Hold-Over Admissions: Are They Educational for Residents?

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PURPOSE: Since implementation of resident duty-hour restrictions, many academic medical centers utilize night-float teams to admit patients during off hours. Patients are transferred to other resident physicians the subsequent morning as “hold-over admissions.” Despite the increase of hold-over admissions, there are limited data on resident perceptions of their educational value. This study investigated resident perceptions of hold-over admissions, and whether they approach hold-over admissions differently than new admissions.

METHOD: Survey of internal medicine residents at an academic medical center.

RESULTS: A total of 111 residents responded with a response rate of 71 %. Residents reported spending 56.2 min (standard deviation [SD] 18.9) compared to 80.0 min (SD 25.8) admitting new patients ($p < 0.01$). Residents reported spending significantly ($p < 0.01$) less time reviewing the medical record, performing histories, examining patients, devising care plans and writing orders in hold-over admissions compared to new admissions. Residents had neutral views on the educational value of hold-over admissions. Features that significantly ($p < 0.01$) increased the educational value of admissions included severe illness, patient complexity, and being able to write the initial patient care orders. Residents estimated 42.5 % (SD 14) of their admissions were hold-over patients.

CONCLUSIONS: Residents spend less time in all aspects of admitting hold-over patients. Despite less time spent admitting hold-over patients, residents had neutral views on the educational value of such admissions.

KEY WORDS: hand-off; transitions; graduate medical education; hold-over; night-float.

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INTRODUCTION

Academic medical centers are greatly affected by ACGME (Accreditation Council for Graduate Medical Education) duty-hour restrictions. Prior to mandatory duty-hour restric-

tions, hospitals relied heavily on resident trainees to provide care during evening and weekend hours. Often, residents were the first point of contact for patient admissions at these times. Residents had autonomy in medical decision-making, coupled with a strong sense of responsibility for their patients. With work-hour restrictions, hospitals have increasingly relied on hospitalists and “night-float” teams¹ to admit patients during evening and weekend hours. Often night-float teams work shifts, and do not provide continuous care for patients from admission through discharge. Instead night-float teams depart the hospital at predefined times, and transition patient care responsibilities to other resident physicians. We term patients that are admitted by a night-float team and transferred to another resident physician “hold-over admissions.”

A survey of internal medicine program directors found that 76 % of programs utilize night-float teams.² While it is not known what percentage of other training programs (e.g. surgery, pediatrics, neurology, etc.) incorporate hold-over admissions in resident education, we speculate hold-over admissions are common in resident training. Despite dramatic increases in hold-over admissions observed with 2011 ACGME mandated duty-hour restrictions,³ there is limited understanding of whether resident physicians approach hold-over admissions differently than new patient admissions. In our training program, a prevailing faculty member perception is that hold-over admissions are less educationally valuable. We undertook this study with the hypothesis that residents spend less time admitting hold-over patients, and that residents perceive hold-over admissions as educationally less valuable.

METHODS

Our internal medicine residency program includes 156 categorical interns and residents. Training in our residency program occurs in one university hospital, a Veterans Administration Hospital, and a community based hospital. Our residency training program has utilized resident night-float coverage for several years.⁴ Residents accept hold-over admissions on nearly all ward services, including general medicine, the medical intensive care unit, cardiac care unit and the hematology/oncology ward. All residents

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participate in night-float rotations for 2–4 weeks per year. During night-float rotations, residents typically work 70–75 h per week. On general medicine night-float rotations, there is a hospitalist faculty member available to staff admissions. In our program, residents are required to contact the hospitalist faculty at least once per night to informally discuss admissions, and together the house staff and faculty member decide which cases to discuss in-depth. On the other night-float experiences, subspecialty fellows are physically present for assistance, and faculty members are available by phone.

We survey all residents yearly in June as part of an annual program evaluation. The survey queries residents on their perceptions of our educational curriculum. In June 2012, we added questions to the annual survey that addressed resident perceptions of hold-over admissions. Questions were developed with input from multiple faculty members with experience in resident education. Questions were pilot-tested with chief residents.

The survey addressed residents' perceptions of the educational value of certain admission characteristics. We defined educational value as "how beneficial something is to your professional development and learning as a resident physician." Specifically, using a 7-point Likert scale, we asked residents to respond to whether an uncommon illness, severe illness, complex patients with multiple comorbidities, patients with substance dependence and abuse, elderly patients (defined as age over 80 years), transfers from the ICU, hold-over admissions, service size of greater than 15 patients (the average service size during the study period was 10 patients with a maximum of 20 patients), and writing orders for initial patient management increased or decreased the educational value of admissions. Scores ranged from 1 = greatly decreases the educational value, 3 = slightly decreases the educational value, 4 = neutral affect on educational value, 5 = increases little the educational value, to 7 = increases greatly the educational value. Using hold-over admissions as the baseline characteristic, we compared the mean responses of each patient characteristic to hold-over admission mean responses using Wilcoxon signed-rank test. This allowed us to understand the relative educational value of patient, illness and service characteristics compared to hold-over admissions.

The survey also addressed the amount of time residents spent admitting new patients (defined as the first contact between a patient and house staff) and hold-over patients (defined as a resident receiving a patient already admitted by another resident). In our program, patients admitted by night-float residents are directed to resident services the next morning. Residents do not receive hold-over admissions from hospitalists. We questioned how many minutes residents spent reviewing medical records, performing the history, performing the physical exam, devising/revising the plan of care, and revising/writing orders during the

admission of a new patient and hold-over patient. Total time spent admitting a patient was calculated by summing the time spent in the activities above. To understand how likely residents were to perform a complete physical exam in a new admission compared to a hold-over admission, we used questions on a 5-point Likert scale. We defined a comprehensive physical exam as including a head and neck, cardiac, respiratory, abdominal, extremity, skin, and neurologic exam. Responses ranged from 1 = very unlikely, 3 = equally likely vs. unlikely, to 5 = very likely. We were also interested in whether residents felt different degrees of responsibility for hold-over admission patients (which we termed patient ownership). Using a 5-point Likert scale, we asked residents, "compared to new patients, my sense of ownership for hold-over patients is..." Scores ranged from 1 = a lot less, 3 = same, to 5 = a lot more. To address whether residents noted differences in their understanding of the patient's history, we asked, "compared to new patients, I feel like my understanding of the history and preclinical course of hold-over patients is..." Responses ranged from 1 = a lot less, 3 = same, to 5 = a lot more.

In addition, we collected demographic data on survey respondents, including age, gender, post-graduate year (PGY), and academic degree. We also asked residents, "over your entire residency (from beginning of the intern year to current) approximately what percentage of patients were admitted to you as hold-overs?" Potential responses ranged from 0 % to 100 %. All surveys were done electronically via a web-based survey instrument (SurveyMonkey.com). Surveys were conducted anonymously and no incentive was offered for participation.

Statistical analyses were conducted using JMP software (SAS, Cary, NC). Means and standard deviations were computed for all survey questions. Differences were compared with paired student's t-test for parametric variables and Wilcoxon signed-rank test for non-parametric variables. This study was done with permission of the University of Pittsburgh institutional review board.

RESULTS

A total of 111 residents replied to this survey with a response rate of 71 %. Demographic data are summarized in Table 1. Respondents were evenly represented by gender and post-graduate year. Residents estimated that 42.5 % (standard deviation [SD] 14) of patients they admitted during their residency training were hold-over admissions. This did not change significantly by post-graduate year. While we do not collect data on hold-over admissions for all services, for general medicine at our main teaching hospital, the actual percentage of hold-over admissions is 45 %.

Table 1. Demographic Data

Age (standard deviation)	29.6 years (2.3)
Gender	48.6 % male 51.4 % female
Degree	82.8 % MD 0.9 % MD/PhD 5.4 % DO 10.8 % MBBS or equivalent
Year of training	
Post-graduate year 1	36.4 %
Post-graduate year 2	37.2 %
Post-graduate year 3	26.3 %

One-hundred and eleven (111) resident physicians replied to the survey with a response rate of 71 %. Demographic data of the respondents are displayed

Several patient characteristics increased residents' perception of the educational value of admissions including: uncommon illness, severe illness, writing orders themselves for initial patient management, and complex patients with multiple comorbidities (Table 2). Residents perceived a neutral affect of the educational value of hold-over admissions (mean response 3.99, SD 1.4). There were no statistically significant differences by post-graduate year in the perceived educational value of hold-over admissions. The only item that significantly decreased the educational value of admissions was a service size of greater than 15 patients.

Residents spent an average of 23.4 fewer minutes on the admission of a hold-over patient compared to a new patient (95 % CI 19.6–27.1, $p < 0.01$). This was due to statistically significant less time in reviewing the medical record, performing the history, performing the physical examination, devising/revising the plan of care, and revising/writing orders (for all comparisons, $p < 0.01$) (Table 3). Residents were less likely to perform a complete physical exam for hold-over patients compared to new patients with a mean score of 3.4 (SD 0.99) vs. 4.1 (SD 1.0) on a 5-point Likert scale ($p < 0.01$).

When asked, “compared to new patients, my sense of ownership for holdover patients is...”, residents reported

Table 3. Time of Admission Activities in Minutes

	New patient	Hold-over patient	P value
Reviewing chart	22.8 (11)	19.4 (9.1)	< 0.01
Performing history	18.2 (6.2)	10.3 (4.6)	< 0.01
Performing physical exam	8.7 (4.0)	7.3 (3.4)	< 0.01
Devising/revising plan of care	16.7 (8.3)	10.7 (5.5)	< 0.01
Writing/revising orders	13.6 (7.0)	8.2 (4.6)	< 0.01
Total	80.0 (25.8)	55.9 (18.9)	< 0.01

Residents self-reported the amount of time in minutes that they spent in various activities for new patients and hold-over patients during the admission process. Means and standard deviations are displayed. P values were calculated by paired student's t-test

only slightly less ownership (mean 2.7, SD 0.57) on a 5-point Likert scale. The majority (73.8 %) of respondents noted that hold-over admissions did not affect ownership, while 26.1 % felt decreased ownership. When asked, “compared to new patients, I feel like my understanding of the history and preclinic course of holdover patients is...”, residents reported less understanding, with a mean response of 2.40 (SD 0.61) on a 5-point Likert scale.

CONCLUSION

Our study's main findings were that overall, residents did not feel hold-over admissions had less educational value. However, trainees do spend less time evaluating these patients. These findings are important to medical educators and residency directors, who increasingly utilize night-float admissions to meet ACGME duty-hour restrictions.

Duty-hour restrictions have resulted in several changes in graduate medical education, including increased patient care hand-offs and hold-over admissions.³ Our hypothesis was that hold-over admissions were less educationally valuable to trainees. We reasoned that since a night team develops

Table 2. Features that Increase or Decrease the Educational Value of Admissions

	Mean (standard deviation)	Mean (standard deviation) of hold-over admission	P value (comparisons made to hold-over admission)
Uncommon illness	6.09 (0.87)	3.99 (1.4)	< 0.01
Severe illness	6.26 (0.77)		< 0.01
Complex patient with multiple comorbidities	5.66 (1.2)		< 0.01
Elderly patient (over 80 years of age)	4.89 (1.2)		< 0.01
Transfer from the ICU	4.31 (1.3)		0.01
Patients with substance dependence and abuse	3.7 (1.5)		0.06
Service size greater than 15 patients	2.94 (1.5)		< 0.01
Writing orders yourself for initial patient management	6.08 (0.94)		< 0.01

Using a 7-point Likert scale, residents were asked to rate the extent to which items decrease or increase the educational value of admissions. Scores ranged from 1= Decreases greatly, 3= decreases slightly, 4= neutral, 5= increases slightly, to 7= increases greatly. Means and standard deviations are displayed. Comparisons were made to hold-over admissions. P values were calculated by Wilcoxon signed-rank test

the plan of care, the day team (which receives the hold-over admission) merely executes a plan of care that it did not generate. Our faculty members feel this paradigm fosters admissions that are less interesting and less educational. We were surprised that the minority of residents had negative perceptions of hold-over admissions. We believe the discordance between resident and faculty perception is a phenomenon of temporal changes in graduate medical education. Many faculty members trained during an era of less supervision and greater autonomy in decision-making. When faculty members compare the current era to their own training, faculty members perceive incrementally less independent decision-making in hold-over admissions. In contrast, current resident physicians have always trained in an era of significant faculty oversight and higher numbers of patient care hand-offs. We believe that the paradigm of continuing the care plan developed by another physician is more natural for current trainees.

Despite an extensive literature review, we were unable to identify other literature that directly examined resident perceptions of hold-over admissions. A study of third-year medical students during internal medicine clerkships at the University of Rochester reported that 43.3 % of patients followed by medical students were hand-off admissions (this included hold-over admissions and patients already on the service that were assigned to students).⁵ In this study, increased numbers of hand-off admissions correlated to lower test scores on the National Board of Medical Examiners (NBME) subject in the Internal Medicine test.⁵ The authors speculated this was due to less practice in clinical reasoning associated with independently diagnosing a patient's illness, and that students had less opportunity to search for, and select, appropriate illness scripts.⁶

Whether hold-over admissions are in fact educationally neutral for graduate medical trainees is difficult to study. The number of survey respondents who felt hold-over admissions increased the educational value of admissions was nearly equal to the number of respondents who felt they decreased the educational value. This observation substantiates that there are both good and bad aspects to hold-over admissions. A potential negative impact is less opportunity to independently rehearse illness scripts and test for accurate diagnoses. Another potential negative impact is less point-of-care learning. Routinely, residents use electronic resources to quickly answer clinical questions when admitting patients. When residents accept hold-over admissions, they may be less likely to research clinical questions at the point-of-care. On the other hand, there are several potential positive impacts to hold-over admissions.

One potential positive impact is more time to read in greater depth. An additional potential positive is more time available to discuss the care with consultants and engage in learning from peers when admitting a hold-over. Certainly, this is accomplished more easily during daytime hours. The ability to delve more into a patient's illness could be true for patients with complex and severe conditions, factors felt by residents to increase the educational value. With logistical issues of an admission already addressed, residents can focus more on urgent and complicated management issues.

Our study has limitations that warrant comment. Our study was a survey of a single residency program. Our internal medicine residency program does incorporate hospitalists that are available 24 h per day, 7 days per week on some of the services where trainees rotate on night-float. Residents are not required to discuss night-float admissions in-depth, but they do have the opportunity for faculty member input if they choose. This may create situations where residents feel less educational value when receiving hold-over admissions, contrasted to greater educational while on night-float rotations admitting patients destined to become hold-over admissions. Our survey addressed overall global perceptions of the educational value of hold-over admissions, and we did not address differential perceptions by daytime and nighttime teams. In addition, our survey relies on resident self-report of time spent admitting patients, not observed time, and survey respondents are subject to recall bias. The survey was incorporated into an annual survey. The survey was not completed during (or at the end) of an inpatient month. For many residents, there were months separating their most recent inpatient rounding responsibilities from survey completion. Certainly, this limits the ability to make precise assessments of the educational value of admissions and time spent admitting patients. Despite the potential for recall bias, the time spent admitting patients was consistently less across respondents for hold-over admissions compared to new admissions. Finally, our study does not examine patient outcomes. Since residents are spending less time in the admission of hold-overs, residents are susceptible to cognitive errors that may negatively affect patients.

Residents estimated that nearly half of their admissions were hold-over admissions. In aggregate, we found hold-over admissions had minimal effects on changing the perceived educational value of admissions. Patient and illness characteristics increased the educational value of admissions. With the increase in hold-over admissions caused by duty-hour restrictions, training programs should be deliberate in triaging patients with

greater illness severity or less common illnesses to resident services.

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