


# BMJ Open Trainee perceptions of resident duty hour restrictions: a qualitative study of online discussion forums

Anahita Dehmoobad Sharifabadi,<sup>1</sup> Chantalle Clarkin,<sup>2,3</sup> Asif Doja <sup>2</sup>

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<sup>1</sup>Faculty of Health Sciences, McMaster University, Hamilton, Ontario, Canada

<sup>2</sup>Children's Hospital of Eastern Ontario Research Institute, Ottawa, Ontario, Canada

<sup>3</sup>Department of Virtual Mental Health and Outreach, Centre for Addiction and Mental Health, Toronto, Ontario, Canada

## Correspondence to

Dr Asif Doja; [adoja@cheo.on.ca](mailto:adoja@cheo.on.ca)

## ABSTRACT

**Objective** Resident duty hour (RDH) restrictions in postgraduate medical education is a controversial yet important topic for study. There is limited literature on authentic trainee perceptions surrounding RDH restrictions to inform evaluation and future planning. Online forums are a widely accessible, yet underused resource, for insight into trainee perceptions. Our objective was to qualitatively assess trainee perceptions of RDH restrictions on online discussion forums.

**Setting** Online discussion forums; Premed101 (Canadian forum) and Student Doctor Network (SDN) (American forum).

**Participants** 6630 posts from 161 discussion threads; comprising 429 posts in 14 threads from Premed101 and 6201 posts in 147 threads from SDN. Posters included medical students, residents and attending physicians.

**Design** Data were analysed inductively and iteratively to create themes and subthemes. Cocoding, consensus-based decision making and an audit trail were used to ensure trustworthiness.

**Results** Key findings distilled across both forums include: the relationship between hours worked and competence, the inapplicability of blanket RDH restrictions to all specialties and the inter-relationship between fatigue and patient safety. Discussions of RDH restriction compliance and perceived consequence for the reporting of violations were also featured on the American SDN forum.

**Conclusions** The findings of this study reveal multiple themes pertinent to the implementation and revision of RDH restrictions. The most prominent theme was the inapplicability of blanket restrictions on duty hours theme due to the diversity of training needs across specialties and the environmental context of training programmes. Other discussions included the inter-relationship of patient safety and resident competence with duty hours. Lastly, concerns regarding the lack of transparency and psychological safety surrounding RDH violations, were discussed.

## INTRODUCTION

Resident duty hour (RDH) restrictions are an evolving aspect of postgraduate medical education, with the initial spark for RDH discussions being the Libby Zion case in 1989.<sup>1</sup> This prompted the Accreditation Council for Graduate Medical Education (ACGME) to impose national RDH regulations in 2003,

## STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This study used online discussion forums as a data source allowing for open and direct access to trainee perspectives and experiences, without financial incentives or predetermined structure that could limit insights.
- ⇒ The nature of anonymous online discussion forums does not allow the identification of poster demographics and its relation to voiced opinions.
- ⇒ This study does not cover all discussion forums (eg, Reddit or Quora).
- ⇒ Selection bias may be inherent to this type of research design as some trainees may be more inclined to share their perspectives in these types of forums than others.

with further revisions in 2011 and 2017.<sup>2</sup> In Canada, there remains little consensus and varying levels of restrictions nationally.<sup>3</sup>

There are a multitude of factors to consider with RDH restrictions. Residents have inter-related responsibilities, both as providers and trainees, creating difficulty in restricting RDH with today's healthcare needs.<sup>4 5</sup> Furthermore, the association of resident well-being, patient safety and RDH restrictions has been controversial.<sup>6 7</sup> The Individualized Comparative Effectiveness of Models Optimizing Patient Safety and Resident Education trial demonstrated flexibility in duty hours did not adversely affect patient outcomes.<sup>8</sup> Systematic reviews have demonstrated that RDH restrictions are not the sole determinant of patient safety; other factors such as patient handovers, continuity of care and staff supervision are additional contributors.<sup>9</sup> Additionally, clinical competence post-training is also an important outcome of RDH, as some studies show the negative impact of RDH restriction on resident education.<sup>3</sup>

Trainee perspectives are an important consideration to the implementation of RDH restrictions, as these perspectives have been understudied relative to expert opinions in medical education decision making.<sup>10</sup> While



some studies demonstrate congruence in attending and trainee perceptions of RDH reforms,<sup>11</sup> other studies, including the Flexibility in Duty Hour Requirements for Surgical Trainees (FIRST) Trial, have demonstrated discordant views in trainee and programme director (PD) survey responses.<sup>12</sup>

Our prior studies using online forums as a research tool for various medical education topics has provided highly unique insight.<sup>10 13</sup> These open-access platforms allow for individuals from various training levels to share their thoughts and participate anonymously, without the constraints of a formal research setting.

The purpose of this study was to explore trainee perceptions of RDH regulations expressed in online discussion forums using qualitative methods.

## METHODS

Our study followed the Standards for Reporting Qualitative Research.<sup>14</sup> A social constructivist paradigm provided the epistemological foundation for this study. In terms of social constructivism, individual knowing is viewed as being rooted in, unfolding from, and shaped by the collective knowledge and larger social practices one participates in inclusive of virtual networks and communities.<sup>15</sup> Given this view of knowledge, engagement in interactive, asynchronous online discussion forums can frame both the process and quality of knowledge building in medical education. In these online forums, posts are organised within threads, where posters may start a new thread or participate in an existing discussion, with the option of posting anonymously or disclosing their identity.

We have described our search methods and analytic approach in a prior study on online discussion forums.<sup>10</sup> We examined postings from Premed101 (<http://forums.premed101.com/>), a Canadian website, and Student Doctor Network (SDN) (<http://www.studentdoctor.net/>), an American website. These websites do not have specific requirements for posting; however, generally Premed101 is a forum used by Canadian trainees, while SDN is the American counterpart. The forums are moderated by 'superusers' who have contributed significantly to these forums, in order to ensure basic principles are preserved (eg, avoiding multiple posts, unprofessional behaviours and discussion of illegal activities). Two study members (ADS and CC) were involved in data extraction and verification. ADS is a resident physician, and CC is a registered nurse and qualitative health researcher with a doctorate in education. ADS completed a preliminary scan of discussion forum posts relevant to RDH. Based on the initial review, we identified a set of common terms and conducted a keyword search of all pertinent terms to each forum (table 1). Posts were restricted to the date range of 1 January 2000 to 25 January 2019. We applied a filter in SDN to restrict our search to premedical, medical students and resident/physician subforums. One researcher (ADS) screened all posts for relevance to our research question. Subsequently, our team discussed

**Table 1** Keyword search and results

Terms	Premed101	SDN
Resident duty hour	5	469
Resident duty hours	6	469
Resident duty hour limit	1	500
Resident work hour	151	497
Resident work hours	140	495
Resident work hour limit	8	495
Duty hour	26	483
Duty hours	60	483
Duty hour limit	3	495
Work hour limit	43	478
Work hour restriction	8	495
Work hour restrictions	24	495

SDN, Student Doctor Network.

selected posts for inclusion based on consensus. Posts were included if the content was of any relevance to upcoming and ongoing RDH restrictions. If posts did not explicitly mention RDH, they were screened and coded for relevance of replies within the discussion thread.

The content was subsequently imported to NVivo V.11 (QSR International, USA). Initially, one study member (ADS) examined the data line by line to create preliminary codes. A second reviewer (CC) cocoded a subset of 600 posts, further refining and revising the preliminary codes. An iterative process of inductive content analysis was employed to identify themes in the dataset, whereby we created categories from the raw content without a theory-based categorisation matrix. In order to examine the similarities and differences, categories were created from the codes by regrouping them into themes and further subthemes and identifying representative quotes. Once within-forum analysis was complete for both datasets, we conducted cross-forum analysis to contrast and synthesise emergent findings.<sup>16</sup> We ensured trustworthiness of our results through cocoding a subset of data, team discussions at multiple phases of coding and maintaining an audit trail of all coding and analytic decisions.

To encourage reflexivity, we engaged in an ongoing, collective process of questioning how our personal and professional positionalities, assumptions and biases could be shaping the inquiry, analysis, findings and interpretations.<sup>17</sup> For instance, we questioned whether any concepts or questions were being omitted due to our beliefs or preconceptions on the topic of RDH. During analysis, we sought to identify and explore diverging perspectives observed within and across the datasets, created codes using language drawn from discussion threads when possible and maintained a detailed audit trail to document our assumptions and emerging interpretations. Reflexivity enhanced research team communication and

promoted rich discussions of both the data and our positions as researchers engaging in this process.

### Patient and public involvement

Patients or the public were not involved in the design, or conduct, or reporting, or dissemination plans of our research. However, individual posters were contacted regarding quotations that were included in the research.

## RESULTS

A total of 6630 posts from 161 discussion threads were examined: 429 posts from 14 threads were from Premed101 and 6201 posts were from 147 threads in SDN forums.

### Role of hours in learning and competence

A large number of discussion threads were linked to the perceived impact of RDH restrictions on aspects of learning and competence. This emerged as one of the top three themes across both SDN and Premed101 forums. The major components included the inapplicability of blanket rules to all specialties and the inter-relationship of learning and RDH restrictions. The notion that *blanket rules do not apply to all specialties* highlighted the need for contextually sensitive and responsive regulations on duty hours. Specifically, surgical specialties were identified as a group requiring exposure through longer hours and higher case numbers to gain proficiency. Additionally, even within surgical specialties and variably sized programmes, work hours need to be adjusted to the specific needs and context of the institution.

...You can handoff a medicine patient waiting on a CT scan to another team; you can't handoff a Whipple procedure to another team. Surgery residencies are smaller than medicine residencies, patients are sicker, and they operate in addition to managing them medically. (SDN)

The importance of *learning on call and overnight* to developing competency in medicine was also distilled as a subtheme. In SDN, posters discussed that skills such as acquainting oneself with new patients to manage their emergencies, resuscitating patients without direct staff supervision and eliciting management plans considering available overnight resources allowed trainees to 'grow professionally'. Similarly in Premed101, posters discussed the importance of the call experience, describing that little to no supervision overnight allowed for the opportunity to independently reason through clinical decisions. Posters stated that the 'stress and hecticness' of overnight call 'tends to burn those patients into (one's) memory much better'.

Being there alone at night forces you to make decisions on your own. Until you do that, you are really just a med student with a longer coat. It's like learning to ride a bike [...], until those training wheels come off you aren't really riding a bike. (SDN)

It was also posited that '*long hours help with future job preparation*'. Many respondents in SDN remarked that there are no duty hour restrictions when one is working as an attending physician; therefore, one needs to be prepared in similar conditions as a trainee. Posters discussed how long hours have a role in training residents to withstand the demands of their job despite feeling fatigued or burnt out, once the RDH restrictions would no longer protect them.

A minority of posts disagreed with these statements, stating that staff physicians have more control over their hours and if they choose to work longer periods, it is through their own will. Equally, some posters felt strongly that *long hours do not equate to more learning*. Moreover, that longer hours are often due to inefficiencies of the system; 'scut work' and 'troubleshooting paperwork' were felt to be non-educational and to not meaningfully translate to improved competence.

### Patient safety and medical error

Patient safety and medical error were notable themes across discussions in SDN and Premed101, specifying inter-relationships between *handovers* and *medical errors*. Regarding handover, the majority of posters agreed that *handover issues tend to increase due to RDH restrictions*; most posters agreed that when a patient deteriorates overnight, it is best for the patient to have trainees who are more familiar with their care, as opposed to someone who is just getting to know the patient, even if they are well rested. Furthermore, some posters stated that even if the quality of handovers were improved, there is no substitute for witnessing the patient's illness journey throughout the day. Similarly in Premed101, posters discussed that the 'broken telephone communication system' was detrimental to patient care. Regarding medical errors, the majority of posters in both forums discussed how *long hours can increase the risk of fatigue-related medical errors*. Posters questioned whether they would allow loved ones to be cared for by physicians who were similarly exhausted after 24-hour shifts.

Conversely, a minority of posts discussed that handovers happen regardless of shift length; therefore, teaching comprehensive handover procedures are more important than focusing on reducing the number of handovers by adjusting shift length.

### Adherence to RDH restrictions

Programme adherence to RDH restrictions was a prominent theme in the SDN forum but rarely surfaced in discussions in the Premed101 forum. In SDN, many posters discussed the 'unspoken rule' in certain residency programmes, where RDH regulations are not followed. Many threads were started by self-identified interns who sought advice for violating RDH regulations and respondents agreed that the best course of action would be to *lie when logging work hours* to 'get through intern year'. The alternatives to *facing RDH regulation violations were thought to carry unfavourable, career-changing consequences* include

being negatively treated by coresidents, experiencing a possible programme probation leading to delayed graduation and damaging rapport with staff physicians who may play a role in future career opportunities.

If we report anything negative or that we are punished as a group and personally. We are pressured into lying about our hours, often doing 100+/ week. [...] (SDN)

Do not get your program in trouble for this. They will make it hell for you. You will get no job recommendations. [...] (SDN)

Another major concern raised with duty hour violations was the *anonymous reporting system*. Many posters stated that in reality the reporting system is not anonymous, because in small programmes, it is relatively easy to identify the trainee responsible for the complaint.

The procedure for this is ‘anonymous’ surveys that ask if you violated work hours. How do you think that will work when you are in a 2 person urology class? It will be pretty easy to tell who tattled, and you can kiss any positive treatment you had goodbye for the rest of your residency. [...] (SDN)

### Resident well-being

The topic of resident well-being emerged as one of the top three themes in Premed101, while less prominently discussed in SDN. In SDN, many posters described 30-hour shifts to be a ‘human rights abuse’; the inability to attend to one’s basic needs, such as sleep, was described to contribute to inhumane working conditions and labour law violations. Duty hours were not the only occupational stress attributed to decreased satisfaction or burnout, posters described that ‘toxic personalities’, ‘scut work’, ‘complete lack of control over (one’s) life’ and abusive working environment as perhaps more significant contributors to burnout. Some residents felt that performing the duties of other allied healthcare professionals, such as social work, which they did not have expertise in, contributed to a sense of burn out.

In Premed101, the impacts of sleep deprivation of mood, cognition and overall well-being were similarly discussed. Posters cited studies that framed sleep deprivation as equivalent to intoxication. Some felt that sleep deprivation threatened their personal safety and mental health, contributing to a sense of moral injury.

### DISCUSSION

Analysis of the Premed101 and SDN forums revealed several themes regarding trainee perspectives of RDH. Most notably, the inapplicability of blanket RDH restriction rules for all specialties and all programmes, patient safety issues related to handover, resident well-being and the potential repercussions of non-adherence to RDH restrictions with implications to reporting systems.

The most prominent theme was the contextual implications of RDH restrictions. Specifically, more procedure-based specialties described the importance of immersion and hands-on training as a vital aspect of their training curriculum. Since the inception of RDH restrictions, studies have demonstrated the negative impact of RDH restrictions in surgical specialties attributing this to an apprenticeship model of surgical training.<sup>18</sup> This is in agreement with expert opinion in an ACGME task force review; work hour rules derived from inpatient clinical medicine do not apply to specialties such as pathology, radiology and emergency medicine.<sup>19</sup> Another study of 719 PDs in US residency programmes, demonstrated that surgery PDs were more likely to believe that ACGME RDH restrictions decreased residents’ competency.<sup>20</sup>

In terms of patient safety, most posts in the handover subtheme agreed that handover issues occur with RDH restrictions. That said, the literature on patient safety and RDH restrictions has generally demonstrated no differences between the traditional and the restricted shift length systems.<sup>7 8 18</sup> Our study findings align with a publication by Desai *et al*,<sup>21</sup> who demonstrated that reduced quality of care was associated with the night float system due to the increased frequency of handovers. Some posited that it was unclear whether frequency of handovers or other factors, such as sleep deprivation, had greater impacts on patient safety. However, the current evidence is heterogeneous regarding the correlation of improved sleep and patient safety.<sup>22</sup> The well-known FIRST trial demonstrated no differences in patient safety in the flexible RDH restrictions group versus the standard RDH restriction group.<sup>8</sup> Importantly, both arms consisted of the 80-hour limit, which were part of the original RDH restrictions.<sup>23</sup> Overall, RDH restrictions to improve patient safety may not solely compose of the number of hours; the nuances of shift length, time between shifts, specialty and programme size may all be factors in patient safety outcomes.

Resident well-being was a prevalent topic in both forums. Toxic work environments, feeling devalued as a team member, low pay and having to complete tasks outside of their educational objectives were all factors noted to contribute to resident burnout. The impact of sleep deprivation was thought to be exacerbated by the lack of post-call days and time between shifts in the night float system. This finding adds context for the existing inconclusive evidence on RDH and resident well-being. Several studies have shown no impact on resident well-being from the implementation of RDH restrictions,<sup>3 24</sup> while others have shown improvements in burnout levels.<sup>25</sup> Our findings suggest that similar to patient safety, there are nuances to the theme of ‘resident well-being’ in the context of RDH, specific number of hours off between shifts and number of consecutive night floats.<sup>26</sup>

Perhaps the most unexpectedly prevalent theme distilled through our analysis pertained to adherence to RDH regulations, which was predominantly discussed in SDN. This is a critical issue as dishonest reporting of

RDH lead to inherently biased study findings and inaccurate assessments of change following implementation. Current evidence supports the presence of RDH violations and cites continuity of care for patients and the demands of the service component required in residency as reasons for violating RDH restrictions.<sup>27 28</sup> Interwoven throughout these discussions are concepts of power, stigma and the perceived vulnerability of trainees within the larger healthcare context.

These findings present an important opportunity; transparency regarding processes is essential to enhancing compliance. It should be clear that reporting violations will not be punitive or result in lasting characterisations of trainees, but rather play an important role in recognising and monitoring for broader system issues that may require attention. A number of systemic strategies to support RDH restrictions are described in the literature, such as scheduling residents below the maximum hours to allow flexibility for unpredictable situations and conducting targeted quality improvement reviews to identify situations that consistently increase hours beyond the acceptable limit.<sup>29</sup>

Our study design includes multiple strengths. Online discussion forums allow for open and direct access to trainee perspectives and experiences, without financial incentives or predetermined structure that could limit insights. The option for anonymity enhances safety, which could increase the sharing of honest views and reduce social desirability bias inherent to other forms of interaction. In this sense, these interactions are entirely trainee generated and free from the constraints of traditional data collection methods. Our qualitative approach allows for the description of an array of views that might not be otherwise captured with scale-based methods. Our search covers a wide date range of almost 20 years of online posts, on platforms hosted in two countries.

There are several limitations to this study. First, the study does not cover other forums such as Reddit or Quora. However, SDN and Premed101 are historically the most used platforms for medical education discussions among trainees. Additionally, the nature of anonymous online discussion forums does not allow the identification of poster demographics and its relation to voiced opinions. Selection bias may be inherent to this type of research design as some trainees may be more inclined to share their perspectives in these types of forums than others, and we recognise that the findings distilled in this study may not be broadly representative of the perspectives of all trainees. That said, the thoughtful synthesis of discussion forum posts is an important first step in identifying concepts that could be used to establish broader dialogue. Lastly, it is important to note that 6201 posts out of the 6630 total posts analysed were from the SDN forums, which are American.

## CONCLUSION

For two decades, RDH regulations have been extensively discussed globally, with the aim of improving patient care, resident physician work-related fatigue and medical education. Considering that the implementation of RDH policies is a challenging organisational change, our qualitative analysis of online posts by trainees suggests the following recommendations:

- ▶ Allowing flexibility in the development of RDH regulations across specialties and within programmes while ensuring protective mechanisms, such as maximum time off between shifts.
- ▶ Developing a standardised and psychologically safe procedures to report duty hour violations that prioritise honesty, open communication and resident well-being.
- ▶ Acknowledging and improving system-level factors that impact resident wellness beyond the number of hours worked.

To implement well-designed RDH restrictions, shared decision making with trainees as stakeholders and transparency regarding the evidence behind the process and/or revisions are important considerations.

**Contributors** AD identified study idea. All authors contributed to the design and execution of the study protocol. ADS and CC transcribed and cocoded a subset of data. ADS coded the remainder of the data. ADS and CC reviewed and revised the themes/subthemes, comparing findings across both forums. ADS organised the data and identified quotations for the manuscript. All authors contributed to writing the manuscript. AD and CC revised the manuscript for important intellectual content. All authors approved the manuscript. AD is responsible for the overall content as the guarantor. The guarantor accepts full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish.

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**Patient and public involvement** Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

**Patient consent for publication** Not applicable.

**Ethics approval** This study was approved by The Children's Hospital of Eastern Ontario Research Ethics Board. We obtained consent from individuals whose posts were used as direct quotations, through directly messaging the posters.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** All data relevant to the study are included in the article or uploaded as supplementary information. Raw data are available by using our search strategy in the following online forums: <https://www.studentdoctor.net/> and <http://forums.premed101.com/>.

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## ORCID iD

Asif Doja <http://orcid.org/0000-0003-1457-071X>

## REFERENCES

- 1 Robins NS. *The Girl Who Died Twice: Every Patient's Nightmare: the Libby Zion Case and the Hidden Hazards of Hospitals*. New York, NY: Delacorte Press, 1996.
- 2 Ulmer C, Wolman DM, Johns MME. *Resident duty hours enhancing sleep, supervision, and safety*. Washington, DC: National Academies Press, 2009.
- 3 Bolster L, Rourke L. The effect of restricting residents' duty hours on patient safety, resident well-being, and resident education: an updated systematic review. *J Grad Med Educ* 2015;7:349–63.
- 4 Wu PE, Stroud L, McDonald-Blumer H, et al. Understanding the effect of resident duty hour reform: a qualitative study. *CMAJ Open* 2014;2:E115–20.
- 5 Kesselheim JC, Cassel CK. Service: an essential component of graduate medical education. *N Engl J Med* 2013;368:500–1.
- 6 Gates M, Wingert A, Featherstone R, et al. Impact of fatigue and insufficient sleep on physician and patient outcomes: a systematic review. *BMJ Open* 2018;8:e021967.
- 7 Fletcher KE, Davis SQ, Underwood W, et al. Systematic review: effects of resident work hours on patient safety. *Ann Intern Med* 2004;141:851.
- 8 Silber JH, Bellini LM, Shea JA, et al. Patient safety outcomes under flexible and standard resident duty-hour rules. *N Engl J Med* 2019;380:905–14.
- 9 Moonesinghe SR, Lowery J, Shahi N, et al. Impact of reduction in working hours for doctors in training on postgraduate medical education and patients' outcomes: systematic review. *BMJ* 2011;342:d1580.
- 10 Dehmoobad Sharifabadi A, Clarkin C, Doja A. Perceptions of competency-based medical education from medical student discussion forums. *Med Educ* 2019;53:666–76.
- 11 Saxena A, Desanghere L, Skomro RP, et al. Residents' and attendings' perceptions of a night float system in an internal medicine program in Canada. *Educ Health* 2015;28:118–23.
- 12 Desai SV, Asch DA, Bellini LM, et al. Education outcomes in a duty-hour flexibility trial in internal medicine. *N Engl J Med* 2018;378:1494–508.
- 13 Peng J, Clarkin C, Doja A. Uncovering cynicism in medical training: a qualitative analysis of medical online discussion forums. *BMJ Open* 2018;8:e022883.
- 14 O'Brien BC, Harris IB, Beckman TJ, et al. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med* 2014;89:1245–51.
- 15 Davis B, Sumara D. Complexity science and education: Reconceptualizing the teacher's role in learning. *Interchange* 2007;38:53–67.
- 16 Strauss A, Corbin J. *Basics of qualitative research*. Thousand Oaks, CA: Sage Publications, 1998.
- 17 Ramani S, Könings KD, Mann K, et al. A guide to reflexivity for qualitative researchers in education. *Acad Med* 2018;93:1257.
- 18 Ahmed N, Devitt KS, Keshet I, et al. A systematic review of the effects of resident duty hour restrictions in surgery: impact on resident wellness, training, and patient outcomes. *Ann Surg* 2014;259:1041–53.
- 19 Mainiero MB, Davis LP, Chertoff JD. Resident duty hour limits: recommendations by the IOM and the response from the radiology community. *J Am Coll Radiol* 2010;7:56–60.
- 20 Antiel RM, Thompson SM, Hafferty FW, et al. Duty hour recommendations and implications for meeting the ACGME core competencies: views of residency directors. *Mayo Clin Proc* 2011;86:185–91.
- 21 Desai SV, Feldman L, Brown L, et al. Effect of the 2011 vs 2003 duty hour regulation-compliant models on sleep duration, trainee education, and continuity of patient care among internal medicine house staff: a randomized trial. *JAMA Intern Med* 2013;173:649–55.
- 22 Pattani R, Wu PE, Dhalla IA. Resident duty hours in Canada: past, present and future. *CMAJ* 2014;186:761–5.
- 23 Bilimoria KY, Hoyt DB, Lewis F. Perspective of the first trial Investigators on accreditation Council for graduate medical education changes in resident work environment and duty hours. *JAMA Surg* 2017;152:903–4.
- 24 Sen S, Kranzler HR, Didwania AK, et al. Effects of the 2011 duty hour reforms on interns and their patients: a prospective longitudinal cohort study. *JAMA Intern Med* 2013;173:657–63.
- 25 Busireddy KR, Miller JA, Ellison K, et al. Efficacy of interventions to reduce resident physician burnout: a systematic review. *J Grad Med Educ* 2017;9:294–301.
- 26 Nishigori H, Deshpande GA, Obara H, et al. Beyond work-hour restrictions: a qualitative study of residents' subjective workload. *Perspect Med Educ* 2015;4:176–80.
- 27 Fletcher KE, Nickoloff S, Whittle J, et al. Why residents consider working beyond the duty hour limits: implications of the ACGME 2011 duty hour standards. *J Grad Med Educ* 2011;3:571–3.
- 28 Grogan EL. Should I lie about my work hours this week? *J Am Coll Surg* 2005;200:635–6.
- 29 Philibert I, Miller R, Heard JK, et al. Assessing duty hour compliance: practical lessons for programs and institutions. *J Grad Med Educ* 2009;1:166–7.