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Impact of Shorter Inpatient Faculty Rotations on Resident Learning Experience

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From the primordial soup of early 19th century US medical training, “house pupils” evolved as distant ancestors to the interns and residents of today’s hospital-oriented residency training programs.¹ In the early years of residency training, the attending physician served as the chief of the department and was responsible for attending rounds and overseeing ward patient care throughout the year.² As academic medicine expanded, more faculty shared in the oversight and teaching, typically rotating on service for 4-8 weeks, corresponding to the clinical clerkship duration.

Changes in research funding opportunities, expected clinical productivity, demand for resident supervision, reduced resident availability related to new Accreditation Council for Graduate Medical Education duty hour

restrictions, and increased patient complexity have added new pressures on inpatient teaching faculty.³⁻⁸ These changes result in less time for research, teaching, and mentoring activities, increasing the potential for faculty dissatisfaction and burnout.⁶⁻¹² Due to these pressures, more faculty are supporting the movement to shorten the duration of the attending cycle, and more faculty are selecting this option.¹³

The evolution to shorter rotations has occurred in the absence of studying the impact of this change on learners. Respondents to an Association of Program Directors in Internal Medicine list server dialogue on this topic question the ability of an attending to accurately evaluate a learner with such limited exposure. We sought to determine if differences exist in the evaluation scores of faculty by internal medicine residents exposed to teaching attendings who were on service for either a 2-week or 4-week rotation, believing that the faculty evaluation serves as a surrogate for understanding aspects of the resident learning experience. If differences did exist, we sought to learn what domains were significantly affected.

METHODS

Study Design

We performed a retrospective analysis comparing resident evaluations of inpatient medicine faculty who attended on the inpatient medicine wards for both 2-week and 4-week blocks between July 1, 2001 and June 30, 2005.

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Setting

The study was conducted in a 90-resident, university-based internal medicine residency program at 2 tertiary care training sites: a 450-bed university hospital and a 140-bed Department of Veterans Affairs Medical Center (VAMC). In this study, we designated inpatient teaching attending physicians as “faculty.” Residents rotate on 4-week rotations, after which they complete required faculty evaluations. Before 2002, all inpatient faculty rotated on service for 4 weeks at both sites. During 2002, VAMC gradually transitioned to a 2-week attending schedule; by the 2003 academic year, no faculty members were attending for 4 weeks. Over the past few years, faculty at the university have evolved toward a similar schedule, such that by the end of 2005, few were on service longer than a 2-week cycle. The 2 sets of faculty are not integrated and faculty are not shared across institutions. The assignment of residents to faculty is arbitrary and although not specifically monitored, it is unlikely that faculty members are evaluated by the same learner more than twice during the study period. The call schedule is a 5-day cycle; the only difference between institutions is the presence of a night float team at VAMC.

Data Collection

Evaluations for all inpatient faculty who had attended for both 2-week and 4-week blocks from July 1, 2001 through June 30, 2005 were identified and coded. All data and demographic characteristics were unlinked to blind the identities of the faculty being evaluated. The evaluations were divided based on the length of the attending block and analyzed accordingly. A subset of evaluations of 8 faculty who were hospitalists,^{14,15} with a primary clinical role of inpatient medicine, also were identified and analyzed. These faculty had a minimum of 10 evaluations in each group, with a total number of evaluations during the study period ranging between 64 and 218 per faculty.

The following faculty characteristics were collected: age, gender, number of years on faculty, academic rank (“junior” for assistant professors and below, “senior” for associate professors and above), and medicine specialty (general medicine/hospitalist vs subspecialist).

Evaluations were completed and accessed via an electronic web-based system (Verinform Graduate Medical Education and Residency Manager) employed by the internal medicine residency program. The evaluation is a 39-question instrument adapted from the

Stanford Faculty Development Program framework to assess teaching faculty performance.¹⁶⁻¹⁸ The 7 primary categories—learning climate, control of session, communication of goals, promotion of understanding, evaluation, feedback, and promoting self-directed learning—have been previously tested for internal consistency and construct validity in a residency setting. We added questions pertaining to clinical supervision, professionalism, and use of evidence-based practices to our instrument. The items in these 10 categories comprised the first 37 questions and were on a 5-point scale (perfect score 5). Two additional questions were scored uniquely, the first using a different 5-point scale and the second using a 6-point scale, addressing the faculty’s overall involve-

ment (perfect score 3) and overall performance (perfect score 6), respectively. Institutional review board approval was obtained from both institutions.

PERSPECTIVES VIEWPOINTS

- Inpatient teaching faculty are shortening attending rotations due to research funding changes, clinical obligations, demand for resident supervision, reduced resident availability due to duty hour restrictions, and increased patient complexity.
- Residents evaluated in-patient teaching faculty who supervised for 2- or 4-week rotations at 2 university-affiliated teaching hospitals to determine if there was a difference in the learning experiences.
- Although the 4-week rotation cycle received higher scores from resident evaluations, the reality of internal medicine faculty pressures are not conducive to the longer rotation cycle; the entire system should be re-evaluated to accommodate the growing pressure on faculty and ensure proper education of residents.

Analysis

The unit of analysis was an individual faculty evaluation for a specific 2-week or 4-week rotation. Scores for the first 37 questions were averaged into a composite score and analyzed to determine if differences existed as a function of rotation length. Due to a strong positive skew in the evaluation scores, we dichotomized the composite score at the median of 4.8. The final 2 questions were dichotomized as the “best possible score” versus other. We evaluated the association between rotation length and dichotomized evaluation scores, using logistic regression to adjust for year, site, and attending characteristics (age, gender, and academic rank). We used generalized estimating equation models to account for clustering of evaluation data within faculty members.

For the primary analyses, we analyzed evaluation data for all faculty evaluations within our sample of faculty who had attended for both 2- and 4-week rota-

tions at least once during the study period. We then repeated our analyses, restricting the sample to the subset of hospitalists who had at least 10 evaluations for each rotation length (2-week and 4-week).

To identify which specific evaluation questions demonstrated the most significant differences between the 2- and 4-week evaluations, we analyzed ordinal responses for each question using the Wilcoxon rank sum test. *P*-values produced by this test were adjusted for multiple comparisons using the false discovery method of Benjamini and Hochberg,¹⁹ and items were ranked by the adjusted *P*-value. Items with *P*-values <.05 were selected for further analysis. These responses were dichotomized into perfect versus less than perfect for logistic regression with generalized estimating equation modeling (“5” versus “<5” for questions 1-37). Regression analysis for these items was performed in a manner similar to that for the composite score analysis.

RESULTS

A total of 1495 evaluations were available on the 52 faculty who attended for both 2- and 4-week rotations during the study period. There were 484 evaluations on 8 hospitalist faculty, all of whom had at least 10 evaluations for each rotation length (163 4-week and 321 2-week evaluations). Sixty-five irretrievable (3.4% of total) evaluations were completed by non-internal medicine residents (psychiatry, neurology, family medicine, emergency department interns) who rotated on the inpatient medicine ward services. Demographics of the 52 faculty included in the primary analysis and the 8 hospitalist faculty are displayed in **Table 1**.

The mean composite score on questions 1 through 37 was 4.72 ± 0.33 for 4-week rotations and 4.67 ± 0.38 for 2-week rotations. The median of all scores was 4.8, and we dichotomized the composite score at this median to allow for logistic regression analysis. In multivariable analyses adjusting for year, site, faculty characteristics, and accounting for clustering of evaluations by physician, 4-week attendings were more likely than 2-week attendings to have a score >4.8 (odds ratio [OR] 1.80, 95% confidence interval [CI], 1.34-2.41). This finding held true for the subset of high-density hospitalist faculty (OR 1.74, 95% CI, 1.07-2.85). Other factors associated with higher composite scores included more recent year of evaluation (2005 vs other years: OR 2.15, 95% CI 1.65-2.79; 2001 vs other years: OR 0.41, 95% CI, 0.26-0.62), VAMC site of rotation (OR 1.79, 95% CI, 1.31-2.46), and female gender (OR 1.50, 95% CI, 1.08-2.08) (**Table 2**).

When evaluating the effect of the rotation length on responses to specific questions, 4-week faculty were more likely to receive a perfect score for questions associated with creating a positive learning climate, providing evaluation, providing feedback, repeating goals periodically, and overall performance (**Table 3**).

Table 1 Characteristics of Inpatient Attending Faculty Who Had Attended for both 2-Week and 4-Week Intervals in an Internal Medicine Residency between July 1, 2001 and June 30, 2005

Number of Evaluations	52 Faculty in Primary Analysis		8 Hospitalist Faculty	
	2-Week	4-Week	2-Week	4-Week
Total	1146	349	321	163
2001	66	90	33	23
2002	260	101	81	47
2003	349	68	95	37
2004	332	55	82	36
2005	139	35	30	20
Gender, % male		54		62.5
Age, average years*		38		42
Years on faculty, average†		9.2		10.2
Academic rank, %‡				
Junior		61.5		62.5
Senior		38.5		37.5
Specialty, %				
Generalist		84.6		100
Subspecialist		15.4		0

*Age when first attended during study period.

†Years on faculty at end of study period.

‡Academic rank at end of study period.

DISCUSSION

This retrospective analysis of resident evaluations of their inpatient medicine teaching faculty suggests that while all faculty were rated highly, evaluation scores were higher for 4-week as compared with 2-week rotations. This effect was observed among all faculty who had attended for both 2- and 4-week cycle lengths during the study period, as well as among designated hospitalist faculty who attended more frequently. The most prominent differences were not in direct teaching but rather in other behaviors associated with effective learning, including generating a positive learning climate, repeating goals, obtaining evaluative input, and delivering feedback.

Importantly, the specific areas of deficit, particularly evaluation and feedback, are the same ones highlighted by academic internists and program directors when queried about the impact of shorter-length faculty rotations on the Association of Program Directors in Internal Medicine list server. A recent survey of residents and teaching faculty suggests they are concerned that shorter-duration attending cycles will have a negative impact on medical education.²⁰ Our results suggest this concern may be valid; however, at our institutions, the overall satisfaction seems to have been preserved.

The reasons for this potential impact are likely multifactorial. A shorter-duration cycle implicitly requires

Table 2 Proportion of Composite Evaluation Scores above the Median*, by Rotation Length, Year of Evaluation, Site, and Faculty Characteristics

Characteristic	Subgroup	Overall Score >4.8		Adjusted OR All Faculty (95% CI)†	Adjusted OR Hospitalist Faculty (95% CI)
		n	%		
Rotation length	2-week	577	50.3	—	—
	4-week	195	55.7	1.80 (1.34-2.41)	1.74 (1.07-2.85)
Year	2001 vs other	58	37.2	0.41 (0.26-0.62)	0.23 (0.14-0.40)
	2005 vs other	111	63.8	2.15 (1.65-2.79)	2.91 (2.20-3.86)
Rotation site	University	222	43.4	—	—
	VAMC	550	55.9	1.79 (1.31-2.46)	—
Physician gender	Male	524	47.8	—	—
	Female	409	54.3	1.50 (1.08-2.08)	2.29 (0.86-6.12)

OR = odds ratio; CI = confidence interval; VAMC = Veterans Affairs Medical Center.

*Average score for 37 questions on a 5-point Likert scale.

†Adjusted for year, training site, and attending physician gender, age, years on faculty, academic rank, and medicine specialty.

a relatively greater time for the transitional activities surrounding patient care and providing orientation to team members, while decreasing time to learn the

unique styles of the team members, obtain evaluative input, and deliver feedback. A shorter cycle provides less time for development of relationships; some experts believe it is the “single most important factor for the effectiveness of supervision.”²¹ With weaker relational bonds, the commitment to the outcome of the learner also might be compromised.

There are several limitations to our study. First, the evaluations reflect resident perceptions rather than objective measures of faculty effectiveness. Second, the faculty evaluation is only a surrogate measure of the learning experience of the resident. Given that components of the evaluation instrument have been validated previously, we believe it is a reasonable surrogate for a true outcome. Thirdly, although we accounted for clustering of multiple evaluations for a given faculty, we did not have unique identifiers for residents and did not account for the potential non-independence of multiple evaluations completed by a given resident. Because the overall evaluation completion rate was 90% in our 90-resident program, we believe that the effect of this non-independence should be small. Additionally, our results reflect the evaluations of internal medicine residents in only one training program, and we cannot assume our results can be generalized broadly. A multi-institutional sample would be useful to determine if this effect is broadly encountered. Finally, while we found statistically significant differences in faculty evaluation scores by rotation length, it is unclear how “clinically” significant or important these differences were. It is therefore difficult to know whether our findings warrant changes in educational practices or policies. We suggest that these data serve as preliminary findings identifying areas of concern to be explored further in future studies. One study might examine the effect of the shorter

Table 3 Odds of 4-Week Attendings Receiving a Perfect Score of 5 on Specific Evaluation Questions*

Item	Odds		
	Ratio	95% CI	P-Value
Learning climate			
Listened to learners	2.59	1.73-3.87	<.0001
Encouraged learners to bring up problems	2.69	1.80-4.03	<.0001
Encouraged participation by learners	2.27	1.63-3.12	<.0001
Evaluation			
Evaluated learners ability to synthesize	2.34	1.80-3.03	<.0001
Evaluated ability to apply knowledge	2.02	1.54-2.66	<.0001
Evaluated learner's clinical skills	2.00	1.55-2.57	<.0001
Evaluated learners knowledge of facts	1.78	1.44-2.20	<.0001
Feedback			
Gave feedback frequently	1.69	1.19-2.38	.0031
Suggested improvements for learners	1.60	1.25-2.04	.0002
Gave positive feedback to learners	1.69	1.29-2.22	.0002
Communication of goals			
Repeated goals periodically	1.75	1.33-2.29	<.0001
Overall performance	1.69	1.31-2.17	<.0001

CI = confidence interval.

*Data reported represent the question domains showing statistically significant responses ($P < .05$) comparing 4- vs 2-week rotation length, after adjustment for training site, year of evaluation, academic rank, age, gender, and years on faculty.

attending cycle on the learning experience of medical students and whether a similar trend exists.

From our study, it is difficult to separate the effect of attending rotation length on resident learning from the impact of duty hour regulations. Resident duty hour restrictions were implemented at around the same time that faculty rotations were transitioning from 4-week to 2-week cycles and were likely a driving force behind that transition. Because both have had the impact of compressing resident-faculty contact time, whether the effects we observed for rotation length were truly due to rotation length, duty hour restrictions, or both, is up for speculation. We note, however, that scores on resident evaluations increased over the study period such that the mean composite scores in 2005 (after implementation of duty hour restrictions) were higher than in 2001 (before restrictions). This finding suggests that duty hour restrictions in and of themselves probably do not account for the observed differences by attending rotation length.

Numerous external pressures and high rates of burnout led faculty at academic centers to shorten the duration of inpatient medicine attending rotations. Our study suggests this reduction may have come with the consequence of a less robust learning experience for the resident. Whether the magnitude of this effect is sufficient to motivate longer attending rotations is unclear. However, we believe that compensatory measures could be taken to offset any loss in the quality of resident education. Clinical teaching relies heavily on modeling of professionalism, providing constructive feedback based on observations, and facilitating the skill of diagnostic reasoning.²² As we move toward shorter cycles, now might be the time to re-evaluate the structure of the ward experience to prevent compromise in these areas.

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