Work Hour Regulations: Do We Need Further Changes Now? A Survey of Internal Medicine Faculty and Residents

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Abstract

Background In 2003, the Accreditation Council for Graduate Medical Education standardized and regulated work hours for physicians in training in the United States. In December 2008, the Institute of Medicine (IOM) recommended further reductions in duty hours to ensure safer conditions for patients and residents and fellows. Significantly, the IOM committee acknowledged that there are barriers to implementing its recommendations.

Methods In the wake of the IOM proposals, we chose to survey a reference closer to home: residency program directors, faculty, and residents. Our survey allowed them the opportunity to express their opinions regarding the IOM proposals.

Results The majority of the faculty oppose the proposed IOM changes, arguing that there is no definite evidence to support the hypothesis that fewer work hours mean better outcomes in patient safety and education. First-year residents and residents who moonlight were more likely to experience stress and to support decreased work hours.

Conclusions The thoughts and opinions of faculty and residents collected through this survey, in combination with evidence-based studies from trial implementation of these standards, will contribute real answers to the challenging questions on resident work hours.

Introduction

In 2003, the Accreditation Council for Graduate Medical Education (ACGME) set common limits on duty hours for physicians in training throughout the United States. In December 2008, the Institute of Medicine (IOM) recommended that further reductions in duty hours be undertaken to ensure that hospitals provide safer conditions for patients and trainees.[1] The IOM referenced the science of sleep deprivation and performance as the foundation on which their recommended limits were based.[2–5] The IOM also acknowledged barriers to implementing these recommendations, the 2 most significant of which were their cost and the challenge of recruiting sufficient numbers of health professionals to assume duties currently performed by residents.[1,6] In the wake of the IOM report, we chose to implement a survey with a reference closer to home: the residency program directors, faculty, and residents. Our survey allowed them the opportunity to express their opinions regarding the IOM proposals.

Methods

The sampling frame consisted of all accredited US internal medicine residency programs with published e-mail addresses (N = 378). An invitation explaining the purpose of the survey was sent by e-mail to each program director; the invitation contained a link to the online resident survey. Respondents also were asked to distribute an online link to residents in their programs.

The survey was conducted between January 29 and February 27, 2009, and responses were received from 142 of 378 active programs for an effective response rate of 38.8% (12 e-mails were returned because nonexistent addresses). Two hundred ninety-four resident surveys were completed online; no response rate is available given that the survey was anonymous and residents' program affiliation was not tracked.

Results

Demographic information about programs and responding faculty and residents is shown in TABLE 1. TABLE 2 shows participants' perspectives on the current ACGME limits and the IOM committee recommendations. Fifty-two percent of faculty perceived that the ACGME duty hour limits

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TABLE 1 **Characteristics of Respondents**

	Faculty Responding, % (N = 142)	Residents Responding, % (N = 294)
Role of faculty respondent[a]	(n = 139)[b]	
Program director	50.4	
Associate program director	25.9	
Faculty	18.7	
Other (eg, designated institutional officer)	5.1	
Policy during training[a]	(n = 140)[b]	
No restrictions	77.9	
80-hour week restrictions	22.1	
Resident's level of training[c]		(n = 294)
PGY-4		3.2
PGY-3		25.9
PGY-2		32.2
PGY-1		38.7
Size (no. of residents)	(n = 141)[b]	(n = 294)
Less than 20	2.8	3.7
20–39	30.5	30.6
40–60	19.9	22.1
61 or more	46.8	43.5
Night float system	(n = 141)[b]	(n = 294)
	84.4	85.6
Resident moonlighting permitted[a]	(n = 140)[b]	
Permitted throughout residency	52.9	
Not permitted at all	29.3	
Not permitted in PGY-1	15.0	
Not permitted in PGY-2	2.8	
Form of moonlighting permitted[d]	(n = 99)	(n = 156)
Internal only	34.3	39.1
External only	21.2	21.1
Both	44.4	39.8
Resident currently moonlighting[c]		(n = 239)
		14.2

Abbreviation: PGY, postgraduate year.

[a] Question asked only of faculty.
[b] The n values for the question excludes missing cases because of item nonresponse.
[c] Question asked only of residents.
[d] The n is based on respondents in programs where moonlighting is permitted.

currently in effect have resulted in a decline in the quality of residency training, 31.9% reported no change, and 15.9% perceived improved training quality. Perceptions differed by program size: larger programs were more polarized (either positive or negative about the work regulations) than smaller programs ($\chi^2 = 9.52$, $P = .009$). Respondents' own training influenced their assessment, with faculty who trained prior to duty hour limits more negative in their perceptions than those educated under an 80-hour limit ($\chi^2 = 17.69$, $P < .001$). The greatest improvements perceived were a reduction of resident fatigue (60.4%) and increased resident satisfaction with training (36.0%). Positive effects did not differ across program size. However, faculty who trained under the 80-hour regulations were significantly more likely to cite positive effects.

A decrease in residents' ownership of their patients (83.8%) was the most widespread reported negative effect of the limits. Other negative perceptions included the belief that additional free time was not used for education or research (70.8%), increased patient errors related to handoffs (51.5%), and perceived decline in patient satisfaction (50.0%).

Respondents anticipated significant effects from an implementation of the proposed reductions in maximum shift length (87.8%), night call frequency (85.9%), time off per month (85.1%) and, to a lesser degree, minimum rest time between shifts (65.2%), as shown in TABLE 3. Three-fourths (77.1%) of faculty respondents anticipated an increase in the number of residents who comply with the proposed changes, and the majority (93.0%) expect that hospitalists and nurse practitioners will pick up the additional clinical workload. Three-fourths (77.0%) expect that the proposed changes may require a lengthened residency to provide adequate patient exposure, and 68.3% reported fear that this increase would result in fewer students choosing internal medicine. Additional comments were volunteered by 47 faculty respondents, who voiced

TABLE 2 **Perceptions of Current Work Hours Regulations**

	Total Faculty, %	Size of Programs, %			Faculty Training Experience, %		
		60 or Less	61 or More	*P* Value[a]	No Regulation	80 Hours	*P* Value[a]
	(N = 142)	(n = 73)	(n = 66)		(n = 109)	(n = 31)	
Effect of current regulations on training (n = 138)[b]				.009			<.001
Quality has deteriorated	52.5	45.1	59.1		61.3	22.6	
No change	31.9	43.7	19.7		28.3	41.9	
Quality has improved	15.9	11.3	21.2		10.4	35.5	
Improvements in resident training (n = 139)[b]							
Reduced resident fatigue	60.4	57.5	64.6	.39	60.0	60.7	.94
Increased satisfaction re: training	36.0	38.4	33.8	.58	29.7	56.7	.005
Improved patient care	8.6	11.0	6.2	.32	4.7	23.3	.001
Decreased patient errors	7.9	8.2	7.7	.91	2.8	26.7	<.001
Hours used for resident education	6.5	6.8	6.2	.87	3.7	16.7	.012
Deterioration in resident training (n = 130)[b]							
Lack of patient "ownership"	83.8	85.5	81.7	.56	86.3	73.1	.11
Hours not used for education	70.8	65.2	78.3	.10	74.5	57.7	.09
Increase patient errors re: handoffs	51.5	55.1	48.3	.45	48.0	65.4	.11
Decreased patient satisfaction	50.0	50.7	50.0	.94	50.0	51.0	.93
Decreased satisfaction re: training	18.5	20.3	16.7	.59	20.6	11.5	.29

[a] From χ^2 tests.
[b] The n values for the question exclude missing cases because of item nonresponse.

further concerns about quality of care, preparation for practice, and a negative effect on resident training.

Most (70.9%) resident respondents were in their first 2 years of training. Faculty and resident respondents were similar in terms of program size and moonlighting policy (TABLE 4). Less than half (43.9%) of the residents reported they experienced severe fatigue once a month or more that interfered with patient care. Fatigue was most likely among first-year residents. Forty-eight percent of residents reported that they had experienced a severe stress reaction once or more a month, with long work hours (66.4%) and patient load (60.2%) the most frequently mentioned sources of stress. Residents who moonlighted were more likely to report having experienced stress reactions attributed to their patient load and work environment.

A majority (61.8%) of residents regard the current ACGME regulations as providing a balance of service and education (TABLE 5), and residents are split regarding whether further decreases in work hours would result in positive or negative effects for training; senior residents tended to be more negative in their expectations. Residents anticipated that the reductions would result in more time for research (81.6%) and less fatigue (74.8%), but would be accompanied by an increase in patient handoffs (74.0%).

Discussion

Eighty-eight percent of faculty respondents were against the IOM recommended limits, commenting on the lack of evidence supporting a relationship between work hour limits and improved outcomes in patient safety or education. Respondents reported that the limits would lead to more handoffs and diminished patient ownership, with this fragmentation of care having a potential for adverse effect on quality and safety. Some respondents raised

TABLE 3 **Anticipated Outcomes of Proposed Changes to Residency Hours**

	Total Faculty, % (N = 142)	Size of Programs, %		*P* Value[a]
		60 or Less (n = 73)	61 or More (n = 66)	
Effect of proposed regulations on training (n =140)[b]				.82
Adverse effect on training	87.9	86.3	89.4	
Improve training	6.4	6.8	4.5	
No impact	5.7	6.8	6.1	
Ability to comply with regulations with same number of residents (n = 140)[b]				.38
No	77.1	74.0	80.3	
Yes	22.9	26.0	19.7	
How will comply with proposed regulations (n = 128)[b]				.024
Hire more hospitalists/nurse practitioners	93.0	88.1	98.3	
Core faculty will pick up patient load	7.0	11.9	1.7	
Change to length of residency (n = 139)[b]				.64
Need to increase for patient exposure	77.0	78.4	75.0	
No change; patient exposure adequate	23.0	21.6	25.0	
Longer training will reduce choice of internal medicine (n = 142)				.57
Few students will choose medicine	68.3	72.0	63.6	
No change	30.3	26.7	34.8	
More students will choose medicine	1.4	1.3	1.5	
Institution will cut funding due to decreased patient care by residents (n = 140)[b]				.41
No	55.7	52.1	59.1	
Yes	44.3	47.9	40.9	
Additional comments regarding proposed changes (n = 47)[c]				
Decreased quality of care	29.8			
Decreased preparation for practice	27.7			
Negative effect on resident education	23.4			
Decreased patient ownership	17.0			
Increased manpower or length of residency training required	17.0			
Increased handoffs and errors	12.8			
Change would be positive	10.6			

[a] From χ^2 tests.
[b] The n values for the question excludes missing cases because of item nonresponse.
[c] Responses to question, "Are there specific comments that you would want to include in the proposed work hour rules that have not been address in this questionnaire?" Percentages based on number of respondents providing a comment.

TABLE 4 **Fatigue and Stress amongst Residents Currently Training**

	Total Residents, %	Training Level, %				Currently Moonlighting, %		
		PGY-1	PGY-2	PGY-3/4		Yes	No	
	(N = 294)	(n = 113)	(n = 94)	(n = 85)	*P* Value[a]	(n = 34)	(n = 260)	*P* Value[a]
Experienced severe fatigue on call that threatened patient care (n = 294)					.005			.12
Three or more times a month	16.7	23.0	12.8	12.9		18.1	13.5	
Once or twice a month	27.2	31.0	33.0	16.5		28.8	23.6	
Less than once a month/never	56.1	46.0	54.3	70.6		53.1	62.9	
Experienced severe stress reaction (n = 292)[b]					.11			.044
Three or more times a month	19.2	24.1	20.4	11.8		22.7	11.2	
Once or twice a month	28.8	32.1	23.7	30.6		29.6	27.0	
Less than once a month/never	52.0	43.8	55.9	57.6		47.7	61.8	
Sources of stress reaction (n = 294)								
Fatigue due to long work hours	66.4	76.3	65.3	52.9	.007	66.7	65.7	.88
Too many patients	60.2	68.0	61.8	47.1	.023	65.9	44.6	.003
Work environment	52.7	53.7	58.9	45.7	.28	56.9	41.5	.034
Personal reasons	26.2	24.1	25.0	35.2	.28	26.8	31.7	.46

[a] From χ^2 tests.
[b] The n values for the question exclude missing cases because of item nonresponse.

concerns over inability to recruit qualified individuals into internal medicine residency programs, greater financial demands, lack of faculty, and so forth, potentially leading to the closing of more residency programs. The 18% who commented positively toward the IOM proposals noted that successful implementation will require the development of improved handoff systems. Although concerns were shared by the majority of faculty, program directors and faculty who completed their own residency prior to duty hour limits were more likely to perceive negative consequences. Faculty who trained under the 80-hour system were more enthusiastic about the positive outcomes, such as reduced resident fatigue, but they were just as likely to cite negative outcomes.

Faculty respondents considered the implications of incorporating each of the proposed IOM changes. They reported that, even though compliance with call frequency and moonlighting could easily be addressed, significant problems would arise in implementing changes to minimum time off between shifts, night call compliance (the mandatory 5-hour rest period), shift length, and the requirement for a 48-hour period that was free of duty once per month. The knowledge base for internal medicine has increased in size and complexity, and fewer hours are available to teach this body of knowledge. Faculty members strive to educate residents, while expectations of their increased revenue generation continue to grow. Respondents perceived that the increased workload and decreased time for teaching may lead to dissatisfaction among faculty, which could negatively impact recruitment and retention of academic physicians.

The resident survey found that first-year residents were more likely to agree with the benefits of decreased work hours. They also reported higher levels of fatigue and stress than their more senior colleagues, likely related to longer work hours and being less acclimatized to the working environment as compared with their seniors. Residents who moonlighted were more likely to experience stress and cite patient load and work environment as sources of that stress, with a likely contributing factor being their longer hours compared with residents who did not moonlight.

TABLE 5 **Resident Perspectives on Current and Proposed Regulations**

	Total Residents, %	Training Level, %			
		PGY-1	PGY-2	PGY-3/4	
	(N = 294)	(n = 113)	(n = 94)	(n = 85)	*P* Value[a]
Current ACGME workweek regulations (n =294)					.045
Service and education balanced	61.8	61.6	53.2	70.6	
More service and less education	37.5	38.4	46.8	27.1	
More education and less service	0.7	0.0	0.0	2.4	
Effect of further decrease in work hours (n = 293)[b]					.058
Both positive and negative effects	45.4	46.0	41.9	48.2	
Positive effects	27.3	35.4	26.9	17.6	
Negative effects	27.3	18.6	31.2	34.1	
Improvements in resident training (n = 294)					
More time for reading and research	81.6	84.9	81.8	77.2	.51
Less fatigue and stress	74.8	78.5	74.2	70.2	.61
More time for patient care	58.5	60.2	51.5	64.9	.90
Adverse effects on resident training (n = 294)					
Too many handoffs	74.0	74.0	72.0	76.4	.89
Less exposure to variety of cases	65.0	62.7	58.6	74.3	.41
Increase in length of residency	50.0	46.6	52.2	51.4	.11
Unsolicited comments (n = 31)[c]					
Decrease in patient care	32.3				
Adverse effects on resident training	25.8				
Prolong length of residency	19.4				
Degrade preparation for practice	19.4				
Improve resident training	16.1				
Decrease patient safety	12.9				
Decrease patient ownership	12.9				

[a] From χ^2 tests.
[b] The n values for the question exclude missing cases because of item nonresponse.
[c] Responses to question, "Are there specific comments that you would want to include in the proposed work hour rules that have not been address in this questionnaire?" Percentages based on number of respondents providing a comment.

Limitations of the survey include its relatively low responde rate and the fact that the majority of the respondents were program faculty on staff at the hospitals which sponsor residency programs. Concerns regarding the proposed significant changes in these institutions could have biased their opinions.

Conclusions

The findings of this survey support the emerging opinion within the academic community that resident duty hours and schedules are not the optimal foundation on which reform of graduate medical education should be based. There is relatively little evidence linking patient safety

outcomes to resident work schedules. Other important variables such as the quality of resident supervision, appropriate workloads, effectiveness of communication and transfer of patient information, and the monitoring and recognition of sleepiness or fatigue or other physician impairments should be included in work hour regulations reform.

We recognize that the results of an opinion survey can inform the debate about resident duty hours, but they are no substitute for objective data. At the same time, the thoughts and opinions of both the faculty physicians and educators entrusted with the responsibility for producing the next generation of physicians and the young physicians who comprise our current resident body should be considered prior to making sweeping changes to the residency programs. We believe the results of our study will help guide those charged with the responsibility of designing appropriate and evidence-based studies that will provide answers to the challenging questions about duty hours, safety, and the learning environment.

References

1 Resident duty hours: enhancing sleep, supervision, and safety: Committee on Optimizing Graduate Medical Trainee (Resident) Hours and Work Schedules to Improve Patient Safety. Washington, DC: National Academies Press, 2008.

2 Jagsi R, Weinstein DF, Shapiro J, Kitch BT, Dorer D, Weissman JS. The Accreditation Council for Graduate Medical Education's limits on residents' work hours and patient safety: study of resident experiences and perceptions before and after hours reductions. *Arch Intern Med*. 2008; 168(5):493–500.

3 Myers JS, Bellini LM, Morris JB, et al. Internal medicine and general surgery residents' attitudes about the ACGME duty hours regulations: a multicenter study. *Acad Med*. 2006; 81(12):1052–1058.

4 Gopal R, Glasheen JJ, Miyoshi TJ, Prochazka AV. Burnout and internal medicine resident work-hour restrictions. *Arch Intern Med*. 2005; 165(22):2595–600.

5 Meltzer DO, Arora VM. Evaluating resident duty hour reforms: more work to do. *JAMA*. 2007; 298(9):1055–1057.

6 Iglehart JK. Revisiting duty-hour limits: IOM recommendations for patient safety and resident education. *N Engl J Med*. 2008; 359(25):2633–2635.