Does Increased Schedule Flexibility Lead to Change? A National Survey of Program Directors on 2017 Work Hours Requirements

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BACKGROUND: The learning and working environment for resident physicians shifted dramatically over the past two decades, with increased focus on work hours, resident wellness, and patient safety. Following two multicenter randomized trials comparing 16-h work limits for PGY-1 trainees to more flexible rules, the ACGME implemented new flexible work hours standards in 2017.

OBJECTIVE: We sought to determine program directors' (PDs) support for the work hour changes and programmatic response.

DESIGN: In 2017, US Internal Medicine PDs were surveyed about their degree of support for extension of PGY-1 work hour limits, whether they adopted the new maximum continuous work hours permitted, and reasons for their decisions.

KEY RESULTS: The response rate was 70% (266/379). Fifty-seven percent of PDs ($n = 151$) somewhat/strongly support the new work hour rules for PGY-1 residents, while only 25% of programs ($N = 66$) introduced work periods greater than 16-h on any rotation. Higher rates of adopting change were seen in PDs who strongly/somewhat supported the change (56/151 [37%], $P < 0.001$), had tenure of 6+ years (33/93 [35%], $P = 0.005$), were of non-general internal medicine subspecialty (30/80 [38%], $P = 0.003$), at university-based programs (35/101 [35%], $P = 0.009$), and with increasing number of approved positions (< 38, 10/63 [16%]; 38–58, 13/69 [19%]; 59–100, 15/64 [23%]; > 100, 28/68 [41%], $P = 0.005$). Areas with the greatest influence for PDs not extending work hours were the 16-h rule working well (56%) and risk to PGY1 well-being (47%).

CONCLUSIONS: Although the majority of PDs support the ACGME 2017 work hours rules, only 25% of programs made immediate changes to extend hours. These data reveal that complex, often competing, forces influence PDs' decisions to change trainee schedules.

KEY WORDS: resident work hours; internal medicine program directors; resident schedules

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INTRODUCTION

The learning and working environment for resident physicians has shifted dramatically over the past two decades. With an intent to improve patient safety, in July 2003, the Accreditation Committee on Graduate Medical Education (ACGME) established policies limiting a work week to 80 h averaged over 4 weeks with a maximum shift length of 30 h.[1] In 2011, the ACGME capped PGY-1 trainee shift lengths at 16 h to provide sufficient time for rest.[2] Each policy change required residency programs to restructure their programs for compliance by establishing night float systems and shifting patient care to non-resident providers.[3,4] Many argued these rule changes compromised education and represented unfunded mandates.[5–8] The Institute of Medicine (IOM) estimated annual labor costs due to the 2011 ACGME work hours to be $1.6 billion.[9] Program directors (PDs) agreed with the broad limits outlined by the ACGME in 2003, but maintained skepticism about education and competency development under the 2011 mandates.[10–12]

Observational studies evaluating patient safety after implementation of both policies failed to show significant benefits.[13,14] Furthermore, studies assessing the impact of reduced work hours on resident quality of life and education have been mixed.[3,15,16] Calls for robust evidence to support further work hour changes resulted in two National Institutes of Health-funded trials.[17,18] Both compared the 2011 work hour limits to

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more flexible schedules (allowing for pre-2011 limits), particularly aligning PGY-1 trainee hours with upper level trainees (24-h shift limits instead of 16-h shift limits). The Flexibility in Duty Hour Requirement for Surgical Trainees (FIRST) trial found allowing flexibility in work hours for surgical trainees did not have deleterious effects on patient safety, resident well-being, or educational quality.[17] The iCOMPARE trial in internal medicine (IM) indicated no difference in direct patient care and education, nor any difference in 30-day mortality.[19] However, PGY-1 trainees with more flexible work hours reported less well-being and satisfaction with educational quality.[18] This contrasted with their PDs who reported more satisfaction with flexible work hours related to patient care, workload, and the learning environment.

The ACGME responded to the FIRST trial by liberalizing the work hour policy in early 2017 and removing the PGY-1 16-h shift limit.[20] Thus, beginning with the 2017–2018 academic year, work hour rules for all residency programs were simplified to five major requirements (Table 1). Within these parameters, PDs were given new flexibility to extend PGY-1 work periods up to 24 h.

Using a national survey of IM PDs, we queried PDs about their attitudes regarding the policy change and if they utilized this new flexibility to extend shifts for PGY-1 trainees during the 2017–2018 academic year or chose to maintain the 2011 work hour limits, and why.

METHODS

Every year, the Association of Program Directors in Internal Medicine (APDIM) develops and administers a nationwide survey of IM PDs to capture demographics and query PDs about issues facing IM residency programs.[21,22] We included a section of questions in the 2017 survey related to program work hours and reasons for either maintaining prior schedules or changing schedules in light of the new ACGME regulations. Survey methodology is previously reported and all 379 APDIM member programs (representing 91% of US PDs at 417 ACGME-accredited IM residency programs prior to July 1, 2016) were invited to participate.[21] The survey opened in late August 2017 and scheduled email reminders were sent to non-responders approximately every 2 weeks until closure of the survey at the end of November 2017.

Table 1 2017 ACGME Rules

2017 ACGME duty hour rules	
1	Residents can work no more than 80 h per week
2	In-house call can occur no more frequently than every third night
3	Residents must have 1 day off every 7 days, all averaged over 4 weeks.
4	Clinical work periods for all residents must not exceed 24 h of continuous clinical assignment, plus 4 h for transitions of care
5	All residents must have 14 h free of clinical work after 24 h of clinical assignment

The authors developed 17 survey questions and edited using an iterative process. APDIM Survey Committee members pilot tested survey questions for clarity and face validity. Questions using branching logic asked participants about their support for changes in work hours, and whether they made schedule changes. Respondents who reported to have made changes were asked about specific rotations and justifications used for those changes. If they did not adjust schedules, they were queried about reasons for not making changes (see supplemental material).

Survey responses were appended with data from publically available sources prior to blinding of program identity for analysis as previously described.[22,23] Descriptive statistics were reported with frequencies and percentages of total. Bivariate associations with selected covariates and changing schedules in response to the 2017 duty hour revisions were assessed using Fisher's exact tests. Continuous valued covariates were dichotomized using the median or other meaningful breakpoint. To account for multiple comparisons, a significance level of alpha = 0.01 was used to determine statistical significance. All analyses were performed using SAS version 9.4 (SAS Institute Inc., Cary, NC). The study was deemed exempt from full human subject research review by the Mayo Clinic Institutional Review Board (ID#: 08-007125), and the Mayo Clinic Survey Research Center fielded the survey using the *Qualtrics* survey platform.

RESULTS

The response rate was 70% (266/379) of APDIM residency program members whose program was of "continued" or "initial" ACGME accreditation prior to July 1, 2016. PDs from university-based programs represented 38% (101/266) of respondents compared to 33% (126/379) for the survey-eligible population, and PDs from community-based, university-affiliated programs represented 48% (127/266) of respondents compared to 52% (198/379) for the survey-eligible population; $P = 0.004$. Larger programs (measured by number of ACGME-approved resident positions) had greater representation among survey respondents compared to the survey-eligible population but was not statistically significant.

The majority of PDs, 57% ($N = 151$), strongly/somewhat supported the increased flexibility in work hours. Opposition to these changes was expressed by a minority of PDs, 15% ($N = 40$). Despite majority support, only 25% ($N = 66$) of programs scheduled PGY-1 residents for greater than 16-h work periods on any rotation. Notably, when stratifying our results by program participation in iCOMPARE, 69% (34/49) of PDs in the iCOMPARE study supported the change in program requirements, as compared to 54% (117/217) of non-participating PDs, and 57% ($N = 28/49$) of PDS in the

iCOMPARE study made schedule changes, as compared to 18% ($N = 38/215$) of non-participating PDs. Among programs who extended PGY-1 hours, most were done on general wards and/or ICU rotations (both $N = 41$, 62%). Of note, for the general wards, schedule changes were nearly evenly split between weekend only coverage ($N = 19$, 46%) vs weekday ($N = 22$, 54%). However, for ICU rotations, the majority ($N = 34$, 83%) of the changes were for weekday.

PDs who somewhat/strongly support the work hour changes ($N = 151$) were significantly more likely to make changes, 37% ($N = 56$) compared with 10% ($N = 4$) of those who somewhat/strongly opposed extending PGY-1 hours ($N = 40$); $P < 0.0001$ (Table 2). Predictive characteristics of PDs more likely to extend PGY-1 hours included longer PD tenure ($P = 0.005$) and PD specialty ($P = 0.003$). Characteristics of programs more likely to adopt new work hours included program type (university vs community/university, $P = 0.009$) and larger program sizes ($P = 0.005$) (Table 2).

PDs who liberalized shift durations ($N = 66$) believed the changes would have a somewhat/very positive effect on frequency of handoffs (86%), continuity of care (83%), team-based care (71%), and quality of education (70%) (Table 3). Narrative comments about the primary motivation included allowing for more weekend days off and decreasing weekend cross-coverage, eliminating night float, alleviating burnout, and improving overall quality of life. The PDs who did not change PGY-1 hours ($N = 198$) cited satisfaction with the current 16-h schedule (85%), risk to PGY-1 well-being (80%), and risk of operational disruption from a change (72%) as having some/a great deal of influence on their decision. Narrative comments reflected concerns about a negative impact on resident recruitment, and a lack of agreement on how work hours contribute to trainee burnout.

Among the 66 programs which implemented longer work periods for PGY-1s, the leading arguments/justifications PD's gave to their PGY-1 residents for the changes included patient safety ($N = 25$, 38%), desire to return to prior schedules that worked well ($N = 14$, 21%), ability to maintain flexible schedules if they were already in the iCOMPARE study ($N = 14$, 21%), and trainees asking for this change ($N = 13$, 20%).

Table 2 Characteristics of Programs and Program Directors by Implementation of the New Flexible Work Hours ($N = 264$)

	n (%)	Changed work hours $N = 66$ (25%)	No change $N = 198$ (75%)	*P* value*
Program directors				
Support of work hour changes				< 0.0001
Strongly/somewhat support	151 (57%)	56 (37%)	95 (63%)	
Neutral/no response	73 (28%)	6 (8%)	67 (92%)	
Strongly/somewhat opposed	40 (15%)	4 (10%)	36 (90%)	
Gender				0.72
Female	99 (38%)	25 (25%)	74 (75%)	
Male	160 (61%)	39 (24%)	121 (76%)	
Unknown	5 (2%)	2 (40%)	3 (60%)	
PD age				0.59
< 50	142 (54%)	37 (26%)	105 (74%)	
50+	117 (44%)	27 (23%)	90 (77%)	
Unknown	5 (2%)	2 (40%)	3 (60%)	
PD tenure				0.005
< 6 years	171 (65%)	33 (19%)	138 (81%)	
6+ years	93 (35%)	33 (35%)	60 (65%)	
PD specialty				0.003
General internal medicine	184 (70%)	36 (20%)	148 (80%)	
Subspecialist	80 (30%)	30 (38%)	50 (63%)	
Programs				
Institution				0.009
University	101 (38%)	35 (35%)	66 (65%)	
Community	33 (13%)	10 (30%)	23 (70%)	
Community/univ affiliated	126 (48%)	21 (17%)	105 (83%)	
Military	4 (2%)	0 (0%)	4 (100%)	
Region				
Midwest	51 (19%)	14 (27%)	37 (73%)	0.89
South	79 (30%)	21 (27%)	58 (73%)	
Northeast	96 (36%)	23 (24%)	73 (76%)	
West	38 (14%)	8 (21%)	30 (79%)	
Total ACGME-approved positions				0.005
< 38	63 (24%)	10 (16%)	53 (84%)	
38–58	69 (26%)	13 (19%)	56 (81%)	
59–100	64 (24%)	15 (23%)	49 (77%)	
> 100	68 (26%)	28 (41%)	40 (59%)	

**Fisher's exact tests*

DISCUSSION

We found that although PDs were generally supportive of the flexible ACGME work hours, this did not translate to schedule changes for the majority of programs. This is surprising given the clamor for change after the 2011 work hours were instituted and the PD survey results in the iCOMPARE study which favored flexible work hours.[5,8,11,18] Our survey found that extension of PGY-1 work hours occurred largely in general ward rotations and ICUs and often for weekends only. Reasons cited by PDs for not making schedule changes were satisfaction with the 16-h rule and PGY-1 well-being. Work hours of physician trainees have long been the subject of debate with competing concerns over its impact on patients, education, and both faculty and resident well-being.[20,24,25]

Table 3 What Influenced PD's Decision to Change PGY-1 Schedule to Include > 16-Hour Work Periods or Maintain Prior Schedules

	Top two boxes *N* (%)
PDs who made schedule changes*	*N* = 66
Reduced frequency of handoffs	57 (86%)
Continuity of care	55 (83%)
Improved team base care	47 (71%)
Quality of education	46 (70%)
Safety of patient care	39 (59%)
PGY-2,3 morale	39 (59%)
Quality of faculty experience	35 (53%)
Quality of life for trainees	22 (33%)
PGY-1 morale	17 (26%)
PDs who did not make changes†	*N* = 198
The 16-h schedule was working well	169 (85%)
Risk to PGY-1 well-being‡	158 (80%)
Risk of operational disruption from the change	142 (72%)
Risk to PGY-1 resistance	99 (50%)
Risk to patient safety	84 (42%)

**Question based on a 5-point scale of very negative to very positive. Top two boxes included "somewhat or very positive" for those who made changes*

†Question based on a 3-point scale of no/some/a great deal of influence. Top two boxes included "some or a great deal of influence" for those who did not make changes

‡There was no difference in who selected well-being based on the size of the residency program; < 60 vs 60+ residents (85/111 (77%) vs 73/86 (85%); P = 0.155)

This survey study corroborates the tension for PDs in balancing many different priorities in designing resident schedules.

It is noteworthy that only 25% of PDs made schedule changes. After a 2009 ACGME policy to improve resident continuity clinics and reduce the tension between inpatient and outpatient patient care responsibilities, 44% of PDs surveyed moved to an X + Y schedule model, most within a year.[26] Although the baseline rate of residency program schedule changes is unknown, we would have anticipated a similar rate of change to the new ACGME flexible work hours. Perhaps the difference reflects more compliance with restrictive policies than liberalizing policies.

PD characteristics including age and gender were not predictive of who made schedule changes, though being a subspecialist or a PD for greater than 6 years did. University-based programs and programs with larger size were more likely to make changes. This is consistent with a prior national survey study which found PD's specialty and program type were predictive of support for more flexible work hours, where community-based/smaller programs were three times more likely to believe work hour changes would decrease the resident experience.[10,11] Smaller programs may face greater challenges in implementing changes due to cost and limited personnel and therefore cannot adopt new work hours as easily. Programs sized by quartiles of approved resident positions demonstrate that larger programs are willing or able to implement changes more quickly. Future recommendations on work hour rules by regulatory agencies should consider that smaller programs may need more time to implement changes. In addition, PDs with longer tenure and more experience may have felt more comfortable making changes given the concerns raised about the impact of work hours on recruitment. The diversity of opinions in our PD survey suggests that program needs are heterogeneous and that PDs design schedules based on different priorities.

Reasons for implementing the schedule changes matched the findings of the iCOMPARE study, where PDs randomized to the flexible work hours were more satisfied with these same elements.[18] This similarity may reflect a bias in selection of programs in iCOMPARE. Program participation in iCOMPARE was voluntary, perhaps reflecting more desire and ability to alter resident schedules if selected. For example, the programs who volunteered for iCOMPARE were bigger programs compared to those who were eligible but did not volunteer. The survey results reflect this bias with more PDs in the iCOMPARE study supporting flexible work hours and actually implementing changes. The fact that PDs who did not make changes cited satisfaction with the PGY-1 16-h work hours as their top reason indicates that despite initial opposition, PDs successfully implemented the 2011 work hour requirements.

Nearly half of PDs who changed general ward PGY-1 rotations did so on weekends only (46%), suggesting that curricular or patient safety reasons were not a primary driver for a substantial proportion of PDs. In fact, patient safety was not listed as a major reason by PDs whether they implemented change or not. The FIRST trial data, which showed no difference in patient safety outcomes, was available at the time of this survey and may have affected PDs' view of patient safety as a reason.[17] Interestingly, the top reasons cited by PDs, including reducing handoffs and continuity of care, could all be considered patient safety issues, so it is notable that patient safety as a survey choice was not given the same weight. This is in contrast to patient safety being the top justification PDs gave to their PGY-1 residents for the schedule changes. This may reflect published studies showing an association between resident perception of patient safety and duty hour violations and therefore the easiest explanation to provide.[27,28] PDs also listed faculty experience as a reason for change. Survey studies after the 2011 work hour suggested faculty reported increased workload and were less satisfied with resident education.[24,25] The diversity of reasons used by both groups of PDs suggests flexibility in scheduling allowed PDs to highlight different priorities when managing a variety of challenges inherent to resident work.

Finally, resident well-being was listed as an indication for both changing and not changing schedules by both groups of PDs. It was a key reason provided by PDs who opted not to make any changes regardless of program size. For PDs who implemented changes, the narrative comments indicated well-being and time off were key factors for reducing the number of weekends needed to work or eliminating night float rotations. Notably, this highlights our overall lack of understanding of the main drivers of trainee burnout, with PDs trying to balance longer work periods with more weekends off vs shorter work periods with either increased night float or weekend coverage.[29,30]

Our study has limitations. First, more of the respondents were from larger university-based programs which may have influenced the outcomes. The survey was done before the iCOMPARE results were published, but after the FIRST study found no patient safety benefits. This may have affected PDs' responses. Our results may also have been influenced by the selection bias of those who participated in iCOMPARE. This survey represents IM PD's views only, not residents' perceptions. The survey asked about changes for the first academic year after the new rules were implemented. Given PD's ability to rapidly change their program may vary based on staffing and schedules, results may differ over time. We were unable to assess all the pressures PDs are under in creating schedules or measure institutional inertia or all obstacles to implementing change. The baseline rate at which residency programs change their schedules is not known, so we are unable to provide context. Finally, we were not able to connect the results with burnout, recruitment, or resident well-being.

CONCLUSION

This national survey of IM PDs' view of the ACGME new flexible work hours illustrates the complexity involved in designing and choosing resident work schedules. While PDs were supportive of increased flexibility, only a minority made immediate schedule changes. These data illustrate the complexity of resident work hours, trainee scheduling, and PDs' need to weigh a variety of competing interests for their current and future trainees.

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Compliance with Ethical Standards:

Conflict of Interest: *The authors declare that they do not have a conflict of interest.*

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