospitalists. Although there were not statistically significant demographic differences between the 2 groups, this may simply reflect the small size of the sample in our study; therefore, the results may not be applicable to other academic institutions. Second, we retrospectively analyzed an evaluation form that had not been validated or specifically designed to compare 2 physician groups. Third, there were multiple statements in each category that students were asked to consider before scoring each attending on the parameters measured. Although hospitalists were rated higher in each category, there may have been individual characteristics within each category for which the nonhospitalist faculty performed better. Fourth, although hospitalists received higher average ratings than nonhospitalist faculty from third-year medical

students, it is important to emphasize this study measured students' attitudes and beliefs not specific educational outcomes. However, even though we cannot rule out the possibility that potentially confounding factors such as the personality of an attending physician influenced the results, prior studies have demonstrated that medical students make sophisticated judgments about teaching in the clinical setting.^{23,24} It is unlikely that hospitalists at our institution were specifically selected to attend more months on a new inpatient service because they had a history of having more favorable teaching qualities because 1 of the 2 hospitalists had just finished residency training, and there were no significant demographic differences between the 2 groups. In a study examining trainee satisfaction in an internal medicine rotation 4 years after adoption of a hospitalist model, where nonhospitalist faculty attended based on their own interest and inpatient skill rather than as a requirement, Hauer et al.¹⁴ reported that trainees experienced more effective teaching and a more satisfying inpatient rotation when supervised by hospitalists. This suggests that hospitalists may possess or develop a specific inpatient knowledge base and teaching acumen over time that distinguishes them from nonhospitalists. There is evidence of accumulated experience leading to improved outcomes in the clinical setting for HIV infection,²⁵ various surgical procedures,²⁶ and hospitalist systems.²⁷

In conclusion, this is the first study to evaluate the performance of hospitalists in the setting of a third-year medical student pediatrics clerkship. Although third-year medical students rate hospitalists at least as highly as nonhospitalist faculty, further studies are needed to reproduce this finding. In addition to the increased time spent on the wards with students and increased experience in caring for hospitalized patients, further studies should also examine the role that communication plays in clinical teaching. Also, the recent development of core competencies in hospital medicine²⁸ may lead to the development of educational outcomes that can be objectively measured.

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