Published in final edited form as:

J Am Coll Surg. 2015 October ; 221(4): 883–889.e1. doi:10.1016/j.jamcollsurg.2015.07.011.

Investigating the Impact of the 2011 ACGME Resident Duty Hour Regulations on Surgical Residency Programs: The Program Director Perspective

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Abstract

Background—The 2011 ACGME regulations required significant change in the structure of general surgery residency programs, due primarily to the 16-hour in-house rule for PGY 1 residents. However, the scope of changes that programs have undertaken to meet these requirements, and the educational impact of those changes, are poorly understood.

Study Design—We performed in-depth qualitative interviews with general surgery program directors (PDs). 20 PDs participated in the study; interviews were conducted until adequate thematic saturation was achieved. Participants were recruited from a stratified random sampling of residency programs in the United States to ensure a representative cohort. Interviews focused on changes in call schedule, interns' educational requirements, development, and satisfaction.

Results—Most programs used a month-long night float rotation (NF) (14/20, 75%). A minority of programs (5/20, 25%) used a weekly rotating schedule, where interns worked 5–6 nights out of a month. Multiple programs (65%) had a NF in place prior to 2011; these programs made changes to and expanded their existing schedule to accommodate the new regulations. Commonly cited challenges to instituting NF included weekend coverage (60%) and providing adequate days off during day-to-night transition. Interns spent as much as 3 months of the year on NF. Only 5 programs made explicit changes to teaching schedules or developed a curriculum for residents on NF. 75% of programs excused interns, explicitly or implicitly, from didactic teaching while on NF. Common themes noted by PDs included delayed maturation of trainees, interns feeling isolated from the team culture, and a conflict between the professional behaviors of “following the rules” and “doing what is right”.

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Disclosure Information: Nothing to disclose.

Disclaimer: The views expressed herein do not necessarily represent the views of the United States Government.

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Introduction

In 2011, the Accreditation Council for Graduate Medical Education (ACGME) instituted a new set of requirements for duty hours that included limitations on interns' continuous work hours to no more than 16 hour shifts, as well as requirements for defined rest periods between consecutive shifts.(1, 2) In addition to the new regulations, the 2011 standards maintained the 2003 duty hour requirements. These standards were based on the recommendations of the Task Force on Quality Care and Professionalism, and additionally included new standards for direct and indirect supervision of residents.(3)

The 2003 duty hour requirements were a landmark event in surgical education, and the full impact of these requirements on patient safety and resident education is still being debated. (4, 5) However, the 2011 duty hour standards may represent an even greater paradigm shift in educational design, as the intern work hour requirements essentially legislate away the traditional overnight "call" system that is often viewed as a critically important aspect of surgical training. The ability of an intern to witness the evolution of early post-operative problems and participate actively in the care of a given patient in these critical first days is felt to be a key experience which contributes to their clinical maturation. Several parties have raised concerns that the combination of the 16 hour work limit, the required 8 hour rest period, and the greater supervision requirements will adversely affect interns' learning experience, readiness for senior residency, and operative experience.(6–11) However, to date, little is known about how exactly programs have responded to the duty hour changes, and how significant the impact of these changes have been on trainees.

In this context, we sought to investigate and better understand the extent of changes in resident call systems since the 2011 reforms, and the effect of these changes on residents training experience. To do this, we conducted semi-structured qualitative interviews with Program Directors (PDs) from ACGME General Surgery residency programs. In order to inform and direct future changes in duty hour regulations, the full impact of the recent changes in ACGME standards must be understood.

Methods

Data Collection and Study Design

Participants were selected using purposeful random sampling. General surgery residency programs were identified using the FREIDA database maintained by the American Medical Association.(12) We performed a stratified random sample of twenty percent of the residency programs by residency program size, geographic region, and academic affiliation (i.e. University hospital, University-affiliated, Community) to achieve a balanced sample. We did elect to exclude programs with a US Military affiliation, as these would potentially have additional restrictions and requirements in place that differ from the remaining programs. New programs that were recently opened following the 2011 ACGME duty hours were also excluded. From this initial sampling framework, we then recruited PDs to participate in our study, and continued performing interviews until we had achieved saturation on our emergent themes. Recruitment for participation was performed by email solicitation, with two follow-up reminders to aid in additional participant accrual.

We developed a semi-structured interview guide with two primary aims in mind. First was to better understand the specifics and logistics of how each program had changed their patient care system to accommodate the 2011 ACGME Duty Hour Standards. The second aim was to assess perceptions of PDs as to how these standards have impacted training and experiences of residents, particularly those provided to PGY1 residents. The interview guide (Appendix 1, online only) was piloted internally within our institution prior to interviewing outside program directors. This process ensured clarity, distinction and flow of questions that would support collection of rich information. Follow-up questions were asked based on the initial responses and in an iterative fashion. The rationale for a semi-structured interview, as opposed to a survey, was that we felt the in-depth nature of these discussions would provide a more nuanced understanding of the issues faced by each program director.

Interviews were conducted either in-person or by telephone by the lead author for consistency. All interviews were audio recorded to ensure accuracy. Interviews were performed in an iterative fashion, using responses from early interviewees to identify emerging themes and enrich the subsequent interviews. One question used in the early interviews was removed from the script after two subsequent interviewees felt the question was leading.

Data Analysis

Once the first (10) interviews were complete, the audio files were anonymized and transcribed. The transcribed files were then uploaded into QRS International's NVivo version 10 qualitative data software package. Responses to the first several questions regarding program structure were used to categorize each residency program's call system. Answers to the remaining questions were analyzed using an inductive approach. Two authors (C Scally, C Magas) reviewed and coded the transcripts and together identified initial emergent themes. These themes were reviewed with the remaining authors to verify the accuracy of the coding and resolve any discrepancies. We continued to conduct additional interviews until saturation of the key themes had been reached. This led us to conduct a total of 20 interviews, out of the larger sampling framework outlined above.

This study was considered exempt from review by the University of Michigan Institutional Review Board.

Results

The 20 participants were representative of the distribution of programs by region and academic affiliation in proportion to the overall distribution of surgical residencies in the United States, as shown in Table 1.

Resident Call System

The most commonly used call system to maintain intern coverage was a one month or four-week long night float (NF) rotation (14/20 programs, 70%). Among programs using this system, interns most commonly spent two total months out of their year on dedicated NF rotations, with some programs spending as much as three months of the year on NF. The second most-common method of coverage was a weekly rotating schedule, where interns

would work blocks of 5–6 nights at a time, then returning to daytime service. One program does not use interns for night-coverage at their primary teaching hospital, relying instead on advanced practice providers. This program does have interns covering NF at a secondary hospital on trauma/emergency surgery services, and the PD expressed the importance of having interns take at least some burden of night call in this way. Among the programs using a month-long NF rotation, two-thirds of these actually had a similar NF system in place prior to the 2011 duty hour regulations and made only small changes to their coverage system following July 2011.

Programs also commonly have enacted multiple different call systems or schedules within the same institution to meet the different needs of subspecialty services and rotations. This can cause some confusion or inconsistency in educational experience. Our categorization of their call system refers to the primary modality used for coverage of core general surgery rotations.

Several common themes emerged regarding challenges implementing the 2011 standards. PDs commonly acknowledged that the 16-hour rule required significant systems changes:

“Probably the biggest stressor on the resident core (rotations) was the 16-hour limitation on PGY-1 so there’s no 24-hour call. So that completely changes your work flow and call schedule and everything”

The most commonly cited issue (12/20 PDs, 60%) was covering the NF resident’s required 1-in-7 day off. Due to the 16-hour intern restriction, covering the NF resident’s 24 hours off requires two interns to cover that time period. This resulted in several programs requiring an upper level resident (PGY2 or greater) to cover this shift, required interns to have fewer days off, or in some cases required moonlighting coverage:

“Obviously we had to shift that to where they were taking paired 12-hour shifts, which is a nuisance if you’re an intern because that means you’re on twice as many weekends and your opportunity to have the old golden weekend, to have a weekend really free diminishes.”

“But we did respond by just making the second and third year residents take in house primary general surgery intern call.”

“The poor lab residents get to be an intern for one day a month to cover so that we can handle the flips.”

A second issue commonly cited was difficulty with interns meeting the required 8 hour and recommended 10 hour break in between duty periods, with interns feeling increased pressure to complete tasks prior to handing off patients at the end of each shift:

“They’re trying to be a good guy and don’t want to just hand the list over to the night float people and say, ‘Oh, I’m done. See you. Bye.’ So they stay and try and get the work done in their service, but now it’s 9:00 at night and they’re supposed to be back at 5:00 in the morning. We have an issue.”

In terms of overall reception to the 2011 changes and the challenges regarding their implementation, 7/20 PDs responded positively, with responses ranging from “it was a

necessary challenge” to “very happy” with the change. 8/20 PDs responded negatively, including responses such as “the word hate comes to mind”. The remaining responses were neutral, characterizing the implementation a mild to moderate challenge.

Resident Education

Table 2 summarizes the major themes that emerged in conversations with the PDs. The first observation was that only 5 programs (25%) made explicit changes to their didactic education or educational curriculum in response to the duty hour regulations. The majority of PDs either explicitly or implicitly excused NF residents from teaching conferences and didactic sessions such as morbidity-and-mortality conference, as well as simulation sessions:

“I usually encouraged the night float to come in...(for conference), but they notoriously didn’t and I didn’t ever challenge them on it.”

“I don’t make them come to didactics because if they do they’ll violate duty hours.”

“Interns...would sometimes not be able to participate in things that they otherwise could have participated in. So they just missed stuff really.”

“So instead of going to simulation every week (our residents) ended up going about once or twice a month. And the night call people never stayed for simulation sessions during their month because it would have put them in violation.”

PDs also frequently cited issues with operative exposure, particularly for PGY-1 trainees. Several noted that traditional “intern-level” cases including hernias were uncovered by trainees and performed by the attending alone due to a lack of available residents.

Delayed Maturation

One of the most consistent themes among program directors was that the cumulative impact of the 2011 regulations was a delay in the maturation process of trainees:

“You’re essentially taking away a year out of training with nighttime and on the weekends when you’re functioning independently and you’re having to think about things.”

“But somewhere around the third or fourth year things begin to click and folks really understand what they’ve missed in night float procedures and so forth. I do think that folks catch up, it’s just not as quick as it used to be.”

While PDs cited their concerns with this delayed progression, several stated that they remained confident in the skill of graduates, including stating a willingness to allow graduating trainees to operate on their own family and loved ones.

Resident Satisfaction

When asked how they perceived their own residents to have handled the changing duty hour regulations, the majority of PDs believed them to be dissatisfied in many areas. Common themes that emerged in analysis were a sense of isolation from the team, struggles to balance personal responsibility with “following the rules.” PDs frequently cited the high level of

commitment and dedication of resident trainees, and expressed sympathy for the difficulty in balancing their obligations.

“They’re the same people we’ve hired forever. They’re the same quality individuals, and the responsibility that they have that makes them great doctors is what makes them abide by the rules as well as they can.”

Fatigue from prolonged stretches of NF duty, and from transitioning from day to night shifts, was also cited by program directors as an unintended consequence of the 2011 regulations. While PDs acknowledged the fatigue inherent in prolonged shifts such as traditional call, they also expressed concern for residents’ well-being:

“We had our (chief resident meeting) this morning. We were talking about the junior residents, it’s only two months into it, and one of the chiefs said”
...”Somebody asked what’s wrong with John Doe, he seems sad all the time. And they said oh he’s been on night float the last month.”

Not all program directors responded that residents perceived the changes negatively. Among the programs that already had a NF in place prior to 2011, and consequently required smaller changes to their call system, these PDs did not cite the same challenges. In three interviews, PDs discussed their program having either recently been on probation or having recently undergone a rigorous ACGME site visit; in these instances all felt that the 2011 regulations aided their efforts to bring their program into compliance with the duty hour standards.

Faculty Perception and Supervision

PDs expressed difficulty relaying the 2011 standards to other surgical faculty and managing their expectations of residents. They also noted that in general faculty became more directly involved in patient care with higher levels of supervision. PDs noted in several interviews that this has spilled-over into the operating room where attendings are less likely to provide autonomy to resident trainees.

“So we as faculty have had to become more aware of what the coverage is, what the residents tell us and keeping in mind, what does that mean. We’re quicker to get out of bed and go see people than we used to be, I think.”

“They basically would just stop looking really to the interns for any information or expecting to really hear about their patients from them at all.”

Striking a balance

One of the most common themes between programs was a sense that the 2003 ACGME duty hour regulations were necessary to improve residents’ quality of life and levels of fatigue, but that the 2011 regulations had tipped the balance too far in favor of inflexible restrictions. In small programs, where only 4–6 interns share a call pool, losing part of the deployable workforce to the 16 hour limitation and the 8 hour break requirement had numerous consequences. Most PDs stated a preference for some balance between the initial 2003 regulations and the 2011 revisions.

“If we could just liberalize them I think it would take some of the pressure off, especially the interns trying to report every eight and a half or nine hours, because they try to get the 10 hours off.”

“I want them to feel that ownership, but they also have the 80-hour week structure so if there’s nothing they have to do they get out of here. I think that’s a good thing because when I was a (resident) growing up we stayed around...and stayed around...to make rounds at 8:00 at night the next day because the attending--that’s when he wanted to make them. I think that was stupid. I thought it then, and I think it now. So I think the first work hour changes were something that needed to be made because the system was brutal.”

PDs also cited the evidence gap – the need for data on the outcomes of these regulation changes – and expressed a desire for data to aid in identifying the optimal regulations for both patient care needs and educational needs.

“If somebody could show us a difference that it made, I think we, as scientists and surgeons, would sure love to see what that is. We made these huge changes based on zero data, and we’re data-driven people and we’re judged by our results.”

Discussion

In summary, we were able to categorize the methods that General Surgery residencies used to meet the 2011 ACGME duty hour regulations. The most common call-system implemented was a prolonged period of NF duty for PGY-1 trainees (4 weeks or 1 month at a time) with a significant minority relying on shorter (5–6 day) periods of NF duty and more frequent day-to-night transitions. PGY-1 trainees most commonly spend 2–3 months out of intern year on NF duty. PDs identified a number of challenges that have arisen from implementing these restrictions, including decreased opportunities for resident education through both didactic and operative exposure; interns feeling isolated from their upper-level residents and teams; and delayed maturity among trainees.

The themes which emerged from these interviews were used to develop a conceptual model of how the duty hours have impacted resident education and training. PDs frequently commented that the 2011 restrictions did not change the overall 80-hour work hour limit, but rather changed the day-to-day enforcement of that limit. This loss of flexibility appeared to be a common linking influence driving a number of the practical changes that programs undertook, as well as driving the impact of the changes on resident education. Concerns about this loss of flexibility have been echoed in the surgical literature: Dr. Karl Bilimoria et al recently commented that the loss of flexibility has the potential to impact both patient care (through loss of continuity) and resident education.(13)

While a number of the themes regarding resident education and satisfaction are concerning, it is important to note that programs with a pre-existing NF in place were less likely to express these same concerns. Within our conceptual model, this appeared to be a significant moderating variable on the impact of the duty hour restrictions. This raises the possibility that many of the challenges raised by the 2011 restrictions are simply challenges of implementation rather than of maintenance, and that once programs have progressed through

the so-called “growing pains” of change, the regulations may not be as onerous as these responses indicate. Change, especially on a large-scale national level, is rarely easy; but the difficulty inherent in such change does not necessarily indicate a negative outcome.

Our findings support and confirm the limited research that has previously analyzed the educational and quality-of-life impact on resident trainees. A national survey found that the majority of surgical residents were opposed to the 2011 restrictions, citing worsened work schedules, worsened educational experience, and feeling unprepared for the duties of senior residency.⁽⁶⁾ However, little research to date has attempted to analyze the PDs perceptions of these changes. Our findings showed that PDs displayed a great deal of empathy towards the plight of junior trainees, and understanding of the challenges they face in the current duty hours paradigm.

Our study does have several limitations. First is that interviews were conducted with only a subset of PDs, and as such may not capture the full breadth of experiences with the 2011 regulations. However due to our sampling methodology, we were able to capture a balanced sample with multiple geographic regions, programs ranging from large academic medical centers to small community hospitals, and different levels of PD experience. Second is that our interviews only captured one perspective; PDs may either be unaware of or misunderstand their trainees’ perspectives and responses to the duty hour interviews. The PDs were able to highlight numerous instances of direct communication with trainees as support for their viewpoints, suggesting that PDs are sensitive to and attempting to understand their trainees’ perceptions. Qualitative studies are at times criticized for seeming to represent subjective opinion rather than quantifiable data. We felt that the semi-structured nature of our interviews allowed for rich data collection and was a strength of the study. There was a great deal of consistency across interviewees and many PDs had similar observations. The interview format allowed us to solicit an informed opinion from educators with significant experience.

Our findings have important implications for regulation of the duty hours moving forward. First is the concern raised by PDs that we lack objective data regarding the impact of the duty hour regulations. Two recent large retrospective studies failed to find an association of the new regulations with improved patient outcomes.^(14, 15) The relationship between duty hour regulations and outcomes is also being actively addressed in the FIRST trial – a large-scale, prospective trial, comparing the 2011 paradigm to a more liberal set of duty hour standards.^(13, 16, 17) However, while these trials will include some educational metrics, their primary focus is on patient outcomes. Should these trials demonstrate equivalence between the two duty hour standards as expected, additional information is needed to help guide future duty hour regulations. Our hope is that the findings of our study, which raise a number of concerns for unintended spillover effects on education and resident satisfaction, will aid in informing future discussions and identifying the optimal balance between service and education.

Acknowledgments

Support: Dr Scally is supported by a grant from the National Cancer Institute (5T32CA009672-23).

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Appendix 1. Semi-Structured Interview Template for Interviews with Program Directors

Program Structure

Prior to 2011, did your program use a traditional 24 hour call system, or did you already have some form of night float in place?

Please describe changes made to your call system in order to adapt to the 2011 duty hour changes?

Have you made any subsequent revisions or changes to that call system?

If so, please describe these changes

Have you changed your residents' didactic/conference schedule in response to the duty hour changes?

If so, please describe these changes

Resident Supervision, Satisfaction, and PD Perception

How would you characterize your residents' reaction to the new schedule?

What has been your staffs' reaction to the new duty hour regulations?

What processes has your program put in place to meet the new intern supervision requirements?

How do you determine when an intern is ready to progress from direct to indirect supervision?

What else should I have asked you about the duty hour changes that I didn't think to ask?

Table 1

Program and Participating Program Director Characteristics, and Program Call Schedule

Program characteristics	Data
Categorical residents/y, mean (SD)	5.5 (2.1)
Program Director Experience, y, mean (SD)	6.5 (4.9)
Academic affiliation, n	
University	12
University-Affiliate	6
Community	2
Geographic region, n	
Northeast/Mid-Atlantic	7
South	5
Midwest/Central	5
West	3
Call system structure, n	
Prolonged night float	14
Modified night float	5
Non-intern coverage	1

Table 2

Categorization of Program Director's Observations Regarding Resident Education and Satisfaction after 2011 ACGME Duty Hour Implementation

Cited factors	Representative comments:
Education	
Decreased operative experience	"I certainly think with the 16 hour, the interns were not getting to the operating room very often" "And on the elective general surgery services you'd have intern level cases and the interns wouldn't be able to participate in them because they would have to leave."
Missed didactic opportunities	"Interns then would sometimes not be able to participate in things that they otherwise could have participated in. So they just missed stuff really." "The night float team would usually stay for (one hour) but then go home, so whoever was on night float would miss the didactics for that month."
Supervision and autonomy	
Delayed maturation	"I think they don't have the opportunity to make independent decisions I think that they--it takes much longer for them to mature in that regard in terms of making decisions, clinical decisions." "I do think that folks catch up, it's just not as quick as it used to be and we can't expect them to pick up on things like maybe we did in our training"
Faculty trust/oversight	"To the faculty--I think essentially the interns became like glorified medical students. They basically would just stop looking really to the interns for any information or expecting to really hear about their patients from them at all." "We're quicker to get out of bed and go see people than we used to be" "I think it had an impact on autonomy and level of responsibility that residents were given because (they) became less relevant to the overall care of the patient and less involved."
Resident satisfaction	
Isolation from team	"I think the residents hate night float. Number one, I think the first-year residents hate the fact that they're stigmatized." "I think the senior residents really felt like it took the interns away from the team that they were on because ... essentially they really couldn't-- they weren't even able to be there to round."
Feeling constrained by regulation	"They were literally embarrassed that they were being limited or told to be taking a nap, or need 10 hours (off) --and they're like why--it was all administrative." "If you talk to the interns, they didn't like being shifted around and not just coming to work and doing work but having to figure out am I (over) - do I leave at 5:00 tonight, what time do I have to leave?" "They really hated the fact that they were being treated like children and not like adults"
Fatigue	"They actually ended up doing more nights to days and more of this fatigue inducing scheduling than they would have done if they would have just been taking normal call." "Somebody asked what's wrong with John Doe, he seems sad all the time. And they said oh he's been on night float the last month."