

Teaching and Learning in an 80-Hour Work Week

A Novel Day-float Rotation for Medical Residents

Jeffrey G. Wong, MD, Eric S. Holmboe, MD, Stephen J. Huot, MD, PhD

The 80-hour workweek limit for residents provides an opportunity for residency directors to creatively innovate their programs. Our novel day-float rotation augmented both the educational structure within the inpatient team setting and the ability for house staff to complete their work within the mandated limits. Descriptive evaluation of the rotation was performed through an end-of-rotation questionnaire. The average length of the ward residents' work week was quantified before and after the rotation's implementation. Educational portfolios and mentored peer-teaching opportunities enriched the rotation. As measured by our evaluation, this new rotation enhanced learning and patient care while reducing work hours for inpatient ward residents.

KEY WORDS: internship and residency; workload; medical education; program evaluation.

J GEN INTERN MED 2004;19:519-523.

Traditionally, residency training immerses medical school graduates in various patient care clinical experiences. This experiential training model, structured around specific learning objectives, involves increasing learner autonomy through graded levels of supervision and is designed to develop a foundation for building clinical acumen.¹ An assumption of this model is that the longer one spends learning one's craft (i.e., caring for patients), the more proficient one becomes. In many residency programs, this assumption became accepted and often resulted in prolonged work periods; residents were expected to take up "residence" in the hospital during this period of their training.

Fundamental ideas behind residency training have evolved. Present time restrictions disallow residents to work more than 80 hours per week.² Concomitantly, brief, intense hospital stays represent the bulk of inpatient admissions³ and many programs struggle to cover patient care needs as their trainees spend less time in the hospital. Due to restrictions on residency size and limits of the residency applicant pool, programs cannot merely increase the number of residents in their programs. The use of other nontrainee professionals (e.g., physician assistants, hospi-

talists, or nurse practitioners, etc.) will likely be necessary at many institutions. Service considerations aside, residents must still graduate from their programs as well-qualified, highly skilled clinicians. Restructuring of residency training programs in response to work hour limits provides an opportunity to enhance resident education as new staffing models are developed.

We created a new day-float rotation to help our ward team residents meet the work hour rules and to develop a novel educational experience for our senior residents. The specific objectives of the day-float rotation were: 1) enhance the educational experience for senior residents; 2) facilitate patient care for residents on their post-long call day; and 3) improve adherence to the 80-hour work limit for residents on inpatient ward teams.

METHODS

Description of the Day-float Rotation

We created staffing for this day-float rotation by eliminating an existing "resident-only" 4-week inpatient rotation for postgraduate year (PGY) 3 residents and shifting those residents into the new 4-week day-float rotation. The resident-only rotation was originally designed for PGY-3 residents to independently admit and care for hospitalized patients, without an intern or medical student, and to perform medical consults for patients on nonmedical services. Anticipated goals of this rotation included enhanced autonomy for senior residents (emulating the experience of a primary care practitioner in a community hospital) and enhanced academic environment in the inpatient setting (by having more senior residents in that setting). Though the patient care and medical consult objectives were met, formal rotation evaluations suggested minimal impact on the overall inpatient educational environment. Residents from this rotation were reassigned in order to staff the day-float rotation without expanding the size of the house staff program.

The new day-float rotation was so named for two main reasons: 1) the rotation was designed with no required night or oncall duties, and 2) the participating resident's daily activities were not limited to a single ward team (as in the traditional rotation structure) but "floated" from team to team as the daily schedule dictated. Table 1 briefly summarizes the day-float resident's learning goals and responsibilities, and Table 2 depicts a representative week.

Each morning, the day-float resident rounded with the post-long call inpatient team. This senior resident served as an additional clinician helping the team members complete their patient care tasks. Examples of such tasks included calling consultants, writing progress notes, obtaining the results of outstanding studies, or completing discharge paperwork. The day-float resident was also

Received from the Yale Primary Care Internal Medicine Residency (JGW, ESH, SJH), New Haven, Conn.

Presented in part at the 26th Annual Meeting of the Society of General Internal Medicine, May 3, 2003, Vancouver, Canada, and as a workshop presentation at the Fall Meeting of the Association of Program Directors in Internal Medicine, October 2, 2003, Washington, DC.

Address correspondence and requests for reprints to Dr. Wong: Yale Primary Care Internal Medicine Residency, 56 Franklin Street, Waterbury, CT 06706 (e-mail: jwong@stmh.org).

Table 1. Day-float Resident Learning Goals and Responsibilities**Patient Care**

1. Patient care ward work performed by the resident on this rotation shall
 - a. Improve efficiency of the postcall team
 - b. Allow the postcall team to end patient care responsibilities by 1330.
 - c. Provide all ward teams with the experience of a resident at the PGY-3 level
 - d. Provide additional support for the chief residents for monitoring the quality of patient care on all teaching service patients
2. Consultations performed by the resident on this rotation shall
 - a. Provide a reliable and effective care for hospitalized nonmedicine patients
 - b. Simplify the mechanism by which these consultations occur
 - c. Serve as a potential mechanism through which the consultation service may be expanded

Teaching

1. Residents on this rotation will demonstrate specific skills toward improving their roles as medical educators
2. Residents shall have a supervised, practical experience with small group peer teaching and will be provided feedback on their performance

Leadership

1. Residents on this rotation will further develop teamwork and leadership skills through their daily interactions with peers and supervisors
2. The resident is expected to show appropriate collegial respect during work rounds with the individual team residents but must also provide guidance and leadership when needed
3. Residents on this rotation will demonstrate appropriate professional behavior and respectful collegial interactions with nonmedical specialists through the consultation service
4. Effective leadership skills will also be developed through the process of organized, formal peer teaching through the resident report conferences

available to help when a team's patient experienced clinical deterioration and required intensive physician presence. The rotation was designed with the expectation that the postcall team leave the hospital after the noon conference, signing out yet-to-be-completed tasks to the day-float resident. The day-float resident worked into the late afternoon/early evening until the team's patient care work was completed before signing out to the inpatient team oncall.

Additionally, throughout the day, the day-float resident served as the medical consultation physician for the non-medical subspecialty services. This role was similar to the medical consultation role that the previous resident-only team fulfilled. Faculty supervision of this role was provided by the inpatient team attendings on service for the month.

Educationally, the day-float resident served as a consultant for the inpatient teams. By design, the day-float resident was expected to research and answer clinical questions that arose on the team's patients during rounds. The day-float resident kept a log of each clinical question posed, whether or not the question was answered, and the source used for answering the question. An evidence-based approach for answering clinical questions was strongly encouraged. A copy of the materials used when answering the question (articles, documents, etc.) was collected and compiled into an educational portfolio. This portfolio provided concrete evidence of the thoughtfulness employed when answering the question and also served as a resource for others in the training program.

Table 2. Day-float Weekly Schedule 2003–2004

Day-float Representative Weekly Schedule 2003–2004							
	Sun	Mon	Tues	Weds	Thurs	Fri	Sat
7:30 AM	Post-Call Rounds Team A	Report		Report	Report	Report	OFF
8:30 AM		Post-Call Rounds Team B	Post-Call Rounds Team C	Post-Call Rounds Team D		Post-Call Rounds Team B	
12:00 PM		Noon Conference	Noon Conference	Noon Conference	Noon Conference Continuity Clinic	Noon Conference	
5:30 PM	Sign-Out with On-call team	Sign-Out with On-call team	Sign-Out with On-call team	Sign-Out with On-call team		Sign-Out with On-call team	

Once weekly, on Thursday mornings, the day-float resident facilitated the resident report conference serving as “chief resident” for this session. Because the day-float resident was involved in the care of every patient admitted to the teaching service, they had an excellent opportunity for selecting and preparing educational patient cases for discussion. Prior to the weekly conference, the day-float resident met with a faculty member (JGW) and outlined a teaching plan for the upcoming session. Small group teaching strategies based on principles from the Stanford Faculty Development Program were used.⁴ Immediately after the conference, the day-float resident met with a faculty member for a debriefing and feedback session during which time teaching problems were discussed and strategies for improvement were offered.

The day-float residents had continuity clinic shifted to Thursday afternoons during the rotation, the same day that they facilitated morning report, and they also had Saturday off (see Table 2). During these times, their duties were covered by a senior resident from a noncall rotation. While the day-float resident did not participate in attending rounds (there are no postcall day attending rounds at our institution), they were expected to attend each resident report and noon conference.

EVALUATION AND RESULTS

In its first year, 13 PGY-3 residents (4 men, 9 women) completed the rotation. The residents’ perceived value of the rotation was evaluated through a descriptive postrotation survey using a 5-point Likert scale inquiring about the frequency with which the educational and patient care goals of the rotation were achieved (1 = almost never to 5 = almost always; see Table 3). The number and quality of the clinical questions that were captured on work rounds were evaluated through the compiled portfolio of educational materials that was created by each day-float resident. The total duration of resident work hours was evaluated by a time “diary” kept by all house staff on inpatient wards prior to and after the institution of the day-float rotation.

The results of our descriptive evaluation are seen in Table 3. The response rate to the questionnaire was 100%. Educationally, the day-float residents found they had ample time to investigate clinical questions for themselves and the ward teams (4.33 out of 5.0), had ample time to prepare for resident report conference (4.67), that the mentored facilitation of resident report was a valuable educational experience (5.0), and that they were able to answer clinical questions for the ward teams on a regular basis (3.58). Regarding team dynamics and efficiency, the residents observed that they made the team more efficient (3.75), allowed the team to leave the hospital by early afternoon (3.58), and that the quality of work they performed was appropriate (4.50). Overall, the residents reported that the rotation was a valuable addition to the program (4.67).

Through the course of the first year, a portfolio of 86 clinical questions that were formally answered by the day-float resident was collected (average 6.6/rotation; range 2–12). Approximately two-thirds of the questions were “background-type” questions (answerable by textbooks and narrative reviews), with the remaining third being “foreground” questions (answerable by original research or evidence-based summaries). A total of 80 questions were answered (93%). Sixty-two of the 86 questions (72%) were answered using published literature (primary data trials, narrative reviews, etc.); 18 of the questions (21%) were answered using electronic reference resources (e.g., Up-To-Date); 6 questions (7%) remained unanswered.

On random weeks during the year, all of the house staff on the inpatient rotations (four teams comprised of one resident and one intern/team) were asked to complete a time diary estimating the number of hours worked during the week. Surveys prior to and after the institution of this day-float rotation were compared. The return rate of these resident surveys varied from rotation to rotation but averaged 90%. The range of hours worked per week for residents on ward rotations prior to the day-float rotation was 79 to 90 hours. After the day-float rotation was operational, that range fell to 67 to 81 hours. The number of hours the

Table 3. Descriptive Resident Responses About the Day-float Rotation

1	2	3	4	5
Almost Never	Rarely	Sometimes	Frequently	Almost Always
Educational Goals (N = 13)				Mean (SD)
I had time to read about patient problems/clinical questions				4.38 (0.94)
I had adequate time to prepare for resident report				4.69 (0.46)
Running resident report was a valuable learning experience				5.00
I provided articles or answered clinical questions for the ward teams daily				3.61 (0.92)
Patient Care Goals (N = 13)				
Rounding with the postcall team made them more efficient				3.84 (0.83)
The postcall team left the hospital by 1:30 PM				3.69 (1.06)
The work I performed for the postcall team was appropriate				4.54 (0.93)
Summary (N = 13)				
I believe this rotation is a good addition to the program				4.69 (0.61)

day-float resident worked in the hospital ranged between 58 and 65 per week.

DISCUSSION

This novel educational innovation is important for others who hope to address some of the challenges that are inherent in educating residents on the inpatient wards, where short hospital stays of patients with high acuity illness are the norm.³ In this frenetic atmosphere, further complicated by work hour limits, residents often find themselves barely able to complete the work necessary to care for their patients,⁵ and programs must guard against missed opportunities for learning. This educationally creative rotation for senior residents added value to their training through mentored peer-teaching sessions, the opportunity to learn about nearly every patient admitted to the teaching service, and the ability to research clinical questions that arose regarding their care. In addition, the rotation successfully reduced the number of hours worked each week by the residents on the inpatient service. We believe that when residency training programs are restructured to meet accreditation mandates, they should also strongly consider creating opportunities for enhancing the educational experience of their residents and not only meet the work hour limits.

For programs interested in adopting such a rotation, we believe that our day-float structure had several important advantages. Staffing for this rotation was created by redeploying a single senior resident and did not require adding additional resident-on-call responsibilities. The senior residents welcomed their clinical and educational consultant roles and the mentored resident report teaching experience provided additional leadership opportunities for individual growth. The unique structure allowed for many clinical encounters with admitted patients and the opportunity to answer pertinent clinical questions that related to direct patient care. It also created a specific mechanism to determine whether indeed a clinical question was answered—such a mechanism has not previously been reported.

Our 13 day-float residents logged 86 clinical questions specific to the patients under their care. The question rate asked by our day-float residents (6.6 per resident) is slightly smaller than other published work. Crowley et al. noted that in their 10-month study, 82 residents generated 625 clinical questions (7.62/resident).⁶ Additionally, Ramos, Linscheid, and Schafer reported that 13 faculty and 25 residents in their program generated 274 questions (7.2/physician).⁷ It is possible that we may only have captured those questions that were actually written down with the honest intention of answering. This is supported by our findings—although the number of questions was smaller than expected, the yield was quite good (93% answer rate). This high rate is remarkable in light of published work noting that up to 70% of clinical questions asked by residents in the outpatient clinic failed to be answered and that the primary barrier for this failure was lack of time.⁸ We believe

that the rotation's structure allowed residents to overcome this "time barrier" and that the task of compiling a learning portfolio of materials provided additional motivation.

This rotation also provided leadership development opportunities for residents to observe and teach their peers. Anecdotally, the day-float residents reported new insight into the educational process as they watched and assisted colleagues, at different levels of training, in their daily tasks of caring for inpatients. They also gained tremendous insight into more formalized group teaching and group dynamics during their supervised morning report sessions. Formally assessing the value of these insights is ongoing.

Some programs have formal "residents-as-teachers" seminars presented as learners advance through the stages of residency,^{9,10} but mentored facilitation of small group teaching activities has not previously been described. Because the resident report conference is ubiquitous in residency programs,¹¹ an intervention based upon this conference may be generalizable to other programs. The day-float residents highly valued the individually mentored resident report conference that they led. In our opinion, identifying a specific faculty mentor with training in clinical teaching skills to oversee this structured educational component was critically important for its success.

There are limitations to our project. We studied its success in one hospital within our system, with only 13 learners for a single academic year. There was no control group for comparison, and our metric cannot evaluate the intervention's effect on ward team learning, quality of care for patients, impact on resident's abilities to sign out patients, or the impact on residents' leadership skills. Furthermore, a disadvantage attributable to our structure is a reliance on faculty members with specific skills in clinical teaching. A program without such faculty may struggle to duplicate our success.

Our program is expanding and looking at future directions for the day-float rotation. In academic year 2003–2004, the day-float program was expanded to our sister hospital and new evaluation of its effectiveness, including the perceived value of the day-float resident by our ward residents and attendings, is ongoing. Through conducting and evaluating this rotation, we are also exploring adding quality of care oversight for specific conditions, systems issues, and quality indicators critical to medical education and patient care.

REFERENCES

1. Ludmerer K. *Time to Heal*. New York: Oxford University Press; 1999.
2. Accreditation Council of Graduate Medical Education. Resident Duty Hours Documents and Duty Hours Language. Available at <http://www.acgme.org>. Accessed July 24, 2003.
3. Rosevear MA, Gary NE. Changes in admissions, lengths of stay, and discharge diagnoses at a major university-affiliated teaching hospital: implications for medical education. *Acad Med*. 1989;64:253–8.
4. Skeff KM, Stratos GA, Berman J, Bergen MR. Improving clinical teaching. Evaluation of a national dissemination program. *Arch Intern Med*. 1992;152:1156–61.
5. Dellit TH, Armas-Loughran B, Bosl GJ, et al. A method for assessing

- house staff workload as a function of length of stay. *JAMA*. 2001;286:1023-4.
6. Crowley SD, Owens TA, Schardt CM, et al. A web-based compendium of clinical questions and medical evidence to educate internal medicine residents. *Acad Med*. 2003;78:270-4.
 7. Ramos K, Linscheid R, Schafer S. Real-time information-seeking behavior of residency physicians. *Fam Med*. 2003;35:257-60.
 8. Green ML, Ciampi MA, Ellis PJ. Residents' medical information needs in clinic: are they being met? *Am J Med*. 2000;109:218-23.
 9. Spickard A, Corbett EC, Schorling JB. Improving residents' teaching skills and attitudes toward teaching. *J Gen Intern Med*. 1996;11:475-80.
 10. Wipf JE, Pinsky LE, Burke W. Turning interns into senior residents: preparing residents for their teaching and leadership roles. *Acad Med*. 1995;70:591-6.
 11. Gross CP, Donnelly GB, Reisman AB, et al. Resident expectations of morning report: a multi-institution study. *Arch Intern Med*. 1999;159:1910-4.