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## Internal Medicine Trainees' Views of Training Adequacy and Duty Hours Restrictions in 2009

**Dr. Judy A. Shea, PhD [Professor of medicine—clinician educator and associate dean of medical education research],**

Perelman School of Medicine, University of Pennsylvania, Philadelphia, Pennsylvania

**Dr. Arlene Weissman, PhD [Director],**

Research Center, American College of Physicians, Philadelphia, Pennsylvania

**Mr. Sean McKinney [Director],**

Self-Assessment Programs, American College of Physicians, Philadelphia, Pennsylvania

**Dr. Jeffrey H. Silber, MD, PhD [Professor of Pediatrics and of Anesthesiology & Critical Care], and**

The Perelman School of Medicine, the University of Pennsylvania, and professor of Health Care Management, The Wharton School of Business, the University of Pennsylvania, Philadelphia, Pennsylvania

**Dr. Kevin G. Volpp, MD, PhD [Staff physician]**

Center for Health Equity Research and Promotion (CHERP), Philadelphia Veterans Affairs Medical Center and professor, Perelman School of Medicine and the Wharton School of Business, University of Pennsylvania, Philadelphia, Pennsylvania

### Abstract

**Purpose**—To gauge internal medicine (IM) trainees' perceptions regarding aspects of their inpatient rotations, including supervision and educational opportunities, the perceived effect of duty hours regulations on quality of patient care, the causes of medical errors, and sleep.

**Method**—The authors analyzed the results of questionnaires administered to trainees following the October 2009 IM In-Training Examination (IM-ITE).

**Results**—Of the 21,768 IM trainees in post-graduate years 1 through 3 who took the IM-ITE, 18,272 (83.9%) responded. The majority of these trainees (87.7%) reported that supervision was adequate, and nearly half (46.3%) reported insufficient or minimal time to participate in learning activities. Two-thirds or more of medicine trainees thought specific work regulations such as limited shift length and more time off after nights and extended shifts would at least “occasionally,” if not “usually” or “always,” improve patient care. IM trainees at least “occasionally” attributed errors to workload (68.8% of respondents), fatigue (66.9%), inexperience or lack of knowledge (61.0%), incomplete handoffs (60.2%), and insufficient ancillary staff (53.5%). IM trainees' sleep hours were limited during extended and overnight shifts.

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Correspondence should be addressed to Judy A. Shea, Ph.D., Associate Dean for Medical Education Research, Perelman School of Medicine at the University of Pennsylvania, 1223 Blockley Hall, 423 Guardian Drive, Philadelphia, PA 19104-6021; telephone: (215) 573-5111; fax: (215) 573-8778; sheaja@mail.med.upenn.edu.

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**Conclusions**—IM trainees agree that limited educational opportunities are the weakest part of the average inpatient rotation. Few have complaints about the adequacy of supervision. These trainees' optimism regarding the positive influence of potential work-hour restrictions on patient care and their views of likely causes of medical errors suggest the need for innovative patient care schedules and education curricula.

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In July 2003, residency and fellowship programs in all specialties began to implement the new duty hours rules put into place by the Accreditation Council for Graduate Medical Education (ACGME). These duty hours standards have been referred to in the popular lexicon as “the 80-hour work week,” due to the requirement that trainees' duty hours be limited to 80 hours per week, averaged over a four-week period inclusive of all in-house call activities (unless programs were awarded an exception).<sup>1</sup> In light of a 2009 report from the Institute of Medicine (IOM) regarding resident sleep and patient safety,<sup>2</sup> the ACGME re-evaluated its 2003 rules and proposed new duty hours standards for July 2011. After extensive debate about a number of proposed additional restrictions to the duty hours, the ACGME has restricted shift duration to 16 hours for interns and put greater emphasis on supervision requirements, but has retained the 80 hours limit per week.<sup>3</sup> The intended results of both the 2003 and 2011 regulations are improved patient safety and improved trainee education and well-being. While there is some opportunity for the ACGME to award exceptions to a limited number of programs, in general, the ACGME's Common Program Requirements take a one-size-fits-all approach.

In the years since the implementation of the 2003 duty hours standards, a number of studies have assessed trainees' reactions to the changes in duty hours; however, many of these studies represent the views of trainees from just a single specialty or institution, and many of them included trainees who began training before the implementation of the 2003 regulations. Clearly, their before and after views of their inpatient rotations could color their impressions. Nevertheless, there have been some common themes. In general, trainees report fewer errors due to fatigue, but more worries about decreased continuity of care. They also report lower rates of fatigue and burnout than prior to the implementation of the duty hours regulations.<sup>4,5</sup> Other studies looking at trainees' opinions of and satisfaction with the (2003) duty hours are mixed<sup>6–11</sup>; for example, in one study across four specialties the dominant response to duty hours was positive,<sup>11</sup> whereas other researchers report few or small observed differences.<sup>6,8,9</sup> Finally, another team of investigators recently queried a nationwide sample of trainees.<sup>12</sup> Although the sample covered many specialties, the response rate was only 22% and the focus of the report was restricted to effects of specific elements in the newly released Common Program Requirements. To our knowledge, no study has queried post-2003 trainees' perceptions about a range of issues that are important to training, including, but also going beyond, duty hours. As the graduate medical education community implements the new 2011 regulations, an assessment of trainees' perceptions of their learning environment including supervision, duty hours, and quality of care, could prove instructive.

Thus, we partnered with the American College of Physicians and the American Board of Surgery to embed survey items within the in-training examinations (ITEs), giving us the opportunity to describe trainees' perceptions of the 2009–2010 training environment in terms of : (1) the quality of the average inpatient rotation in terms of supervision, patient load, time for learning and patient care, and training in specific areas; (2) the likely effects that possible changes in duty hours would have on the quality of patient care; (3) the perceived causes of medical errors involving trainees; and (4) the amount of sleep trainees are getting. We also asked internal medicine (IM) and surgery trainees about the amount of training they received in error reduction and quality improvement. We have published the

results for the surgery trainees elsewhere<sup>13,14</sup> and will refer to them in the conclusion section.

## Method

In October 2009, all IM trainees taking the IM-ITE received a set of survey items upon completion of their examination. The instructions informed trainees that completion of the survey was voluntary and independent of evaluation, and that individual responses were confidential and would not be linked with personal, identifiable information in the analytic file. The American College of Physicians administered the 2009 IM-ITE to 21,768 trainees in post-graduate years 1 through 3.

After reviewing literature since the implementation of the 2003 duty hours regulations, IM-ITE steering committee members and members of the study team drafted items for the survey. Next they reviewed, reworked, and shortened the initial items over multiple iterations. Committee members who did not participate in writing the items reviewed them for clarity and relevance. Acting on a need for brevity, a subgroup consisting of representatives from the American College of Physicians, the Alliance for Academic Internal Medicine, and the University of Pennsylvania chose by consensus a select number of items for the final survey. Questions on the survey asked IM trainees to do each of the following:

- to evaluate their average inpatient rotation relative to the adequacy of supervision, patient load, time available for learning and patient care, and training in specific skills (rated on a scale of 1 to 5 where 1 = very insufficient, 2 = insufficient, 3 = adequate, 4 = excessive, 5 = very excessive);
- to indicate the degree to which they believe several proposed duty-hours-related measures would improve the quality of patient care (rated on a scale of 1 to 5 where 1 = never, 2 = rarely, 3 = occasionally, 4 = usually, 5 = always);
- to note the frequency of various causes of trainee-involved medical errors (rated on a scale of 1 to 5 where 1 = never, 2 = rarely, 3 = occasionally, 4 = usually, 5 = always); and
- to report the amount of sleep they get on various days of the call cycle (none, 1–2 hours, 3–4 hours, 5–6 hours, 7+ hours).

To ease interpretation and to signal general positive or negative valences, we collapsed ratings of “very insufficient” and “insufficient,” and of “sufficient” and “very sufficient” for average inpatient rotation. For responses regarding quality and errors we collapsed the options of “occasionally,” “usually,” and “always.”

Analyses consisted of descriptive statistics showing distributions. We combined data for all IM trainees from post-graduate years 1–3 as effect sizes<sup>15</sup> comparing them by years averaged 0.00 (range: –0.17 to +0.33) and because we detected no consistent trends. We used SPSS (version 16, Armonk NY) for all analyses. The analytic file did not include any personal or program-level identifiers, demographics, or examination data. The University of Pennsylvania Institutional Review Board approved this study.

## Results

Of the 21,678 IM trainees who took the IM-ITE, a total of 18,272 (83.9%) completed the survey: 6,025, 6,386, and 5,861 trainees in, respectively, post-graduate year 1, 2, and 3.

### Supervision, patient load, time for learning and patient care, and training

The overwhelming majority of responding IM trainees (87.7%; 15,636/17,828) rated the supervision they received as “adequate” (Table 1). About one quarter (26.0%; 4,637/17,810) thought the number of patients admitted was excessive or very excessive, and about a third (32.2%; 5,731/17,781) felt there was insufficient time to complete patient care responsibilities. Nearly half of the trainees (46.3%; 8,235/17,780) reported insufficient or minimal time to participate in learning activities.

The majority of responding IM trainees indicated that they received the right amount of training in each of the following four areas: error reduction/reporting (72.1%, 12,733/17,670), quality improvement (77.7%, 13,732/17,665), handoffs (79.3%, 13,982/17,639), and patient safety (85.2%, 15,024/17,636).

### Duty hours and improvements in quality of care

At least two thirds of the responding IM trainees thought each duty hours measure would improve patient care at least “occasionally” if not “usually” or “always”—with one exception: only 33.2% (n = 5,664/17,065) thought eliminating moonlighting would improve quality of care (Table 2). Responding IM trainees believed the two duty hours regulations that would have the greatest effect on the quality of patient care would be increasing the number of hours off after nights and extended shifts (83.1%, 14,482/17,432) and limiting shift length to 16 hours (78.4%, 13,714/17,482).

### Safety and medical errors

As Table 3 indicates, more than half of the IM trainees thought errors were at least “occasionally” caused by excessive workload (68.8%, 12,215/17,747), resident fatigue (66.9%, 11,840/17,686), inexperience or lack of knowledge (61.0%, 10,837/17,754), incomplete handoffs (60.2%, 10,608/17,631), and insufficient ancillary staff (53.5%, 9,426/17,620).

### Sleep

Table 4 shows the amount of sleep trainees report getting on different days in a call cycle. During extended shifts, nearly one in three IM trainees (30.2%, 5,164/17,103) reported getting 5 or more hours of sleep. However, many (16.4%, 2,807/17,103) reported no sleep. Responses were very similar for sleep during night floats: a quarter of responding trainees (25.0%, 3,760/15,014) reported receiving no sleep, and more than a quarter (28.1%, 4,214/15,014) reported getting only 1 to 2 hours of sleep. This compares with more than three-quarters of all trainees who reported sleeping 7+ hours on their days off (87.2%, 14,531/16,659).

### Discussion and Conclusions

The results of our national survey of IM trainees with its extremely high response rate point to a number of conclusions about their perceptions of the current training environment. First, IM trainees have few complaints about the multiple aspects of their average inpatient rotations. They are particularly satisfied with the supervision of attending physicians. Inadequate time for educational activities was their largest complaint, which is consistent with findings noted in many earlier reports.<sup>4,5</sup> Time for education activities is not likely to increase under the new requirements. Second, IM trainees viewed changes to the quality of medical care as a result of proposed duty hours restrictions somewhat favorably. Third, they viewed handoffs, which the new ACGME regulations explicitly address,<sup>3</sup> as well as inexperience as at least occasional causes of medical errors. Fourth, consistent with other reports,<sup>16,17</sup> most trainees get some, though little, sleep when they are on extended shifts or

a night shift. Whether trainees' sleep will increase under the 2011 standards is unclear, given that the total hours worked per week will remain capped at 80.

As mentioned, during the 2009–2010 academic year, we administered a similar survey to surgery trainees. Those results, reported elsewhere,<sup>13,14</sup> suggest that in many areas explored in the surveys, IM trainees' views differed from those of their surgery counterparts. For example, compared to their surgery counterparts, IM trainees showed more optimism for the effects of some of the debated changes in the duty hours regulations on patient safety (e.g., the majority of surgery trainees selected “not at all” or “to a small extent” when asked if reducing the cap from 80 hours per week would increase patient safety); they were more likely to perceive that issues such as fatigue and supervision contribute to patient errors (most surgery trainees indicated these potential factors were “never” or “rarely” a cause); and they get more sleep. These differences suggest that efforts to apply a one-size-fits-all approach to modifying the duty hours standards or to setting new standards in realms such as supervision may be ill-advised. The work and learning environment preferences, expectations, and demands are quite different between these two specialties. That said, both surgery and IM trainees generally agreed that supervision is adequate whereas time for educational activities is often limited, and that handoffs and inexperience contribute to errors.

One take on these results is that IM trainees are largely satisfied with their training environments. They rated multiple features, including supervision, as adequate. On the other hand they consistently indicated that at least occasionally, changes in duty hours would improve quality of care. These perceptions regarding effects on the quality of care are inconsistent with the growing literature showing that, on balance, in the first few years post-2003 reform, there were no significant increases in mortality and possibly some slight benefits for medical (though not surgical) patients in several large patient databases.<sup>18–20</sup> More recent reports have failed to find clinically important differences before and after duty hours restrictions in multiple areas: between patients receiving nighttime operations (i.e., after 16 hours of work) as compared to daytime,<sup>21</sup> in complication rates between patients operated on for emergency laparoscopy,<sup>22</sup> in rates of patient safety indicators,<sup>23</sup> in intensive care unit mortality,<sup>24</sup> in the proportion of patients with prolonged length of stay,<sup>25</sup> in readmission rates,<sup>26</sup> and in the outcomes for general and vascular surgery patients.<sup>27</sup>

Many of the early duty-hours studies compared the responses of trainees who had experienced only the 2003 regulations with those of trainees who had been intern and junior trainees prior to 2003 and were senior residents in the new era,<sup>28–30</sup> thus making it difficult to know whether elicited opinions reflected differences in views that may come with advanced training vs. feelings resulting directly from the changed duty hours standards. For our study, all trainee respondents had entered their training post-2003 reforms. However, in many ways the results are consistent with earlier surveys based on local samples. For example, one study of IM and surgical trainees in five academic medical centers,<sup>4</sup> reported concerns regarding opportunities for formal education and bedside learning. Other early studies of trainees were more limited in the number and diversity of respondents, but their findings reinforce the conclusion that, among trainees, early opinions regarding duty hours were quite mixed.<sup>6–11</sup>

Overall, these results—based on surveys completed by nearly all IM trainees who took the fall 2009 IM-ITE—leave the academic medicine community with several provocative questions for further study. For example, why is there so little agreement in trainees' opinions of the commonly discussed culprits of inadequate supervision and fatigue as safety issues, when leaders in the fields consistently have pointed to both? What new types of team

and rotation assignments can dually address concerns about inadequate educational time and excessive workload? Will the 2011 duty hours standards improve the quality of care?

Another important question is Will the new regulations help post-graduate trainees get more sleep? The majority of our respondents reported that they sleep for 2 hours or less while on extended shifts. When programs implement the 2011 regulations, time for extended sleep will no longer be an issue for interns, but getting adequate sleep remains quite relevant for non-intern trainees who will still be required to work extended work shifts of up to 30 hours. Clearly, trainees are getting at least the recommended 7 to 8 hours of sleep when they are off-duty, but even this off-duty sleep may not be enough to preclude chronic sleep deprivation. Efforts to add sleep hygiene to the professionalism curricula should be studied. Likewise, examining how the effects of fatigue vary according to the nature of the task should be an area for future study.

Our study has several limitations to consider. First, we did not validate the self-report of trainees' perceptions. Actual causes of errors and factors that affect patient care may differ from trainee perceptions of those issues. Second, many of the ACGME duty hours changes mentioned in the survey are not, in fact, in the final regulations; nevertheless, these debates are likely not over, and knowing what trainees think about the many elements under consideration will be valuable going forward. Third, the survey items were at the end of a long exam; thus, trainees may not have been as thoughtful as they might have been had they completed the short survey at a separate time. Finally, these results represent the views of trainees of just one specialty. While there are some similarities to surgery trainees,<sup>13,14</sup> there is no reason to think these responses are generalizable to other specialties. However, the large number of respondents does support the credibility of our results.

In summary, this national sample with a high response rate indicates that in late 2009 IM trainees were generally satisfied with most aspects of their inpatient training environment, with the exception of the time available for educational activities. The trainees thought supervision was adequate, and they were somewhat optimistic regarding the effects of the proposed restrictions in duty hours on quality of care. While trainee opinions are important and likely reflect their experiences, further careful assessment of the affects of the 2011 duty hours standards on a variety of outcomes including education, quality, and patient safety will be important in guiding further efforts to improve both the process of training medical school graduates in varying specialties and the quality of care they provide.

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## References

1. Philibert I, Friedman P, Williams WT. Accreditation Council for Graduate Medical Education (ACGME) Work Group on Resident Duty Hours, ACGME. New requirements for resident duty hours. *JAMA*. 2002; 288:1112–1114. [PubMed: 12204081]
2. Ulmer, C.; Wolman, DM.; Johns, MME., editors. *Resident Duty Hours: Enhancing Sleep, Supervision, and Safety*. Washington DC: National Academies Press; 2009.
3. Nasca TJ, Day SH, Amis ES Jr. Accreditation Council for Graduate Medical Education (ACGME) Duty Hour Task Force. The new recommendations on duty hours from the ACGME task force. *N Engl J Med*. 2010; 363:e3. [PubMed: 20573917]
4. Myers JS, Bellini LM, Morris JB, et al. Internal medicine and general surgery residents' attitudes about the ACGME duty hour regulations: A multicenter study. *Acad Med*. 2006; 81:1052–1058. [PubMed: 17122468]

5. Irani JL, Mello MM, Ashley SW, Whang EE, Zinner MJ, Breen E. Surgical residents' perceptions of the effects of the ACGME duty hour requirements 1 year after implementation. *Surgery*. 2005; 138:246–253. [PubMed: 16153433]
6. Jagsi R, Shapiro J, Weissman JS, Dorer DJ, Weinstein DF. The educational impact of ACGME limits on resident and fellow duty hours: A pre-post survey study. *Acad Med*. 2006; 81:1059–1068. [PubMed: 17122470]
7. Ratanawongsa N, Bolen S, Howell EE, Kern DE, Sisson SD, Larriviere D. Residents' perceptions of professionalism in training and practice: Barriers, promoters and duty hour requirements. *J Gen Intern Med*. 2006; 21:758–763. [PubMed: 16808778]
8. Kashner TM, Henley SS, Golden RM, et al. Studying the effect of the ACGME duty hour limits on resident satisfaction: Results from VA learners' perceptions survey. *Acad Med*. 2010; 85:1130–1139. [PubMed: 20592508]
9. Landrigan CP, Fahrenkopf AM, Lewin D, et al. Effects of Accreditation Council for Graduate Medical Education duty hour limits on sleep, work hours and safety. *Pediatrics*. 2008; 122:250–258. [PubMed: 18676540]
10. Zonia SC, LaBaere RJ 2nd, Stommel M, Tomaszewski DD. Resident attitudes regarding the impact of the 80-duty-hours work standards. *J Am Osteopath Assoc*. 2005; 105:307–313. [PubMed: 16157519]
11. Lin GA, Beck DC, Stewart AL, Garbutt JM. Resident perceptions of the impact of work hour limitations. *J Gen Intern Med*. 2007; 22:969–975. [PubMed: 17468888]
12. Drolet BC, Spalluto LB, Fischer SA. Residents' perceptions on ACGME regulation of supervision and duty hours—A national survey. *N Engl J Med*. 2010; 363:e34. [PubMed: 21121827]
13. Borman KR, Biester TW, Jones AT, Shea JA. Sleep, supervision, education and service: Views of junior and senior residents. *J Surg Educ*. 2011; 68:495–501. [PubMed: 22000536]
14. Borman KR, Jones AT, Shea JA. Duty hours, quality of care, and patient safety: General surgery resident perceptions. *J Am Coll Surg*. Feb.2012 accepted for publication.
15. Colliver JA. Call for greater emphasis on effect-size measures in published articles in *Teaching and Learning in Medicine*. *Teach Learn Med*. 2002; 14:206–210. [PubMed: 12395480]
16. Arora V, Dunphy C, Chang VY, Ahmad F, Humphrey HJ, Meltzer D. The effects of on-duty napping on intern sleep time and fatigue. *Ann Intern Med*. 2006; 144:792–798. [PubMed: 16754921]
17. Richardson GS, Wyatt JK, Sullivan JP, et al. Objective assessment of sleep and alertness in medical house-staff and the impact of protected time for sleep. *Sleep*. 1996; 19:718–726. [PubMed: 9122559]
18. Shetty KD, Bhattacharya J. Changes in hospital mortality associated with residency work-hour regulations. *Ann Intern Med*. 2007; 147:73–80. [PubMed: 17548403]
19. Volpp KG, Rosen AK, Rosenbaum PR, et al. Mortality among patients in VA hospitals in the first 2 years following ACGME resident duty hour reform. *JAMA*. 2007; 298:984–992. [PubMed: 17785643]
20. Volpp KG, Rosen AK, Rosenbaum PR, et al. Mortality among hospitalized Medicare beneficiaries in the first 2 years following ACGME resident duty hour reform. *JAMA*. 2007; 298:975–983. [PubMed: 17785642]
21. Yaghoobian A, Kaji AH, Ishaque B, et al. Acute care surgery performed by sleep deprived residents: Are outcomes affected? *J Surg Res*. 2010; 163:192–196. [PubMed: 20655546]
22. Naylor RA, Rege RV, Valentine RJ. Do resident duty hour restrictions reduce technical complications of emergency laparoscopic cholecystectomy? *J Am Coll Surg*. 2005; 201:724–731. [PubMed: 16256915]
23. Rosen AK, Loveland SA, Romano PS, et al. Effects of resident duty hour reform on surgical and procedural patient safety indicators among hospitalized Veterans Health Administration and Medicare patients. *Med Care*. 2009; 47:723–731. [PubMed: 19536029]
24. Prasad M, Iwashyna TJ, Christie JD, et al. Effect of work-hour regulations on intensive care unit mortality in United States teaching hospitals. *Crit Care Med*. 2009; 37:2564–2569. [PubMed: 19623042]

25. Silber JH, Rosenbaum PR, Rosen AK, et al. Prolonged hospital stay and the resident duty hour rules of 2003. *Med Care.* 2009; 47:1191–1200. [PubMed: 19786912]
26. Press MJ, Silber JH, Rosen AK, et al. The impact of resident duty hour reform on hospital readmission rates among Medicare beneficiaries. *J Gen Intern Med.* 2010; 26:405–411. [PubMed: 21057883]
27. Kaafarani HM, Itani KMF, Petersen LA, Thornby J, Berger DH. Does resident hours reduction have an impact on surgical outcomes? *J Surg Res.* 2005; 126:167–171. [PubMed: 15919415]
28. Coverdill JE, Adrales L, Finlay W, et al. How surgical faculty and residents assess the first year of the Accreditation Council for Graduate Medical Education duty-hour restrictions: Results of a multi-institutional study. *Am J Surg.* 2006; 191:11–16. [PubMed: 16399099]
29. Immerman I, Kubiak EN, Zuckerman JD. Resident work-hour rules: A survey of residents' and program directors' opinions and attitudes. *Am J Orthop (Belle Mead NJ).* 2007; 36:E172–9. [PubMed: 18264560]
30. Whang EE, Perez A, Ito H, Mello MM, Ashley SW, Zinner MJ. Work-hour reform: Perceptions and desires of contemporary surgical residents. *J Am Coll Surg.* 2003; 197:624–630. [PubMed: 14522334]



**Table 1**  
Internal Medicine Trainees' Ratings of the Adequacy of Supervision, Patient Load, and Other Aspects of Inpatient Rotations, 2009

Category	No. responding to question	No. (%) selecting "Very insufficient" or "Insufficient"*	No. (%) selecting "Adequate"	No. (%) selecting "Excessive" or "Very excessive"
Supervision by attending physician	17,828	1,400 (7.9)	15,636 (87.7)	792 (4.4)
Number of patients to meet learning needs	17,813	720 (4.0)	14,013 (78.7)	3,080 (17.3)
Number of patients admitted	17,810	392 (2.2)	12,781 (71.8)	4,637 (26.0)
Workload	17,713	195 (1.1)	12,250 (69.2)	5,268 (29.7)
Time available to complete patient care responsibilities	17,781	5,731 (32.2)	11,507 (64.7)	543 (3.1)
Time available to participate in learning activities	17,780	8,235 (46.3)	9,258 (52.1)	287 (1.6)

\* Items were rated on a scale where 1 = very insufficient, 2 = insufficient, 3 = adequate, 4 = excessive, 5 = very excessive. Options 1 and 2 were collapsed for analyses as were options 4 and 5.

Table 2

Internal Medicine Trainees' Perceptions of How the Proposed Changes in Duty Hours Regulations Would Improve Quality of Care, 2009

Proposed regulation:	No. responding to the question	No. (%) responding "Never"	No. (%) responding "Rarely"	No. (%) responding "Occasionally," "Usually," or "Always"*
Reducing the cap from 80 hours per week	17,476	2,061 (11.8)	3,431 (19.6)	11,984 (68.6)
Limiting shift length to 16 hours	17,482	1,319 (7.5)	2,449 (14.0)	13,714 (78.4)
Requiring naps during 30 hour shifts	17,360	2,321 (13.4)	2,613 (15.1)	12,426 (71.6)
Increasing hours off after nights and extended shifts	17,432	920 (5.3)	2,030 (11.6)	14,482 (83.1)
Enforcing the 80-hour rule each week instead of averaging over 4 weeks	17,434	1,412 (8.1)	2,910 (16.7)	13,112 (75.2)
Instituting 24/7 in-house attending supervision	17,476	1,561 (8.9)	4,030 (23.1)	11,885 (68.0)
Eliminating moonlighting	17,065	5,567 (32.6)	5,834 (34.2)	5,664 (33.2)
Reducing the maximum number of patients covered by a resident	17,503	1,337 (7.6)	3,272 (18.7)	12,894 (73.7)

\* Items were rated on a scale where 1 = never, 2 = rarely, 3 = occasionally, 4 = usually, 5 = always. Options 3, 4 and 5 were collapsed for analyses. Percentages do not all equal 100 due to rounding.

**Table 3**

Summary of Internal Medicine Trainees' Perceptions on Causes of Medical Errors Involving Residents, 2009

Cause of medical error	No. responding to the question	No. (%) responding "Never"	No. (%) responding "Rarely"	No. (%) responding "Occasionally," "Usually," or "Always,"*
Inadequate supervision	17,755	2,422 (13.6)	7,605 (42.8)	7,728 (43.5)
Incomplete handoffs	17,631	1,428 (8.1)	5,595 (31.7)	10,608 (60.2)
Resident fatigue	17,686	980 (5.5)	4,866 (27.5)	11,840 (66.9)
Insufficient ancillary staff	17,620	1,952 (11.1)	6,242 (35.4)	9,426 (53.5)
Inexperience or lack of knowledge	17,754	1,063 (6.0)	5,854 (33.0)	10,837 (61.0)
Excessive workload	17,757	1,005 (5.7)	4,537 (25.5)	12,215 (68.8)
Inadequate electronic medical records	17,659	3,609 (20.4)	7,191 (40.7)	6,859 (38.8)

\* Items were rated on a scale where 1 = never, 2 = rarely, 3 = occasionally, 4 = usually, 5 = always. Options 3, 4 and 5 were collapsed for analyses. Percentages do not all equal 100 due to rounding.

**Table 4**  
Internal Medicine Trainees' Self-Reported Typical Sleep on Multiple Call Cycle Days, 2009

Amount of sleep during...	No. responding to the question	No. (%) reporting no sleep	No. (%) reporting 1-2 hours of sleep	No. (%) reporting 3-4 hours of sleep	No. (%) reporting 5-6 hours of sleep	No. (%) reporting 7+ hours of sleep
Extended shifts	17,103	2,807 (16.4)	5,929 (34.7)	3,203 (18.7)	4,226 (24.7)	938 (5.5)
Night float	15,014	3,760 (25.0)	4,214 (28.1)	1,860 (12.4)	3,653 (24.3)	1,527 (10.2)
Days off	16,659	176 (1.1)	68 (0.4)	133 (0.8)	1,751 (10.5)	14,531 (87.2)