

and increased patient-provider communication,<sup>20</sup> are needed to increase the receipt of recommended care for HIV-infected and at-risk persons.

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## Beyond Night Float?

### The Impact of Call Structure on Internal Medicine Residents

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**Limitation of resident working hours has been a critical issue for training programs in recent years. At Providence Medical Center, residents and faculty collaborated in developing goals, implementation strategies, and an evaluation process for a new ward float system. The goals of the float system were to reduce fatigue, facilitate education, maintain continuity of care, and minimize the negative impact of training on residents' personal lives. Evaluation revealed: 1) 74% of the residents preferred Providence Medical Center float system (PMCF) to either night float (NF) (13%) or standard every-fourth-night call (EFNC) (13%); and 2) PMCF was perceived**

**to ensure quality patient care to a greater degree than was NF, to better facilitate resident education than was NF, and to have a less negative impact on personal lives than was EFNC.**

**KEY WORDS: residency training; night float; night call; ward structure; continuity of care.**

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Recently there has been increasing concern about the impact of residents' working conditions on quality of patient care, resident education, and recruitment and development of humane, caring physicians by residency programs.<sup>1-3</sup> Legislation limiting residents' hours in New York, new recommended training guidelines, curricular changes in medical training, and experimentation in structuring of clinical rotations have been undertaken.<sup>4-6</sup> Many residency programs have instituted a

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Chart 1  
Description of the Float Schedule

Thu	Fri	Sat	Sun	Mon	Tue	Wed
R <sub>1</sub> R <sub>2</sub> F Post-call	R <sub>1</sub> R <sub>2</sub> F Short-call	R <sub>1</sub> F No admissions	R <sub>2</sub> F Long-call	R <sub>2</sub> F Post-call	R <sub>2</sub> R <sub>1</sub> Short-call	R <sub>2</sub> R <sub>1</sub> No admissions

- ◆ Each ward team consists of one ward resident (R<sub>2</sub>) and one or two ward interns (R<sub>1</sub>s).
- ◆ The float intern (F) rotates weekly on each of four ward teams.
- ◆ F always joins Thursday's post-call team.
- ◆ Clinic for F is Thursday afternoon.
- ◆ R<sub>1</sub> is off Sunday and possibly Monday and/or Saturday.
- ◆ F is off Tuesday and Wednesday.
- ◆ R<sub>2</sub> is off Saturday.
- ◆ R<sub>1</sub> is covered by on-call R<sub>2</sub> on Saturday.

night float (NF) to limit hours and lighten workloads. In 1989, 30% of internal medicine programs reporting had NF systems.<sup>7</sup> The optimal balance between preserving continuity and limiting resident work hours has increasingly been debated in the literature.<sup>8, 9</sup>

At Providence Medical Center (PMC), a resident-centered process was used to design and evaluate an alternative ward float system. The goal of the process was to develop and evaluate a new ward structure that maximized patient care, education, and resident personal satisfaction.

## METHODS

### Program Description

Providence Medical Center is a 483-bed university-affiliated community hospital in Portland, Oregon. There are 29 internal medicine housestaff (eight in each categorical year and five preliminary). There are four ward teams that, historically, rotated every-fourth-night call (EFNC). Each ward team consists of a senior resident and one intern. Admissions to the teaching service are closed once the short-call team receives two admissions and the long-call team seven admissions. Housestaff had six months of ward in their first postgraduate year (PGY-I) and three months in each of PGY-II and PGY-III.

### Development of Ward Float

The faculty and residents collaborated in a three-month process to develop the Providence Medical Center float (PMCF). Concerns about the preexisting EFNC system were identified and prioritized by the program director and residents. These included 1) chronic fatigue engendered by EFNC, 2) acute post-call fatigue, and 3) obtaining at least one day off per week and one weekend off per month. Several key concerns with an NF system were identified: 1) impact of transferring patients on the morning-after admission, 2) lack of didactic education for residents on NF, and 3) isolation of float housestaff from their peers and continuity panels. The goals of the PMCF were to decrease chronic fatigue and increase days off while maintaining continuity of care.

Chart 1 illustrates a description of the PMCF. There are four ward teams that rotate call. An intern spends four consecutive weeks on the float rotation, rotating through each of the four ward teams in turn, spending one week with each team. The float intern always joins the team that is post-call on Thursday and relieves the regular ward intern of all admitting responsibilities on the following short-call (Friday) and long-call (Sunday) days. The float intern rounds on the teams' patients Saturday, either with the ward intern or alone, allowing the ward resident the day off. The float intern stays with the team for five days, leaving after the work is completed on the post-call Monday.

### Method of Evaluation

A survey was distributed to all housestaff at the end of the academic year. The survey consisted of 20 statements designed to assess residents' perception of PMCF, EFNC, and NF concerning delivery of patient care, physician-patient relationship, education, and personal life. Twelve questions were rephrased to assess the perceived impact of the two float structures from the perspective of the float intern. The residents expressed their opinions using a Likert scale. Statistical analysis was done using SPSS (Chicago, IL). Comparisons between ratings of each system were done using paired t-tests. The Bonferroni correction defined statistical significance at  $p \leq 0.002$ .

## RESULTS

Completed surveys were returned by 24/29 (83%) of the housestaff. Twenty of the 24 responding (83%) had worked on ward services utilizing the PMCF. Fourteen of the 24 (58%) had personal experience with an NF system. The responses grouped by presence or absence of personal experience did not differ. The results are tabulated in Table 1. The PMCF system was perceived to be superior to NF in facilitating well-coordinated, efficient, and cost-effective health care. Fatigue was felt to be detrimental to patient care least with NF, to a greater extent with PMCF, and to the greatest extent with EFNC.

The housestaff felt that PMCF maintained greater continuity of care for patients than did NF. Both PMCF and NF were perceived to cause less fatigue-related learning impairment than was EFNC.

From the point of view of the float intern, the PMCF was felt to facilitate physician-patient relationships and patient responsibility to a greater extent than was NF. Attendance at rounds and feeling part of a team were perceived to be superior with PCMF. The effects on personal life were felt to be similar between the two float systems. When asked to rank the three call structures according to personal preference, 74% preferred PMCF, 13% preferred EFNC, and 13% preferred NF.

## DISCUSSION

Over the past several years, many internal medicine programs have instituted an NF system to decrease res-

ident fatigue and to comply with resident work limitation recommendations. Concern has surfaced, however, that NF systems have their own drawbacks, including fostering a "shift mentality," impairing continuity of patient care, and actually increasing the number of quality daylight hours in the hospital.<sup>8-11</sup>

The PMCF system was designed by the housestaff and medical education faculty at PMC as an attempt to decrease chronic fatigue and improve morale without compromising continuity of care. A distinction is made between acute post-call fatigue and chronic progressive fatigue accumulating over the course of a rotation or a year. Acute fatigue is addressed by limiting consecutive hours, while chronic fatigue is eased by ensuring days off and limiting numbers of admitting days and admissions when on call. Distinguishing the effects of acute fatigue and chronic fatigue on patient care and education has not been definitively studied. Neuropsychiatric

**Table 1**  
Impact of Call Structure on Ward Team and Float Intern at Providence Medical Center (PMC) (1 = Strongly Agree, 4 = Neutral, 7 = Strongly Disagree)

	Impact on Ward Team			Impact on Float Intern	
	PMC Float	Every-fourth-night Call	Night Float	PMC Float	Night Float
<b>Impact on delivery of patient care</b>					
Care is worsened by fatigue	3.7 ± 1.4	2.1 ± 1.1*	(4.7 ± 1.3*)†	—	—
Consultations are well-coordinated	2.7 ± 1.3	2.0 ± 1.1	4.4 ± 1.6‡	—	—
Care is cost-effective	3.1 ± 1.2	3.0 ± 1.2	4.5 ± 1.3	—	—
Care is efficient	2.5 ± 1.2	2.1 ± 1.0	4.5 ± 1.8*	—	—
<b>Impact on physician-patient relationship</b>					
Continuity of care is maintained	2.8 ± 1.4	(1.2 ± 0.5*)	5.7 ± 1.2*	—	—
Personal responsibility for patient	2.1 ± 0.9	(1.3 ± 0.5*)	4.9 ± 1.8*	2.9 ± 1.6	5.7 ± 1.35*
Care is fragmented	5.4 ± 1.4	6.5 ± 1.1	2.1 ± 1.3*	—	—
Detailed knowledge of patient	2.3 ± 1.1	1.7 ± 1.2	5.0 ± 1.4*	2.7 ± 1.1	5.2 ± 1.5*
Patients know their physicians	3.1 ± 1.8	(1.5 ± 0.8‡)	5.5 ± 1.5*	—	—
<b>Impact on education</b>					
Learning is impaired by fatigue	3.4 ± 1.6	2.0 ± 1.1*	4.2 ± 1.6	—	—
Teaching rounds attendance is facilitated	3.6 ± 1.7	3.7 ± 1.6	4.3 ± 1.8	3.1 ± 1.6	5.5 ± 1.5*
Teaching rounds learning is facilitated	3.3 ± 1.7	4.1 ± 1.5	3.3 ± 1.4	2.8 ± 1.2	5.3 ± 1.6*
Residents teaching residents is facilitated	2.6 ± 1.3	2.6 ± 1.4	4.0 ± 1.7	3.2 ± 1.9	3.7 ± 1.7
Residents' teaching students is facilitated	3.4 ± 1.8	3.2 ± 1.8	4.3 ± 1.8*	3.6 ± 1.9	4.8 ± 1.9*
Time for reading is available	4.5 ± 1.6	5.5 ± 1.6	4.3 ± 1.5	3.6 ± 1.7	3.9 ± 1.9
Interaction with multiple housestaff	2.5 ± 1.2	3.6 ± 1.1*	4.3 ± 1.7*	2.5 ± 1.4	5.0 ± 1.8*
Sense of being part of team	2.2 ± 1.1	(1.3 ± 0.4‡)	3.8 ± 2.0‡	—	—
<b>Impact on personal life</b>					
Detrimental to personal life	3.3 ± 1.3	2.1 ± 1.1*	3.7 ± 1.5	3.9 ± 1.4	3.9 ± 2.0
Workday is appropriate length	4.0 ± 1.7	5.5 ± 1.4*	3.7 ± 1.6	4.0 ± 1.7	3.9 ± 1.7
Workload is appropriate	3.7 ± 1.9	4.5 ± 1.9‡	3.7 ± 1.6	3.4 ± 1.5	3.7 ± 1.3

\* $p \leq 0.0001$  compared with PMC float.

†Values in parentheses were perceived as better than PMC float.

‡ $p \leq 0.002$  compared with PMC float.

studies of acutely fatigued housestaff have found little difference between their fatigued performance and the performance of the same housestaff in a well-rested state.<sup>12-17</sup> While acute fatigue is not remedied with the PMCF system, by giving each ward team an "easy week" each month, with extra days off, chronic fatigue is relieved, while integrating the float intern into the ward team and maintaining patient care continuity.

Several limitations of this study should be noted. First, this study was designed to assess housestaff perceptions of three call systems, not to directly assess impact on patient care. Second, not all housestaff had direct experience with each of the call systems. Also, the sample size is fairly small and the residents evaluating the ward structures helped design the PMCF system. Finally, the PMC program itself is a fairly small, university-affiliated, community-based program with a strong emphasis on primary care and patient continuity, issues that bias the selection of residents in this program.

Our goal in preparing this report is not to extol the virtues of a specific system, but to advocate continued creativity in developing ward structures designed to optimize patient care and resident education as well as resident satisfaction.

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