Hippocrates Affirmed? Limiting Residents’ Work Hours Does No Harm to Patients

In 2003, the Accreditation Council for Graduate Medical Education (ACGME) required residency training programs to restrict the number of hours that housestaff worked. The work-hour rules included a limit of 80 hours per week, a maximum duty period of 30 hours, a minimum break of 10 hours between duty periods, and at least 1 day in 7 free from clinical and educational obligations (1). The rationale was that sleep deprivation and fatigue compromise clinical performance and education, and that, in the absence of self-regulation, the government would regulate residency training (2). By 2003, New York had already imposed work-hour limits for residents (3).

Work-hour requirements were met with skepticism, some alarm, and compliance (4). To comply, many internal medicine programs added “night float” or “day float” residents. The number of housestaff-to-housestaff transfers of responsibility for a patient’s care increased, raising concerns that care would be fragmented and patients would be harmed as residents, increased in number but less familiar with their patients, struggled to finish their work and hand off the care of their patients within the work-hour limits.

Studies done before the ACGME rules, many from New York, suggested that inpatient mortality rates were unchanged after the reduction in work hours and that the effects on other patient safety indicators varied (5). After implementing the 2003 work-hour regulations, some internal medicine programs reported that patient care was suffering (6–8), but a randomized trial of reduced work hours for medical interns in the intensive care units of a major teaching hospital demonstrated significantly improved attention to duties and fewer medical errors (9, 10). Because it is difficult to extrapolate from the resource-laden setting of an intensive care unit, the question of benefit versus risk remained: Did the ACGME work-hour rules violate the Hippocratic principle of doing no harm?

In this issue, 2 studies attempt to answer this question (11, 12). Shetty and Bhattacharya (11) analyzed a national sample of 20 medical and 15 surgical diagnoses for 2.5 years before implementation of the 2003 work-hour rules and 1.5 years after, using nonteaching hospitals to control for secular trends. For medical diagnoses in hospitals with medicine residents, the absolute net change in the number of hospital deaths after work-hour restrictions was 0.25%, a statistically significant relative reduction of 3.75%. Hospital deaths among surgical patients did not change.

The study’s major limitation was that it compared hospitals with and without residency programs, not patients actually seen by housestaff versus those who were not. Many hospitals have started or expanded nonteaching services, often using hospitalists, and mortality rates may be lower on such services (13). Nevertheless, these results extend those from an earlier New York study, which found no significant difference in hospital mortality rates for common medical diagnoses between teaching and nonteaching hospitals after the imposition of work-hour restrictions (14).

The single-site study by Horwitz and colleagues (12), who analyzed changes that eliminated overnight call for housestaff, overcomes this problem. The investigators compared their teaching service with a preexisting nonteaching hospitalist service in the years before and after the new coverage. The teaching service changed the coverage system at their hospital so that “nocturnalists,” a cadre of attending hospitalists and moonlighting fellows, cared for newly admitted patients until the next day; in addition, they added a resident on day float service to the postcall team. Patients in the 2 services had different characteristics, but the results were not materially changed by statistical adjustment for demographic characteristics, insurance coverage, severity of illness, comorbid conditions, and case mix. On the teaching service, 3 of 6 measurable outcomes showed statistically significant improvement after the 2003 changes: intensive care use dropped, length of stay decreased, and fewer pharmacist interventions to prevent error occurred. Rates of discharge to home or rehabilitation were marginally higher, but short-term readmission rates increased. In the nonteaching hospitalist service, 4 measures worsened during the same period; no measure improved. In the comparison of adjusted outcomes between the 2 services, the teaching service had net, significant improvements in intensive care utilization, discharge to home or rehabilitation, and pharmacist interventions. The in-hospital mortality rate in the teaching service was 2.41% before and 2.03% after the regulations ($P = 0.05$); whereas in the nonteaching service it was 1.27% before and 1.10% after the regulations ($P = 0.34$).

These results complement data from a major New York teaching hospital before and after the introduction of work-hour limits in 1989, when hospitals could not make compensatory adjustments in coverage (15). Some measures of care worsened, such as delays in diagnostic tests, but length of stay, intensive care utilization, discharge disposition, and inpatient death did not change.

Horwitz and colleagues’ study, however, provokes 2 caveats. First, comparison with a nonteaching hospitalist service made the adjusted results heavily dependent on the performance of the nonteaching service. Most of the outcome measures on the hospitalist service deteriorated slightly in the second year of the study, in contrast to a study of hospitalist services at a California hospital, which showed continuing improvements in the second year (13). Second, the organizational changes to the teaching service had only a modest effect on internal transfers of care. A
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The authors of these 2 articles performed sophisticated analyses, but both studies were retrospective; real-time data about the interactions between housestaff and patients were therefore not available. Limitations notwithstanding, both studies add to the growing evidence that work-hour limits have not worsened patient outcomes.

Even if Hippocrates is satisfied and work-hour rules probably do not ultimately harm patients, is the case closed? Not so fast. Little is known about how work-hour limits for residents affect the overall experience of patients and their families, nor how they affect nurses and other members of health care teams. Most important, the implications of the new rules for the adequacy of education and training remain uncertain (16).

Work-hour rules, like other major organizational interventions, can improve patient outcomes when done sensibly. Our institution uses daytime intern shifts to relieve postcall interns and night residents to provide overnight supervision of interns. Housestaff do not “float” from team to team but instead are assigned to specific teams for periods of 2 weeks, become familiar with their patients, and participate in scheduled educational activities.

Transfers of care, also known as “sign-outs” (already a weak link in most training programs), need increased attention on reorganized teaching services (17, 18). Often overlooked in the commotion over work-hour limits were parallel appeals for increased supervision of housestaff and night residents to provide overnight supervision of interns. Housestaff do not “float” from team to team but instead are assigned to specific teams for periods of 2 weeks, become familiar with their patients, and participate in scheduled educational activities.

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The Residency Review Committee for Internal Medicine recently announced limited exceptions to the rule requiring 10 hours between shifts. The changes allow more patients to be admitted by their primary housestaff team, reducing hand-offs, and also allow more residents to participate in educational activities (21). More flexibility in applying work-hour reductions, with a concomitant emphasis on demonstrating improved or acceptable patient, educational, and performance outcomes, would be welcome.

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