

High Impact

A Project from the First 10 Years of NORA



Effects of Extended Work Hours on Intern Health and Safety

The Challenge:

The current work hour guidelines of the Accreditation Council for Graduate Medical Education (ACGME) recently limited work hours for U.S. medical residents to less than 320 hours in a four-week period, but still allow interns in the United States to work 30 consecutive hours every other shift. Although sleep deprivation, inherent in these schedules, has been shown to impair neurobehavioral performance and negatively affect health, these long work hours and extended duration work shifts remain a hallmark of medical education in the United States. 🍎

Approach:

In the nationwide Web-based survey, interns received e-mails directing them to complete a baseline survey at the beginning of their internship, monthly surveys throughout the year and a year-end survey. In order to validate reported work hours, a randomized subset of participants completed a daily diary, and we sought documentation for all reported motor vehicle crashes. In the smaller intervention study, subjects worked two rotations in the ICU: one using the traditional schedule (three interns working on a three-day cycle, with every other shift of extended duration) and one using the intervention rotation (four interns working a four-day schedule, with a maximal scheduled shift duration of 16 hours). Interns recorded work and sleep hours in a daily log and underwent continuous ambulatory polysomnographic monitoring. Attentional failures were identified by means of continuous electrooculography and direct observation by physicians was the principal means of detecting serious medical errors.

Results:

We found that the odds that interns will have a motor vehicle crash on the commute following an extended work shift were more than double the odds after a nonextended shift [OR=2.3 (1.6,3.3)]. Near-miss incidents were more than five times as likely to occur after an extended work shift as they were after a nonextended shift [OR=5.9 (5.4,6.3)]. In a prospective analysis, every extended work shift that was scheduled in a month increased the monthly risk of any motor vehicle crash by 9.1% (3.4,14.7%). In the intervention study, interns worked 19.5 hours/week less ($P<0.001$), slept 5.8 hours/week more ($P<0.001$), and had less than half the rate of attentional failures while working during on-call nights ($P=0.02$) on the intervention schedule as compared with the traditional schedule. Additionally, we found interns made 5.6 times as many serious diagnostic errors during the traditional schedule as during the intervention schedule ($P<0.001$).

Impact:

Extended-duration work shifts, currently sanctioned by the ACGME, pose safety hazards for interns. These results have important implications for medical residency programs, which routinely schedule physicians to work more than 24 consecutive hours. Eliminating interns' extended work shifts in an ICU significantly increased intern sleep, decreased attentional failures during night work hours, and reduced serious medical errors. Moreover, our data indicate that scheduling physicians to work such extended shifts poses a serious and preventable safety hazard for them and other motorists. Further modifications of ACGME standards, particularly with respect to shift duration, are clearly indicated to improve the safety of interns. Our findings in interns will likely have broader implications for all medical residents and others working long work weeks and shifts of extended duration. This research should be expanded to identify if these safety risks exist in the later years of medical residency and throughout medical practice. ■

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For complete description of this project and others see the CD Rom "A Compendium of NORA Research Projects and Impacts, 1996-2005" located at www.cdc.gov/niosh.

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