



# Resident Duty Hours: A Survey of Internal Medicine Program Directors

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**INTRODUCTION:** In 2011, the Accreditation Council for Graduate Medical Education (ACGME) implemented new Common Program Requirements to regulate duty hours of resident physicians, with three goals: improved patient safety, quality of resident education and quality of life for trainees. We sought to assess Internal Medicine program director (IMPD) perceptions of the 2011 Common Program Requirements in July 2012, one year following implementation of the new standards.

**METHODS:** A cross-sectional study of all IMPDs at ACGME-accredited programs in the United States ( $N=381$ ) was performed using a 32-question, self-administered survey. Contact information was identified for 323 IMPDs. Three individualized emails were sent to each director over a 6-week period, requesting participation in the survey. Outcomes measured included approval of duty hours regulations, as well as perceptions of changes in graduate medical education and patient care resulting from the revised ACGME standards.

**RESULTS:** A total of 237 surveys were returned (73 % response rate). More than half of the IMPDs (52 %) reported “overall” approval of the 2011 duty hour regulations, with greater than 70 % approval of all individual regulations except senior resident daily duty periods (49 % approval) and 16-hour intern shifts (17 % approval). Although a majority feel resident quality of life has improved (55 %), most IMPDs believe that resident education (60 %) is worse. A minority report that quality (8 %) or safety (11 %) of patient care has improved.

**CONCLUSION:** One year after implementation of new ACGME duty hour requirements, IMPDs report overall approval of the standards, but strong disapproval of 16-hour shift limits for interns. Few program directors perceive that the duty hour restrictions have resulted in better care for patients or education of residents. Although resident quality of life seems improved, most IMPDs report that their own workload has increased.

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Based on these results, the intended benefits of duty hour regulations may not yet have been realized.

**KEY WORDS:** graduate medical education; resident duty hours; compliance; patient safety.

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## INTRODUCTION

Over the past decade, increased duty hour regulations for resident physicians have transformed the United States graduate medical education system. In 2003, the Accreditation Council for Graduate Medical Education (ACGME) established the first national limits on working hours, with the goals of improving patient safety and resident education. In addition to a maximum 80-hour work week, the ACGME created standards for shift length, call frequency, and minimum days off.<sup>1</sup> In 2010, further changes were proposed by the ACGME Duty Hours Task Force in response to recommendations published in the 2008 report “Resident Duty Hours: Enhancing Sleep, Supervision, and Safety,” from the Institute of Medicine (IOM).<sup>2,3</sup> The most significant and controversial change limited first year residents to 16-hour shifts and required that these junior residents have on-site supervision immediately available at all times.

Following release of the IOM report in 2008, several prominent Internal Medicine (IM) organizations offered opinions to the ACGME regarding the potential impact of further duty hour restrictions. In 2009, the American College of Physicians (ACP) expressed concern about the lack of flexibility in duty hour regulations for meeting the goals of residency training.<sup>4</sup> The Alliance for Academic Internal Medicine advocated developing evidence-based standards for duty hour limits, and recommended increased flexibility similar to the ACP.<sup>5</sup> Published surveys of both program directors and residents noted mixed feelings about the potential impact of the regulations on education and

patient care.<sup>6–10</sup> Nevertheless, the proposed 2010 ACGME regulations were implemented in July 2011, with minimal revisions following the comment period.<sup>11</sup>

In implementing the new Common Program Requirements, many residency programs modified their rotation and daily schedules, generating some concerns and criticism about the unintended impact on education, patient safety, professionalism and quality of life.<sup>12–15</sup> More recent studies have noted that interns—the group with the most significant time restrictions—are spending less time on direct patient care, and resident surveys indicate general disapproval of the duty hour regulations and a perceived negative impact of the regulations on education.<sup>16,17</sup>

To date, no studies have specifically addressed Internal Medicine program directors' (IMPDs) response to the 2011 Common Program Requirements. IMPDs oversee the largest specialty training group, which represents the greatest number of residents and future physicians in the United States. As such, their opinions and experiences regarding the impact of duty hour regulations on residency training and patient care are particularly relevant, especially to any future modifications of the requirements. We conducted a national survey of IMPDs in July 2012, one year after implementation of the new standards, to determine the impact of the new duty hour standards on training from a program director's perspective, as part of a larger survey including surgery and pediatrics program directors.<sup>18</sup>

## METHODS

We used an observational study design with cross-sectional survey data collected from residency directors of ACGME-accredited IM training programs. A 32-question survey was constructed by the authors from prior studies and the Common Program Requirements, which averted the need for pilot testing.<sup>9,16,19</sup> In addition to a series of demographic questions, respondents were asked eight questions about approval of duty hour restrictions, including one question regarding “overall impression” of the changes. The next section consisted of 18 questions regarding perceptions of changes in graduate medical education as well as changes in patient care resulting from the revised ACGME standards. The survey is available as an [online appendix to the manuscript](#).

Following approval from the Rhode Island Hospital Institutional Review Board, we collected the names and contact information for all IMPDs ( $N=381$ ) from available ACGME listings, institutional websites and through an extensive internet search. Functional email addresses were identified for 323 (85 %) IMPDs. Beginning in June 2012, three individualized emails were sent to each identified program director over the course of 6 weeks, requesting participation in the anonymous, self-administered electronic survey. Each email requested an affirmation or refusal of

participation to iteratively refine the sampling to include only those program directors who had not yet participated. Participation was voluntary, with no compensation provided. Standard error of proportions was used to construct 95 % confidence intervals; statistically significant differences between mean responses to each question were established by non-overlapping confidence intervals. These results were confirmed with a one-sample hypothesis test of a multinomial distribution. The chi-square test was used to evaluate for independence of proportions between independent demographic groups. Data analysis and statistical testing was performed with Excel (Microsoft®) and SPSS version 21 (IBM®).

Because all scales were measured at the ordinal level, internal reliability was estimated using the ordinal alpha.<sup>21</sup> The ordinal alpha was estimated using the R programming language, 3.0.0 (R Foundation for Statistical Computing, Vienna, Austria) using the psych<sup>22</sup> and GPArotation (Bernaards & Jennrich, 2005) packages (see Gadermann, Guhn & Zumbo, 2012).<sup>23,24</sup>

## RESULTS

A total of 237 responses were obtained from eligible participants (73 % response rate). Most respondents were males (71 %) between the ages of 40 and 60 years (71 %). Half of the IMPDs were from academic medical centers (AMCs – 50 %), while the remainder reported primary affiliation with community (46 %) or military hospitals (3 %). Comparable demographics for the national sample were not available (Table 1). The ordinal alpha was

**Table 1. Demographics of Survey Respondents**

		Number (% of respondents)
Gender	Male	168 (71)
	Female	67 (28)
	Not Reported	2 (< 1)
Age	< 40	29 (12)
	41–60	169 (71)
	> 60	27 (11)
	Not Reported	12 (5)
	Years as program director	0–5
	6–10	47 (20)
	11–15	46 (19)
	16–20	24 (10)
	> 20	22 (9)
	Not Reported	0 (0)
Primary training site affiliation	VA or Military	6 (3)
	Academic Medical Center	119 (50)
	Community-Based	108 (46)
	Not Reported	4 (2)
Total # of residents in your program	10–29	29 (12)
	30–49	71 (30)
	50–79	53 (22)
	80 or more	80 (34)
	Not Reported	4 (2)

calculated using a polychoric correlation matrix. The ordinal alpha value was 0.91, indicating good internal consistency amongst the scale’s items. The survey contained two primary sections: 1) approval of duty hour regulations and 2) perceived changes in patient care, resident education and quality of life resulting from the regulations.

**Approval of Duty Hours Regulations**

Most IMPDs reported “overall” approval of the 2011 duty hour regulations (52 %). Nearly 70 % or more of respondents approved of each of the duty hour regulations, with the exception of senior resident duty periods, of which less than half of IMPDs reported approval (49 %), and 16-hour intern shifts, of which only 35 % of IMPDs reported approval (Table 2). Despite the generally reported approval of the regulations, 61 % of IMPDs stated that there should be fewer duty hour regulations. This response was strongly associated with feelings of overall disapproval—of the 51 program directors reporting overall disapproval, 49 felt that there should be fewer regulations. In subgroup analysis, no differences were noted between IMPDs at community-affiliated programs compared to AMCs.

Finally, we examined reported “overall” approval based on responses to individual duty hour standards and perceived impact of duty hour standards. There was a strong association between overall disapproval and disapproval of intern shift limitations (conditional probability;  $P=1.0$ ). Several “impact” variables were also associated with greater overall disapproval, including reported worsened continuity of care ( $P=1.0$ ), ownership of patients ( $P=0.96$ ), and increases in hand-offs ( $P=0.96$ ) as well as resident education ( $P=0.94$ ) and preparedness for senior roles ( $P=0.92$ ).

**Table 2. Internal Medicine Program Director Approval of Components of the 2011 Common Program Requirements (Question: Regarding the ACGME Common Program Requirements, please indicate your level of approval.) (N=237)**

	Disapprove	Neutral	Approve
	Percent of Respondents (95 % Confidence Interval)		
Direct supervision of PGY1	4 % (2–7)	11 % (7–15)	85 % (80–89)*
80-h work week	7 % (4–10)	13 % (9–17)	80 % (75–85)*
1 day off in 7	2 % (0–4)	8 % (5–12)	90 % (87–94)*
16-h PGY1 shifts	65 % (59–71)*	18 % (13–23)	17 % (13–22)
24+4 h senior resident shifts	26 % (20–31)	26 % (20–31)	49 % (43–55)*
8 h off between shifts	12 % (8–17)	18 % (13–23)	70 % (64–76)*
Night shift frequency (< 7 consecutive days)	11 % (7–15)	16 % (12–21)	73 % (68–79)*
Overall impression	22 % (17–27)	26 % (20–31)	52 % (46–59)*

\*Indicates significant difference by non-overlapping 95 % confidence intervals

**Perceived Impact of Duty Hours Regulations**

IMPDs reported mixed perceptions about the impact of the Common Program Requirements (Table 3). Only quality of life was identified as an area improved by a majority of respondents (55 %). Most directors reported that resident education (60 %) and preparedness for more senior roles (70 %) were negatively impacted, but most did not feel that board scores or in-service examination performance suffered (73 %). Likewise, the majority of respondents reported no change in the balance of service and education (61 %). With regard to patient care, most IMPDs perceived no change in safety (57 %), while the plurality stated there was no difference in quality of care (49 %). A large majority, however, reported increased patient hand-offs (90 %), with diminished continuity of care (83 %) and resident ownership of patients (76 %). Although more IMPDs reported increased supervision (33 %) than decreased (6 %), the majority reported no change (62 %). Finally, 72 % of respondents reported that program directors have experienced increased workload as a result of the new regulations.

No difference was noted for reported IMPD workload among any of the demographic groups.

**DISCUSSION**

One year after implementation, more than half of IMPDs (52 %) reported an “overall” favorable impression of the 2011 ACGME Common Program Requirements, although several individual standards received lower approval, including 16 hour PGY1 shifts (17 %) and 24-hour senior resident daily duty periods (49 %).

**Shift Length Limits**

The shift length limits may be most contentious because of their perceived impact on the quality of resident education and patient safety. It has been reported that IM residents increasingly spend their time on indirect patient care activities like speaking with other providers and documentation, with as much as 40 % of time dedicated to computer use.<sup>25</sup> With scheduling changes instituted to meet 16-hour limits, more IM intern time may be spent on night shifts, decreasing availability for teaching conferences that generally occur in the daytime.<sup>26</sup> Furthermore, increased patient handoffs may have negative implications for patient safety.<sup>27</sup> Although the ACGME Common Program Requirements state that “programs must design clinical assignments to minimize the number of transitions in patient care,”<sup>1</sup> over 90 % of IMPDs report increased handoffs and 80 % report a decrease in continuity of patient care under the 2011 Common Program Requirements.

Table 3. Internal Medicine Program Director Perception of 2011 Common Program Requirements (N=237)

	Worse Percent of Respondents (95 % Confidence Interval)	Unchanged Percent of Respondents (95 % Confidence Interval)	Improved
Patient safety	33 % (27–39)	57 % (50–63)	11 % (7–15)
Quality of patient care	43 % (37–49)	49 % (43–55)	8 % (5–12)
Resident education	60 % (54–67)*	30 % (24–35)	10 % (6–14)
Resident board/in-service scores	23 % (18–28)	73 % (67–78)*	4 % (2–7)
Resident quality of life	11 % (7–15)	33 % (27–39)	55 % (50–62)*
Resident fatigue	6 % (3–9)	49 % (43–55)	45 % (38–51)
Resident preparation for more senior roles	70 % (64–75)*	28 % (22–34)	3 % (1–5)
Education vs service balance	24 % (19–30)	61 % (55–68)*	14 % (10–19)
Resident ownership of patients	76 % (71–82)*	23 % (17–28)	1 % (0–3)
Continuity of care	83 % (78–87)*	14 % (9–18)	4 % (1–6)
	Decreased Percent of Respondents (95 % Confidence Interval)	Unchanged	Increased
Number of patient's seen/operative cases	48 % (42–55)	49 % (42–55)	3 % (1–6)
Supervision of residents	6 % (3–8)	62 % (55–68)*	33 % (27–39)
Frequency of hand-offs/signout	2 % (0–3)	8 % (5–12)	90 % (87–94)*
Program director workload	0 % (0–0)	28 % (22–34)	72 % (66–78)*
Physician extender (NP, PA) coverage	0 % (0–0)	48 % (42–55)	52 % (45–58)
	Disagree Percent of Respondents (95 % Confidence Interval)	Neutral	Agree
Length of training should be increased	49 % (43–56)*	31 % (25–37)	20 % (15–25)
There should be fewer duty hour regulations	14 % (10–19)	25 % (19–30)	61 % (55–67)*

\*Indicates significant difference by non-overlapping 95 % confidence intervals

NP = nurse practitioner; PA = physician's assistant

Reconciliation of these two conflicting elements should be addressed as further experience with the latest duty hour standards evolves.

## ACGME Goals

The three primary goals proposed for the 2011 ACGME Common Program Requirements were improved patient safety, quality of resident education and quality of life,<sup>28</sup> yet it is not clear that there have been positive improvements in these areas for IM programs. Few IMPDs in this survey feel that the new duty hour standards have resulted in improved patient safety (11 %), quality of care (8 %) or resident education (10 %). Meanwhile, the majority of IMPDs (55 %) report improved resident quality of life. This may reflect the perception that interns, and possibly residents, are now less fatigued, which was reported by 45 % of IMPDs in this survey.

A recent review of resident comments regarding the duty hours changes revealed mixed perspectives on improved quality of life. The majority of residents predicted an improvement in quality of life, but noted that senior residents may experience worse quality of life with displaced responsibility from junior residents, and overall residents may have fewer “golden weekends” off or increased work from home with the changes.<sup>10</sup>

Compared to other specialties, IMPDs in this study were less likely to feel that there should be fewer duty hours regulations than surgeons or pediatricians (61 % versus 78 % and 71 % respectively,  $p < 0.01$ ).<sup>18,20</sup> IMPDs were also less likely to report increased use of physician extender coverage (OR 0.48,  $P < 0.01$ ) than the other two specialties, which may contribute to work load compression challenges reported by residents under new duty hour restrictions.<sup>14</sup>

The implications of these findings are arguably more compelling for IM than other specialties, as continuity of care over a patient's hospital stay remains a fundamental component of clinical education, and more recently, of milestone-based evaluation through direct observation in this specialty. Disciplines such as Emergency Medicine, in which residents are generally scheduled in defined shifts, may be affected differently than IM for this reason. IM is also distinct from specialties like surgery, in which some aspects of progress toward graduation can be measured with case logs and defined procedural competencies. These differences in training paradigms may account for 60 % of IMPDs in this study reporting that they perceive resident education to be compromised. Nevertheless, 73 % felt that in-service exam and board scores have not changed.

## Cost and Difficulty of Implementation

One potential explanation for the findings in this study is that IMPDs have been focused more on adoption and implementation challenges and less on the basis for the regulations. Only 42 % of IMPDs report their residents are “always” compliant with duty hours standards, which may reflect ongoing program challenges in implementation.

This finding of poor compliance was seen in all specialties in the program director survey and in a similar study of residents.<sup>16</sup> A previous study noted a correlation between residents reporting non-compliance with duty hours and reporting issues with other areas of resident education, including faculty teaching, supervision, service obligations and mechanisms to resolve issues without fear or intimidation.<sup>29</sup> Whether or not the same holds true for program directors' perception of compliance is unknown.

In a recent survey from the Association of Program Directors in Internal Medicine (APDIM), nearly half of IMPDs (47 %) reported decreased morale and 88 % reported increased complexity of scheduling due to the 2011 duty hour changes.<sup>30</sup> In our survey, nearly three quarters of IMPDs (72 %) reported increased workload as a result of duty hour changes, and zero respondents reported decreased workload. Many IMPDs have reported difficulty implementing the new standards, particularly 16-hour shifts for first-year residents and 10 hours off between shifts.<sup>31</sup>

When IMPDs were asked to estimate the cost of compliance with the 2011 duty hour standards in their programs, the median estimate was \$180,000.<sup>32</sup> Across all ACGME-accredited programs it has been estimated that the annual labor costs of 2011 duty hour regulations may be as high as \$1.6 billion. However, these costs may be offset by a decrease in the number of preventable adverse events in patients if the duty hours changes ultimately result in fewer physician fatigue-related errors and better quality of care.<sup>33,34</sup> Future studies should address the true costs incurred in adopting the new standards, including the cost of mid-level providers, as well as the impact of duty hours changes, especially for interns, on program didactics and faculty time.

The future of duty hours standards is unclear, particularly since the impact of changes in training on competency at graduation, patient safety and quality and cost of care has not been adequately studied. Almost 20 % of IMPDs in this study responded that the length of residency training should be increased, suggesting that they believe 3 years of training under current duty hours restrictions is no longer adequate. Meanwhile, others have suggested decreasing the length of training or changing the structure of residency programs because of the cost associated with undergraduate and graduate medical education.<sup>35–37</sup> Future studies should focus on evolving perceptions of program directors as time passes, and on more objective patient safety and outcomes data as they relate to duty hours changes.

## LIMITATIONS

This study is limited by the observational survey instrument. Compared to objective values, the survey measures perceived impact on variables such as resident quality of life, fatigue, patient safety and quality of care, and not actual outcomes. Likewise, questions in the survey focused only on the current viewpoint, and not reasons for the perceptions elicited. As such, there is potential for interpretation bias as well as recall bias. Social desirability of responses is less of a concern because of the anonymous nature of the survey. This study may be affected by selection bias that can be present in cross-sectional studies. Although the high response rate reduces this concern, it

should be noted that from the outset, all U.S. IMPDs were not able to be surveyed due to a lack of email contact information on some. If factored into our analysis, our effective response rate would decrease from 73 to 62 %, but this remains a response with minimal concern for non-response bias.<sup>38</sup>

Despite these weaknesses, the perceived negative impacts and overall impression of IMPDs in this study are compelling.

## CONCLUSION

This study describes the perceptions of IMPDs one year after implementation of 2011 ACGME Common Program Requirements. Despite finding overall approval of the duty hour standards, individual components are still perceived negatively, especially the 16-hour PGY-1 limitation. Few IMPDs reported that duty hour standards have resulted in better outcomes for patients or education for residents. In addition, while resident quality of life may be improved, the workload for program directors seems to have increased.

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