Our continuing experience with duty-hours regulation and its effect on quality of care and education

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Over the past few years it has become increasingly clear that regulation of the number of hours worked by residents in training has not improved the safety or quality of care for surgical patients in our nation’s teaching hospitals. This has disappointed advocates of further duty-hours reform but has not surprised critics of these policies. Many surgical educators are troubled by the failure of the regulations to improve outcomes and by the effect of the regulations on the quality of surgical training. The concern is that not only are today’s patients not benefiting from the regulation of hours but that future patients may be at risk because today’s surgical residents are not getting adequate exposure to the surgical experience that is necessary for them to achieve competence.

In the current issue of the Journal of Neurosurgery: Spine, investigators from Duke University have provided new information that bears on this issue. They have examined national administrative data on almost 700,000 patients who underwent spinal surgical procedures. The authors report that complication rates increased in teaching hospitals and decreased in nonteaching hospitals in the period after the 2003 duty-hours regulations went into effect. In looking at the complications it appeared that problems with both operative technique and postoperative care were increased in the patients treated in teaching hospitals. This suggests that resident technical proficiency and ability to manage acute postoperative complications may have decreased as a result of the new regulations.

As the authors note, there are limitations of their study. Could the findings be explained by differences in the complexity of the procedures done in teaching versus nonteaching hospitals? Over time, patterns of care and the complexity of that care may have changed, and such changes may have affected the interpretation of results across the epochs that were subjected to study. The authors argue that adequate controls and their statistical analysis mitigate the risk of this bias or potential misinterpretation. Did coding procedures change over time, possibly affecting the results? Notwithstanding these potential methodological problems—which are inherent in an administrative database study such as this—this and other studies indicate that duty-hours regulations have not delivered the promised improvements in patient care, safety, and quality. In spite of this, advocates for further limitations on resident duty hours argue that even more restrictions and aggressive enforcement are called for and that the problem is simply that residents are not compliant with the existing regulations.

The 2003 and 2011 Accreditation Council for Graduate Medical Education (ACGME) Duty Hours regulations, the resultant changes in the “sense of ownership” of the surgical patient by trainees, and a decrease in the attainment of appropriate autonomy by surgical residents have been associated with a deterioration of many aspects of the surgical training environment. The American College of Surgeons is studying best practices for ensuring the safe transition of residents into independent surgical practice, reflecting significant concern about the adequacy of the preparation of current surgical residents.

The restriction of duty hours for postgraduate 1st-year residents by the ACGME in 2011 was primarily based on only one trial, which indicated that performance was impaired after about 16 hours of duty. Despite this limited evidence on which to base policy formulation, the ACGME Task Force (of which I was a member) was under pressure to further tighten the regulations. Activists threatened to engage the US Congress and the Occupational Safety and Health Administration to enact even more restrictive regulations without additional evidence or any significant input from active surgical educators.

Now that evidence is accumulating that patient safety is either not improved or is affected adversely by these regulations, neurosurgical educators must continue to advocate strenuously for optimal conditions in our nation’s neurosurgical training programs—including adequate measures to prevent fatigue from adversely influencing patient care. However, calls for further restrictions in duty hours by nonsurgeon sleep scientists should be rejected. The regulations have not improved patient safety and, indeed, may have made it worse. Patient care in neurosurgical centers is complex and requires that teams of engaged,

See the corresponding article in this issue, pp 502–515.
experienced, and committed attending physicians and residents provide care to patients over extended and irregular periods of time. Duty-hours regulation has, in many instances, impaired the function of these teams to the detriment of our current patients. More important, however, is the fact that future neurosurgical patients will need well-trained surgeons to care for them. It is up to us to make sure that they get them.

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**Disclosure**

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**References**


**Response**

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We appreciate Dr. Dacey’s comments regarding our manuscript investigating the impact of duty-hour restrictions on the outcomes of patients following spine surgery. The implementation and effects of these restrictions has certainly been controversial, with surgical educators and duty-hour advocates often having starkly different opinions regarding their utility and impact on patient outcomes. These restrictions were based on the premise that fatigue from extended duty periods endan-

gered resident safety and resulted in increased medical errors. However, although there are some data indicating that extended work shifts (≥ 24 hours) increase the risk of resident motor vehicle accidents and percutaneous injuries, current studies have not been able to correlate these shifts with increased medical errors.2,3

To support strict duty-hour restrictions, many advocates point to studies that have shown a decline in cognitive functioning following long work hours.1,11 However, despite the findings of these few select studies, there are few data indicating that this may lead to increased medical errors and thereby worse patient outcomes. Studies in various surgical disciplines have shown conflicting data, with some demonstrating that sleep deprivation and fatigue increase technical errors whereas others have shown no decrease in performance.6,8,10 Even more difficult to prove is a negative effect on patient care, with many studies demonstrating no increased complication risk in surgeries performed by sleep-deprived residents.7,12

One of the main flaws of the ACGME duty-hour regulations is the implementation of uniform restrictions for all specialties. Although the regulation of work hours may be prudent to prevent substantial resident fatigue, the assumption that a set number of hours per week is sufficient for residents of all fields to deliver comprehensive patient care and partake in educational activities is unfounded. Certainly, demanding fields such as neurosurgery, which has a high percentage of critically ill patients, often require residents to provide extended periods of high-intensity care. As a result, duty-hour restrictions cause increased shift work and decreased continuity of care.

Additionally, a potentially larger consequence of the implementation of work-hour restrictions is the impact on resident clinical experience. The majority of learning in neurosurgery residency occurs in the operating room and in the neurointensive care unit, where postoperative patients may experience emergency complications. The limits placed on duty hours surely curbs operative experience, with many residents having to leave cases, which are then frequently covered by mid-level providers. This reduction in operative time is likely to negatively affect technical skills and increase the need for additional training following residency. Additionally, the restriction on continuous duty prevents residents from managing their patients postoperatively during the most critical period, thereby reducing their experience with managing difficult complications.

These critical impacts on resident training may certainly lead to deficiencies that will place future patients at greater risk. Also, the deterioration of clinical skills will probably affect the surgeon-apprentice relationship, which is critical to the education of surgical residents. Whether it is due to suboptimal resident patient management or decreased operative skills, the resultant reduction in mutual trust may hinder further learning and affect the quality of neurosurgeons produced by our nation’s residency programs. These effects are real and are probably the cause of the worse outcomes seen in all studies evaluating the impact of duty-hour restrictions in neurosurgical patients.4,5,9

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Due to the potential long-term consequences of the ACGME regulations, as Dr. Dacey eloquently stated, it is our responsibility as neurosurgical educators to ensure that residents receive comprehensive training. Because further reductions in work hours are likely to result in significantly less experienced neurosurgeons and dramatically worse patient outcomes, the neurosurgical community must advocate for our residents and patients and reject any further restrictions. It is our duty to safeguard the production of passionate and skilled neurosurgeons so that our patients can continue to receive the high-quality care they expect and deserve.

References

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