

Resident work hours: Examining attitudes toward work-hour limits in general surgery, orthopaedics, and internal medicine

Surgical and nonsurgical residents who were surveyed about their work hours expressed different opinions about restricting their hours, with surgical residents favoring fewer restrictions than nonsurgical residents.

ABSTRACT

Background: Residency work hours are currently receiving considerable attention. Work-hour limits have been set in the US and the EU, and the Professional Association of Residents of BC has negotiated a contract stipulating a 24-hour limit to shift length. In surgical disciplines, however, long hours are thought to be necessary to learn procedures.

Methods: To examine attitudes toward work-hour limits, a questionnaire was created and distributed to residents in general surgery, orthopaedics, and internal medicine at the University of British Columbia in February 2009.

Results: Survey results indicated that surgical residents favor fewer work-hour restrictions when compared with nonsurgical residents.

Conclusions: Concern about procedural competence explains some individual variability in terms of these attitudes but fails to explain the between-group difference.

Background

Recently the issue of resident work hours and, more specifically, work-hour limits has received increased attention in medical education.¹⁻³ Concerns about the effects of resident sleep deprivation due to long working hours led the Accreditation Committee for Graduate Medical Education (ACGME) in the United States to set limits on work hours. The ACGME specifically limits the work week to 80 hours (including all time in hospital) while requiring that residents have 1 day off in 7 and that no single shift continue for longer than 24 hours.⁴ Meanwhile, in the European Union, the European Working Time Directive, which covers most areas of employment, recently came to include medical trainees. It originally mandated a 56-hour work week, which was changed to a 48-hour work week on 1 August 2009.⁵ In Canada, there is no similar legislation, but provincial organizations of residents have negotiated contracts with health authorities to set limits. For instance, in BC the Professional Association of Residents (PAR-BC) has negotiated a contract stipulating a 24-hour limit to shift length.⁶

Reaction to work-hour regulations has been mixed. A frequently cited divide is one between surgical and nonsurgical disciplines,⁷ where it is often noted that surgical residents will simply not obtain the operative experience necessary for future practice if work hours are limited.⁸ Meanwhile, in internal medicine, work-hour regulations are more frequently perceived to have a positive impact on resident education.⁹ As for whether surgical experience is diminished by work-hour regulations, there is conflicting evidence on the matter.¹⁰⁻¹³ In the Netherlands, surgical residents observing the European Working Time Directive are quite satisfied with the regulations and do not perceive them as a threat to their training.¹⁴

Despite the attention being paid to resident work hours, there is very little Canadian data concerning the attitudes of residents toward work-hour regulations. This lack of data leaves

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Resident Work Hours Survey

Conducted in association with the UBC School of Population and Public Health

Purpose: To examine resident work hours and attitudes towards work hours limitations

Instructions: There are 18 questions in this survey. Questions 3-7 require a numerical answer; question 18 is optional and intended for you to express any comments, and the remainder of the questions are multiple-choice. The survey should take no more than 10 minutes, and your consent to participate is implied by your completion of this survey (see attached consent form).

1. Please circle the letter that best corresponds to your training program:
 - a) Anesthesia
 - b) Community Medicine
 - c) Dermatology
 - d) Emergency Medicine
 Please circle:
 - 1) CCFP-EM
 - 2) Royal College
 - e) Family Medicine
 - f) Internal Medicine
 General (or in Core 3-yr program)
 Subspecialty: _____
 - g) Neurology
 - h) Obstetrics/Gynecology
 - i) Pediatrics
 General (or in Core 3-yr program)
 Subspecialty: _____
 - j) Pathology/Lab Medicine
 - k) Radiology
 - l) Surgery:

Please circle:

 - 1) Cardiac
 - 2) ENT
 - 3) General
 - 4) Neurosurgery
 - 5) Ophthalmology
 - 6) Orthopedics
 - 7) Plastics
 - 8) Urology
 - 9) Other _____
 - m) Other: _____
2. Program year (eg. PGY-1) (circle one): 1 2 3 4 5 6 7 8
 3. Hours worked in last 7 days (including in-house call): _____
 4. Length of longest shift in last 7 days (including in-house call): _____
 5. Hours slept last night: _____
 6. Total hours slept in last 7 days: _____
 7. If I were to set a work hour limit (including in-house call), I would set it at: _____ hours/ week

Please rate how much you agree with the following statements (Circle your answer: 1-Strongly disagree; 3-neutral; 5-strongly agree)

General Questions:

8. I am sleep-deprived on a regular basis.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
9. I feel overworked.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
10. I feel pressured to work more.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11. If I could extend my residency in order to work fewer hours, I would.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

If tighter work hour restrictions were imposed (3 Questions):

12. I wouldn't have time to master the procedures of my specialty during residency.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
13. My residency training would still adequately prepare me for practice.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
14. I would sleep more.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

If I slept more (3 questions):

15. I would learn more effectively.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
16. I would master procedures faster.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
17. I would commit fewer medical errors.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
18. **Optional:** How do you see work hour limitations impacting your training?

Figure 1. Resident work hours survey distributed to residents in internal medicine, general surgery, and orthopaedics at the University of British Columbia in February 2009.

several questions unanswered. First, do surgical residents favor fewer work-hour restrictions than nonsurgical residents? Second, do surgical residents believe their procedural competency will be compromised by tighter restrictions? Third, is there a correla-

tion between such concerns and attitudes toward work-hour restrictions?

Methods

To attempt to answer these questions, an 18-item questionnaire was created and distributed to residents in internal

medicine, general surgery, and orthopaedics at the University of British Columbia in February 2009 (Figure 1). The questionnaire was distributed at academic half-days in paper form and was collected the same day. For the orthopaedics and general surgery residents, additional questionnaires were given to office staff to distribute to the residents missing from the half-day, and these were then collected 1 week later (orthopaedics) and 2 weeks later (general surgery).

The questionnaire included items related to sleep and work hours that were adapted from Fok and colleagues¹⁵ and items related to attitudes that were similar to those asked by Morris-Stiff and colleagues.⁵ The first part of the questionnaire asked for numerical responses concerning hours worked, hours slept, and a suggested work-hour limit in hours per week. The second part asked for qualitative responses to statements such as, “If tighter work-hour restrictions were imposed, I would not have time to master procedures.” Respondants used a scale of 1 to 5, with 1 indicating “Strongly disagree” and 5 indicating “Strongly agree.”

The study was conducted with the approval of the UBC Behavioural Research Ethics Board.

Results

Survey response rates varied by discipline. Of the 52 internal medicine residents who received questionnaires, 39 responded for a response rate of 75%. Of the 30 questionnaires distributed to orthopaedics residents, 20 were returned for a response rate of 67%. Meanwhile, of the 45 questionnaires distributed to general surgery residents, 18 were returned for a response rate of 40%.

Notable findings included significant differences between surgical (general surgery and orthopaedics) and nonsurgical (internal medicine)

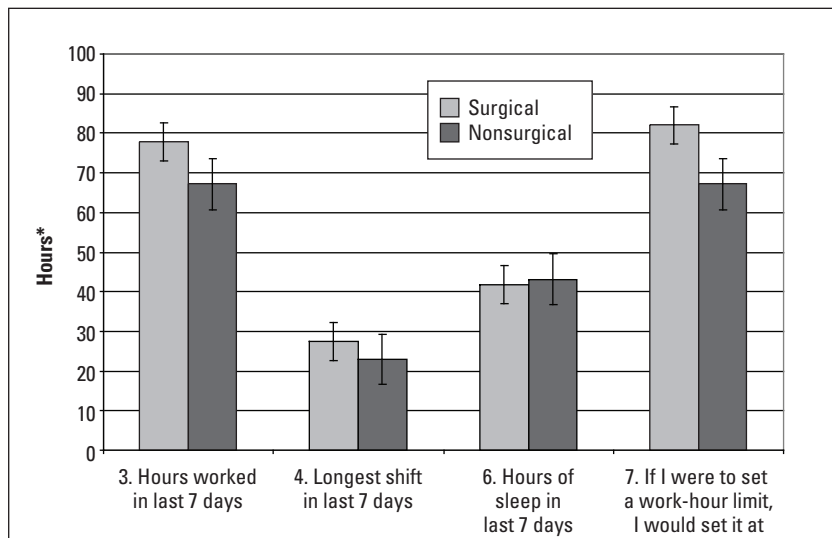


Figure 2. Comparison of work and sleep hours, and suggested work-hour limits, based on responses to questions 3, 4, 6, and 7 from surgical and nonsurgical residents.

Note that surgical residents worked longer hours than nonsurgical residents and recommended higher work-hour limits. Also note that there is a remarkable similarity between the work-hour recommendations and the current conditions for each group of residents.

*Error bars show 95% confidence interval. Columns 3 and 6 show statistical significance > .05

Table 1. Results from numerical response questions 3 to 7 about work and sleep hours.

Question	Number of responses by group	Hours		t-test for significance	
		Mean	SD	Significance (2-tailed)	Mean difference
3. Hours worked in last 7 days	Surgical: 35	77.89	21.23	0.03200	10.73
	Nonsurgical: 32	67.16	18.59		
4. Longest shift in last 7 days	Surgical: 36	27.46	12.65	0.10000	4.54
	Nonsurgical: 32	22.92	9.50		
5. Hours of sleep last night	Surgical: 36	6.00	1.44	0.42000	-0.41
	Nonsurgical: 32	6.41	2.62		
6. Hours of sleep in last 7 days	Surgical: 36	41.81	8.92	0.47000	-1.38
	Nonsurgical: 30	43.18	6.04		
7. If I were to set a work-hour limit, I would set it at:	Surgical: 35	82.00	14.26	0.00040	14.85
	Nonsurgical: 31	67.15	18.02		

residents for year of program (2.66 vs 1.76, $P < .01$), hours worked in the last 7 days (77.89 vs 67.16, $P < .05$), and recommended work-hour limit (82.00 vs 67.15, $P < .001$) (Figure 2). There was, however, no significant difference between the hours worked in the last 7 days by a group and the work-hour limit recommended by that group. This was seen in both the surgical (77.9 vs 82.0, $P = .248$) and the nonsurgical (67.2 vs 67.1, $P = .438$) groups (Table 1).

For the questions requiring qualitative responses, hypothesis testing was done using nonparametric methods. In comparing responses between surgical and nonsurgical residents, a Mann-Whitney U-test was used to rank responses from highest to lowest value and then compare the mean rank between groups. No significant differences were found for any of the questions, including whether procedural competency would be hampered by stricter work-hour regulations (Table 2).

We also calculated the correlations between responses to the question asking for a recommended work-hour limit and the questions asking how work-hour restrictions would affect procedural competency and preparedness for practice. These correlations were performed while controlling for differences in program and year. It was found that those concerned with procedural competency showed a moderate tendency to suggest higher work-hour limits ($r = 0.458$, $\alpha = 0.00018$), and those who believed that they would still be adequately prepared for practice even with tighter restrictions showed a moderate tendency to suggest lower work-hour limits ($r = -0.506$, $\alpha = 2.7E-05$).

Conclusions

This study sought to address three questions. The first was whether sur-

Table 2. Results from Mann-Whitney U-test for significance of qualitative responses to questions 8 to 17.

Question	Number of responses by group	Mean rank	Rank sum	U	Z	Significance (2-tailed)
8. I am sleep-deprived on a regular basis	Surgical 38	41.04	1559.5	663.5	-0.86	0.39
	Nonsurgical 39	37.01	1443.5			
9. I feel overworked	Surgical 38	41.30	1569.5	653.5	-0.95	0.34
	Nonsurgical 39	36.76	1433.5			
10. I feel pressured to work more	Surgical 38	40.42	1536.0	687.0	-0.58	0.56
	Nonsurgical 39	37.62	1467.0			
11. I would extend residency to work less (if I could)	Surgical 38	36.33	1380.5	639.5	-1.09	0.28
	Nonsurgical 39	41.60	1622.5			
12. I would not master procedures effectively (if there were tighter work-hour restrictions)	Surgical 37	40.64	1503.5	642.5	-0.85	0.39
	Nonsurgical 39	36.47	1422.5			
13. I would be adequately prepared for practice (if there were tighter work-hour restrictions)	Surgical 37	36.04	1333.5	630.5	-1.00	0.32
	Nonsurgical 39	40.83	1592.5			
14. I would sleep more (if there were tighter work-hour restrictions)	Surgical 37	38.99	1442.5	703.5	-0.20	0.84
	Nonsurgical 39	38.04	1483.5			
15. I would learn more (if I slept more)	Surgical 38	38.78	1473.5	732.5	-0.10	0.92
	Nonsurgical 39	39.22	1529.5			
16. I would master procedures faster (if I slept more)	Surgical 38	40.28	1530.5	692.5	-0.52	0.60
	Nonsurgical 39	37.76	1472.5			
17. I would commit fewer medical errors (if I slept more)	Surgical 38	37.41	1421.5	680.5	-0.65	0.52
	Nonsurgical 39	40.55	1581.5			

gical residents favored fewer work-hour restrictions than nonsurgical residents, and our results indicate that they did, with surgical residents, on average, suggesting a weekly limit of 82.00 hours and nonsurgical residents, on average, suggesting a 67.15-hour limit. The second and third questions this study sought to answer were whether there were differences

between the groups in terms of concern about procedural competency being compromised, and whether such concerns predicted differences in attitudes toward work-hour regulations. Regarding the second question, the answer appears to be no, as there were no significant differences between surgical and nonsurgical groups on any of the questions about attitudes

There does appear to be an inverse relationship between concerns about restricted work hours compromising procedural competency (and competency in general) and suggested work-hour limits.

to work hours. This may, however, reflect a small sample size; perhaps a difference exists but it could not be detected in a survey of fewer than 80 residents from three programs in one city. As for the third question, there does appear to be an inverse relationship between concerns about restricted work hours compromising procedural competency (and competency in general) and suggested work-hour limits. While this explains some of the variability within any given group of residents, it fails to account for the difference between surgical and nonsurgical groups.

Thus, further explanations must be hypothesized and tested concerning the difference between surgical and nonsurgical residents' attitudes toward work-hour restrictions. One possibility is illustrated by the striking correspondence between the average work week for each group and the suggested work-hour limit. Perhaps residents in the surgical group are simply used to working more hours on a regular basis, and thus when asked to set a reasonable work-hour limit, they set it at a level that reflects the status quo, while nonsurgical residents, who are not working as many hours on a regular basis, do the same.

Finally, it is clear that more research remains to be conducted in this field. In many cases, residents'

attitudes are assumed or referred to anecdotally.⁷ The medical community needs to obtain data from more residents in a range of programs before proclaiming that a group of residents feels one way or another about work-hour limits.

Competing interests

None declared.

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