
Work Hours Reform: Perceptions and Desires of Contemporary Surgical Residents

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- BACKGROUND:** New Accreditation Council for Graduate Medical Education (ACGME) requirements on resident duty hours are scheduled to undergo nationwide implementation in July 2003. General surgery residents, because of their long duty hours, are likely to be among those most affected by changes imposed to comply with the ACGME requirements. There are few contemporary data on their attitudes toward work hours reform.
- STUDY DESIGN:** The study entailed a region-wide survey of residents enrolled in general surgery residencies in New England to characterize the perceptions and desires of surgical residents on the issue of work hours reform.
- RESULTS:** Respondents reported working a mean of 105 ± 0.7 hours per week, considerably more than the 80-hour limit stipulated by the ACGME. Of the respondents, 81% reported that sleep deprivation had negatively affected their work. A strong majority of respondents believe that work hours reform would improve their quality of life but less than one half expect it to have a positive impact on patient care. A greater percentage of senior residents than junior residents ($p < 0.05$) have negative perceptions of work hour limitations, particularly with respect to consequences for patient care. Other findings suggest that residents who have actually experienced work hour restrictions are less positive about such restrictions than these residents who had not yet experienced them.
- CONCLUSIONS:** Changes imposed by residency programs to comply with work hour requirements might have detrimental effects on senior residents and patient care. The impact of such changes should be carefully monitored as the ACGME requirements are implemented. (J Am Coll Surg 2003; 197:624–630. © 2003 by the American College of Surgeons)
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The year 2003 is likely to be remembered as a watershed in the evolution of surgical residency training in the United States. In July the new Accreditation Council for Graduate Medical Education (ACGME) requirements on resident duty hours will be implemented.^{1,2} These requirements will be the first comprehensive resident work hour regulations to undergo nationwide implementation.

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Resident work hour limitations are widely argued to have beneficial effects on both patient care and resident quality of life³⁻⁵ but the available data do not unequivocally support this assumption. A recent study of the consequences of resident work hour limitations already enacted in New York State suggest that such limitations might be associated with harmful effects on the quality of patient care and resident education.⁶ For this reason, as we develop and implement strategies for complying with the new ACGME requirements, it will be of paramount importance to document their consequences including negative and unanticipated effects.

General surgery residents, because of their especially long duty hours, are likely to be among those most affected by changes imposed to comply with the ACGME requirements⁷ but there are few contemporary data on the attitudes of these residents toward work hours reform. To characterize the perceptions and desires of surgical residents on this issue, we conducted a region-wide

survey of residents enrolled in general surgery residency programs in New England.

METHODS

Survey instrument development

We developed a 37-item structured questionnaire for this study. Some of the questions were derived from a previously validated survey instrument.⁶ Topics included demographic characteristics, actual and desired work schedules, attitudes toward proposed legislation limiting resident work hours, and satisfaction with residency training and choice of surgery as a career. Attitudinal questions were formatted as five-point Likert scales. A draft of the survey instrument was pretested on five New England surgical residents at various stages of training who were debriefed in cognitive interviews focusing on question topics, wording, response categories, and format. The instrument was refined after the pretesting.

Survey administration

The final survey instrument and administration method were approved by the institutional review board of the Brigham and Women's Hospital. The program directors of each of the 20 general surgery residency programs in the New England states (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont) were contacted and agreed to participate in the survey. Surveys were mailed to each program in April 2002. The offices of surgical education at each institution then distributed the surveys to their residents ($n = 647$). Surveys were accompanied by a cover letter containing the standard elements for obtaining informed consent. All responses were anonymous. A second mailing was sent to all residents after 2 months to give initial nonresponders another opportunity to participate.

Statistical analysis

Coded survey responses were manually entered into an electronic spreadsheet. Descriptive statistics were calculated, and t -tests, chi-square analyses, and Kruskal-Wallis tests for equality of populations were performed using a commercially available computer software package (Statistica version 4.3, StatSoft). The descriptive statistics are presented in unweighted form. Data are presented as percentages or as means \pm SEMs.

RESULTS

Sample characteristics

Of the 647 residents approached, 334 returned a survey, yielding a response rate of 52%. Of these respondents 57% were junior residents (PGY 1 and 2) and 35% were female (Table 1). The mean age of respondents was 31 ± 1 years. In all, 49% of respondents were married and 20% had one or more children. A total of 78% of respondents had attended a US medical school, whereas 22% were foreign medical graduates. Of the respondents 86% were training at an academic medical center and 14% were at a community hospital.

A total of 77% of the respondents reported planning clinical fellowship training after completion of their general surgery residency and 53% planned a career in academic surgery. In addition 48% reported having a surgical mentor and 87% of these residents reported being happy with their mentorship.

Relative to junior residents the senior residents were significantly more likely ($p < 0.05$) to report being married, having children, being a graduate of a US medical school, planning clinical fellowship training, and having a surgical mentor.

Current and desired work schedules

Residents were asked to report the average number of hours per week that they currently work and their current average call frequency. Residents were also asked what work schedule parameters they believed should be in an ideal residency program.

Respondents reported working a mean of 105 ± 0.7 hours per week, with 52% reporting that they work more than 100 hours per week (Table 1). In contrast the respondents' ideal work hours were 85 ± 0.7 hours per week, with 51% of respondents indicating that duty hours should be less than 80 hours per week. The modal call frequency, reported by 76% of respondents, was every third night. The modal response (57% of respondents) for ideal call frequency was every fourth night.

Of the respondents, 81% reported that sleep deprivation had negatively affected their work (Table 2). Respondents also reported feeling sleep deprived a mean of $60\% \pm 2\%$ of the time at work and 57% of respondents reported feeling sleep deprived more than one half of the time at work.

Satisfaction with residency training

A total of 81% of respondents reported being happy with their surgical residency training on the whole and

Table 1. Sample Characteristics (n = 334)

Characteristic	n	%
Clinical PGY (n = 326)		
1	115	35.3
2	71	21.8
3	54	16.6
4	42	12.9
5	44	13.5
Age yr (n = 330)		
<25	0	0
25–30	131	39.7
30–35	157	47.6
35–40	36	10.9
≥40	6	1.8
Gender (n = 328)		
Female	115	35.1
Male	213	64.9
Marital status (n = 332)		
Single	164	49.4
Married	164	49.4
Divorced	4	1.2
Have children		
Yes	66	19.8
No	268	80.2
Primary hospital type		
Academic medical center	287	85.9
Community hospital	47	14.1
Plan clinical fellowship		
Yes	256	76.6
No	57	17.1
Undecided	21	6.3
Plan academic career (n = 330)		
Yes	174	52.7
No	128	38.8
Undecided	28	8.5
Have surgical mentor (n = 298)		
Yes	142	47.7
No	156	52.3
Average ABSITE percentile (SEM)		
	54	(1.5)
Current work hours/wk (n = 323):		
<80	10	3.1
81–90	42	13.0
91–100	105	32.5
101–110	92	28.5
111–120	58	18.0
>120	16	5.0
Average call frequency (n = 328)		
Every 2 nd	27	8.2
Every 3 rd	250	76.2
Every 4 th	45	13.7
Every 5 th	4	1.2
<Every 5 th	2	0.6

Percentages may not sum to 100 because of rounding. Frequencies may not sum to 334 because of missing data

Table 2. Survey Responses Regarding Satisfaction and Perceptions of Work Environment (n = 334)

Response	n	%
Sleep deprivation has negatively affected work (n = 292)		
Yes	236	80.8
No	56	19.2
Percentage of time respondents feel sleep-deprived (n = 285)		
0–25	66	23.2
26–50	58	20.4
51–75	55	19.3
76–100	106	37.2
Work environment is abusive (n = 298)		
Yes	85	28.5
No	213	71.5
Have seriously considered quitting surgical training (n = 298)		
Yes	148	49.7
No	150	50.3
Happy with training overall (n = 296)		
Yes	240	81.1
No	56	18.9
Would choose surgical career again (n = 292)		
Yes	227	77.7
No	65	22.3

Percentages may not sum to 100 because of rounding. Frequencies may not sum to 334 because of missing data.

78% reported that they would choose to pursue surgical residency training again if they were in medical school (Table 2); however, one half of all respondents reported that they had seriously considered quitting surgical residency training. Of the respondents, 29% indicated that they believe their work environment to be abusive or disruptive to training. Respondents characterized their experience of training as being more like a job than education; the percentages of time at work during which respondents reported feeling like a student being taught and an employee paid to work were 23% ± 1% and 64% ± 2%, respectively.

Attitudes toward mandated restrictions on resident work hours

The majority (83%) of respondents believed that mandated limitations on resident work hours would have a positive or a very positive effect on the quality of residents' personal lives and 2% believed that such restrictions would have a negative effect (Table 3). With regard to the quality of resident work 65% believed that the restrictions would have a positive or very positive effect, 19% thought that they would have a negative effect, and 16% believed that they would have no effect.

Table 3. Anticipated Effects of Restrictions on Resident Work Hours

Effect	Very positive	Positive	No effect	Negative	Very negative
On patient care	9.8%	34.7%	30.1%	17.2%	8.9%
On resident work life	18.9%	46.5%	16.4%	12.9%	5.6%
On resident personal life	34.7%	48.1%	15.1%	1.0%	1.4%

Percentages might not sum to 100 because of rounding.

Residents were much less sanguine about the impact of work hour limitations on patient care: fewer than one half of respondents (45%) believed that the restrictions would have either a positive or very positive effect on patient care. More than one quarter (27%) believed that these limitations would have a negative or very negative effect and 30% believed they would have no effect.

Comparison of junior and senior resident responses

Comparisons of responses by junior and senior residents are presented in Table 4. There were no statistically significant differences in work schedules or perceived sleep deprivation between junior and senior residents. Senior residents reported feeling like a student being taught for a significantly greater percentage of the time ($p = 0.0005$) and feeling like an employee being taught a significantly lower percentage of the time ($p = 0.0006$) than did junior residents. No significant differences in overall satisfaction with residency training between junior and senior residents were evident.

Most residents in both the junior and senior groups believed that work hours restrictions would have beneficial effects on resident work life but the groups diverged significantly in their perceptions of the effects of such restrictions on residents' work life and patient care. Most junior residents believed that duty hours restrictions would have beneficial effects on work life and patient care (75% and 58% respectively); only a minority of senior residents (48% and 26% respectively) believed the same.

DISCUSSION

Our findings suggest that in 2002 the general surgery residents in the New England states were working a considerably greater number of hours per week than the 80-hour limit stipulated by the new ACGME requirements. Our findings also suggest that most general surgery residents support work hour limitations and that a

Table 4. Comparison of Junior and Senior Resident Survey Responses

Characteristic	Junior residents (PGY1/2) (n = 186)	Senior residents (PGY3+) (n = 140)	p Value*
Sociodemographics			
Female	35%	32%	0.52
Married	40%	60%	0.0004
Have children	15%	26%	0.017
US medical graduate	75%	86%	0.009
ABSITE score (percentile)	53 ± 2.0	55 ± 2.3	0.71
Planning on fellowship	70%	84%	0.0059
Planning on academic career	51%	54%	0.5
Residency characteristics			
Academic medical center	84%	88%	0.31
Have mentor	40%	60%	0.008
Happy with mentor (of those with mentor)	89%	86%	0.58
Time sleep deprived	60% ± 2.3%	53% ± 2.7%	0.8
Sleep deprivation has affected work	79%	83%	0.42
Time feel like student	20% ± 1.2%	26% ± 1.8%	0.0005
Time feel like employee	69% ± 2.0%	55% ± 3.1%	0.0006
Happy with training	79%	86%	0.12
Have thought about quitting	48%	50%	0.76
Work in an abusive environment	24%	32%	0.12
Would do surgery again	77%	78%	0.86
Duty hours			
Actual hours (h)	104 ± 0.9	108 ± 1.2	0.0423
Desired hours (h)	85 ± 0.8	86 ± 1.1	0.46
Actual call frequency (d)	3 ± 0.04	3 ± 0.05	0.052
Desired call frequency (d)	4 ± 0.15	4 ± 0.07	<0.0001
Work hour limits would have a positive impact on resident personal life	86%	77%	<0.0001
Work hour limits would have a positive impact on resident work life	75%	48%	<0.0001
Work hour limits would have a positive impact on patient care	58%	26%	<0.0001

Means ± SEM are listed where indicated. Percentages represent responses received for each question, which in some cases was <334%.

*t test, chi-square analysis, or Kruskal-Wallis test of equality of proportions as appropriate.

substantial proportion of general surgery residents believe that legislation limiting work hours would have

Table 5. Perceptions of Impacts of Work Hours Restrictions: Comparison of Surgical Residents in New York and New England

Area affected	Positive impact, %		No impact, %		Negative impact, %		p Value*
	NE	NY	NE	NY	NE	NY	
Patient care	45	21	30	44	26	35	<0.0001
Resident work life	65	42	16	32	19	27	<0.0001
Resident personal life	83	66	15	28	2	6	<0.0001

Percentages may not sum to 100 because of rounding.

*Mantel-Haenszel chi-square test for NE versus NY resident responses (over all three ordered response categories).

NE, New England; NY, New York State.

positive effects on resident quality of life and on patient care. It is important to remember that this support is in principle only, as the residents surveyed in this study have not actually experienced work hour limitations.

The findings from a contemporaneous survey of residents in New York State, who are already subject to work hour limitations, provide an interesting contrast to these results.⁶ New York's duty hour limitations, called the 405 (Bell) Regulations, were adopted in 1989 in response to the death of a young woman, Libby Zion, in a New York teaching hospital in 1984.^{8,9} The Bell Regulations are similar in most respects to the ACGME limitations.¹⁰ We surveyed 319 New York surgical residents in May 2002 regarding their views of these regulations.⁶

Comparison of the New York and New England survey findings suggests that residents who have actually worked under duty hours restrictions have a less favorable view of such restrictions than residents who have not yet experienced them (Table 5). In all, 63% of New York residents reported improved quality of life as a result of the duty hour restrictions compared with 83% of New England residents who anticipated improved quality of life ($p < 0.0001$). Of the New York surgical residents, 42% reported improved work life compared with 65% of such residents in New England who expected such improvement ($p < 0.0001$). Most dramatically, only 21% of New York residents believed that the duty hours restrictions had had positive impacts on patient care in contrast to the 45% of New England residents who anticipated positive impacts ($p < 0.0001$).

One finding common to both the New York and the New England surgical resident surveys is that though junior and senior residents report similar work hours

(both current and desired), a markedly greater percentage of senior residents than junior residents have negative perceptions of duty hour restrictions. The New York survey findings suggested several possible reasons for this disparity.⁶ A key factor was that 80% of senior residents reported that their programs had shifted duties from junior to senior residents to bring junior residents' hours into compliance with the Bell Regulations. Senior residents in the New England states might be more apprehensive about the prospect of duty hour limitations than juniors because they anticipate this burden shifting or because their longer experience makes them more attuned to the possible impacts on quality and continuity of care, opportunities to perform procedures, and other aspects of patient care and resident learning. The finding that senior residents believe that they spend a greater percentage of their time on educational activities and a lesser percentage of time on service-oriented tasks than junior residents is consistent with this latter possibility.

There are few contemporary data with which to compare our results. In the National Graduate Medical Education Census, jointly administered by the American Medical Association and the Association of American Medical Colleges during the academic year 2001 to 2002, the average weekly on-duty hours of general surgery residents was found to be the highest among all residents at a mean of 78.9 hours.¹¹ Residency program directors, rather than residents participated in that survey. Similarly, in a survey of General Surgery Residency program directors conducted in 2001, respondents reported that residents in their programs worked an average of 91 hours per week¹²; but more than one third of the respondents of that survey had no data on which to base their responses, offering only their best guesses. In a nationwide survey of obstetric-gynecologic residents conducted in 2000, 42% of respondents reported working more than 80 hours per week and 77% of respondents reported desiring work hour limitations.¹³

General surgery residents in New England were surveyed on their attitudes toward work hour reforms by Ruby and colleagues¹⁴ in 1989. In that study, the respondents reported working a mean of 107 hours per week. Almost three quarters of the respondents in 1989 supported work hours reforms in principle; but only a minority (14%) supported legislation limiting resident work hours. It is significant to note that although work hours reforms have been supported by general surgery residents for more than a decade the work schedules

reported by residents have not changed significantly during this period. What has changed is the greater acceptance of government intervention on this issue, an attitude that is particularly prevalent among today's junior residents.

Our study provides a region-wide update on the views of surgical residents on work hours reform. This is the group that is likely to be most affected by the work hour limitations that are about to be implemented, but ironically these residents' input has been underrepresented in the recent dialogue on resident work hours. Because our survey was brief and anonymous we were able to obtain a response rate that is relatively high for resident surveys, but our findings should be interpreted with attention to the fact that 48% of those approached did not respond. Appropriate caution should also be exercised when extrapolating our findings to surgical residents in other regions of the country.

The data from this study will serve as a baseline that will help in the evaluation of the consequences of work hour limitation-compliance strategies on residents. Surgical residency programs must be prepared to modify these strategies as necessary to ensure that the quality of resident education and residents' ability to provide high-quality patient care are not jeopardized. In particular, we must ensure that graded responsibility, which is so critical to the education of senior residents, is not eroded in the face of short-term pressures to comply with work hours limitations. We emphasize our concern that senior residents, who are on the verge of independent practice, have educational needs that are fundamentally different from those of junior residents and that these senior residents might be the most vulnerable to the adverse consequences of arbitrary duty hour limitations.

As we reengineer our residencies, we should take advantage of this opportunity to improve our residency training system in ways beyond those set forth by the ACGME. Specific opportunities suggested by our study include the following: 1) improved mentoring (the need for this may be particularly acute among junior residents, only 40% of whom reported an identifiable surgical mentor in our study); 2) enhanced work environment (the fact that more than one quarter of our respondents reported working in an environment that they believed to be abusive should cause concern and motivate action); and 3) increased efficiency of training (our results suggest that most surgical residents believe they spend most of their time on tasks that lack educa-

tional value; such tasks should be identified and minimized).

The ACGME requirements might be only the first wave in a series of resident work hour reform measures. A number of groups have already articulated that the ACGME requirements are not stringent enough and such groups continue to call for legislative mandates.¹⁵⁻¹⁷ It is time for us to study our training system and to plan its future before others do it for us. Our efforts have the potential to stimulate medical student interest in surgical careers, to improve the educational experience of our residents, and most importantly to enhance the quality of patient care. There is in fact reason to face the future of our profession with great optimism.

Author Contributions

Study conception and design: Whang, Perez, Ashley, Zinner

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