The American Journal of Surgery xxx (2017) 1–5

Contents lists available at ScienceDirect

The American Journal of Surgery

journal homepage: www.americanjournalofsurgery.com

Assessing the 16 hour intern shift limit: Results of a multi-center, mixed-methods study of residents and faculty in general surgery

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ARTICLE INFO

Article history:
Received 1 May 2017
Received in revised form
6 June 2017
Accepted 22 August 2017

Keywords:
Resident duty hour restrictions
General surgery residents
Intern duty hour limitation
Resident education
Professionalism

ABSTRACT

Background: The study explores how residents and faculty assess the ACGME's 16-h limit on intern shifts.
Methods: Questionnaire response rates were 76% for residents (N = 291) and 71% for faculty (N = 279) in 13 general surgery residency programs. Results include means, percentage in agreement, and statistical tests for 15 questionnaire items. Semi-structured interviews conducted with 39 residents and 43 faculty were analyzed for main themes.
Results: Few view the intern shift limit as a positive change. Views differ ($P < 0.01$) for residents and faculty on 12 of 15 item means and across PGY levels on all 15 items. Interviews indicate concerns about losses with respect to education and professional development, difficulties when interns transition to their second year, and how intern shifts may be more fatiguing than expected.
Conclusions: The 16-h limit on intern shifts has remained a source of concern and an educational challenge for residents and faculty.
Summary: The study documents little support among residents and faculty in general surgery for the ACGME's 2011 16-h limit on intern shifts. Potential advantages – less fatigue, enhanced patient safety, and intern quality of life – are thought to be largely unrealized and offset by educational losses and new challenges for interns and second-year residents.

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https://doi.org/10.1016/j.amjsurg.2017.08.053
0002-9610/

In 2011, the Accreditation Council for Graduate Medical Education (ACGME) restricted intern shifts to a maximum of 16 h, a compromise from a recommendation in a National Academy of Medicine report that duty periods be capped at 16 h *for all residents* because "human performance degrades after 16 h of wakefulness."[1,p.217] Two streams of research have explored the cap. A first examined the health outcomes of patients, as a primary rationale for the cap was concern about intern errors and patient welfare. Results do not indicate that the 16-h cap improved patient outcomes.[2–5] A second explored the views of residents and faculty as to whether the cap was a good, bad, or mixed policy for residents and residency programs. This research sheds light on how the cap might shape aspects of residencies – such as education or professional development – that do not bear immediately on patient outcomes. Residents and faculty are critical of the 16-h cap.[6–18]

Our study, which was conducted and analyzed in advance of the ACGME's decision to revoke the cap in July 2017, makes three contributions to this second stream of research. First, most studies were conducted in anticipation of the cap[7–9] or shortly after its introduction.[10–18] Our delayed assessment provided faculty, residents, and programs time to adjust to the change, which means that their views are based on more direct experience than in previous studies. Second, we explore the possibility that interns, junior residents, and senior residents, along with more or less experienced faculty, view the 16-h cap differently. A third and final contribution stems from the multi-center design and use of mixed methods. Questionnaire evidence establishes outlooks and patterns of association; interviews identify rationales for those views that are difficult to capture with a questionnaire. The interview arm of the study includes nearly six times as many interviews as a recent exploratory qualitative study of similar issues.[19] The study thus elaborates and documents experienced-based assessments of the 16-h cap on the eve of its revocation.

1. Methods

The study includes faculty and categorical residents from 13 residency programs in general surgery located in 10 states and all continental U.S. time zones. Coordinators secured local Institutional Review Board (IRB) approval and administered the questionnaire. Response rates were 76% for residents (N = 291) and 71% for faculty (N = 279). Questionnaire items, largely adapted from previous studies,[7–9,12,13,15] had five-point responses ranging from "strongly disagree" to "strongly agree." Items were critiqued for face validity and clarity by the Surgical Education and Performance Group at Southern Illinois University (Springfield, Illinois).

The last questionnaire item sought volunteers for interviews. Interviews posed an open-ended question, followed by probes, as to whether (and why) the 16-h limit on intern shifts had been a good, bad, or mixed policy for surgical residents and residency programs. The lead author conducted semi-structured interviews with 39 residents and 43 faculty chosen from 273 volunteers (48% of questionnaire respondents). The aim was to interview 3 faculty and 3 residents randomly chosen from each site's volunteers. Interviews averaged 24 min and were conducted by telephone, recorded with permission, and transcribed (620 single-spaced pages).

The analysis unfolded in two stages. The questionnaire data were analyzed by STATA 14 (College Station, TX). Results include means and percentage "agree or strongly agree" for interpretive ease. Statistical significance was assessed by two-tailed t tests, F ratios, and Chi-square tests; a *P* value of 0.01 was used to determine significance due to the number of tests conducted. Analysis of the interviews involved thematic coding of the transcripts after multiple readings and use of MAXQDA 12 (Berlin, Germany), software that facilitates the analysis of textual evidence. Given the sensitivity of the data, residents and faculty were assured that no one in their program would have access to their interview or know of their participation. Our qualitative analysis was thus conducted by the lead author, an external investigator with experience analyzing qualitative data, who reviewed evolving themes with the last author. The analysis focuses on dominant patterns and presents representative quotations. Quotations are labeled with unique IDs followed by an F for faculty and an R with a number to indicate resident level (e.g., ID#1:R1 is participant 1 who is a PGY 1; ID#3:F is faculty participant 3).

Table 1
Assessments of the 16 hour intern shift limit by general surgery faculty and residents.

Exact Question Wording: The 16 Hour Duty Period Limit on Interns	Percent Agree or Strongly Agree (Means)		
	Residents	Faculty	Significance
Panel A: General Assessments.			
1. is supported by credible evidence that performance diminishes after 16 duty hours.	26 (2.7)	18 (2.3)	0.017 (<0.001)
2. represents a positive change for surgical residency programs.	26 (2.7)	12 (2.0)	<0.001 (<0.001)
3. should be extended to include all residents, not just interns.	14 (1.9)	4 (1.5)	<0.001 (<0.001)
Panel B: Fatigue, Patient Safety, and Quality of Life.			
4. reduces intern fatigue at the hospital.	42 (3.0)	39 (3.0)	0.452 (0.731)
5. improves patient safety by reducing fatigue among interns.	27 (2.8)	9 (2.2)	<0.001 (<0.001)
6. worsens patient safety due to problems with information transfer and communication	55 (3.5)	77 (3.9)	<0.001 (<0.001)
7. improves the quality of life and well-being of interns.	48 (3.3)	48 (3.3)	0.919 (0.864)
Panel C: Professional Development.			
8. promotes education over service obligations.	17 (2.6)	19 (2.5)	0.600 (0.069)
9. encourages an unprofessional "shift mentality" among interns.	57 (3.4)	81 (4.1)	<0.001 (<0.001)
10. makes it difficult for interns to learn to place patient needs above self-interest.	38 (3.0)	69 (3.8)	<0.001 (<0.001)
11. diminishes interns' clinical competence and fund of knowledge.	44 (3.2)	72 (3.9)	<0.001 (<0.001)
12. diminishes the preparation of interns for more senior roles.	60 (3.5)	87 (4.2)	<0.001 (<0.001)
Panel D: Care Teams.			
13. Makes it more difficult for interns to function as members of a care team.	39 (3.0)	74 (3.9)	<0.001 (<0.001)
14. worsens relationships between interns and more senior residents.	32 (2.9)	39 (3.3)	0.059 (<0.001)
15. shifts some work from interns to other residents or attendings.	69 (3.7)	90 (4.2)	<0.001 (<0.001)

Notes. The "significance" column first provides the *P* value of the Pearson Chi-Square (for the percentages) and then, in parentheses, the *P* value of the *t*-test (for the means).

Please cite this article in press as: Coverdill JE, et al., Assessing the 16 hour intern shift limit: Results of a multi-center, mixed-methods study of residents and faculty in general surgery, The American Journal of Surgery (2017), https://doi.org/10.1016/j.amjsurg.2017.08.053