

## Progress Report

The Evolving Educational Challenge: Balancing Patient Numbers, Conference Attendance, Sleep and Resident Wellness

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The Accreditation Council on Graduate Medical Education (ACMGE) 2011 guidelines for resident physicians specifically limited interns to 16-hour shifts and forced a paradigm switch from traditional overnight call.<sup>1</sup> In *Shift Schedules and Intern Work Hours, Patient Numbers, Conference Attendance, and Sleep at a Single Pediatric Residency Program*,<sup>2</sup> we prospectively compared intern work hours, patient numbers, conference attendance, sleep duration, pattern, and quality in 2003 and 2011 ACGME duty hour compliant call schedules at a single pediatric residency program. We concluded that a shift schedule reduced intern work hours and improved sleep duration and pattern. Although intern didactic conference attendance declined significantly during high census months, opportunities for experiential learning in a shift schedule remained robust with unchanged or increased intern patient numbers. Since the publication of our study, the ACGME has removed the 16-hour intern work hour limit, but still requires a maximum 80-hour work week and limits consecutive time on-task to 24 hours, plus four hours to transition care.<sup>1</sup> Educators aim to provide the best clinical education for residents, while meeting requirements. In this progress report, we consider our study's findings in light of what has been published since October 2016 and discuss innovative scheduling, didactic and experiential resident education, resident sleep and wellness and areas for future work.

### Scheduling

Chestovich et al. found innovative scheduling to maximize patient numbers in light of work hour restrictions effective.<sup>3</sup> Surgical fellows increased their patient exposure when their program added a

swing shift during the busiest trauma census hours. Using modeling of hourly volume trends allowed the program to match fellows with patient volume.

#### Didactic Education

In an adult learning environment, educators debate the value of scheduled didactics versus experiential learning. In our study, we reported decreased intern didactic attendance during high census months with a shift schedule compared to Q4 call; however, experiential learning increased with patient numbers.

Meyer et al used multivariate regression models to determine if conference attendance could predict in-training rotation and board scores. Radiology residents with lower conference attendance had comparable clinical performance and knowledge to residents who attended more frequently.<sup>4</sup> Meyer et al. concluded that, while conferences may serve useful purposes, "required attendance may not be necessary to gain certain measurable core competencies."<sup>4</sup>

To preserve didactics, Zastoupil et al. implemented a protected didactic "academic half day" and compared it to a traditional noon conference schedule in a pediatric residency. With the academic half day, they reported improved resident conference attendance (55% to 95%,  $p < .001$ ) and minimized interruptions in work flow. Residents reported improved wellness and value in protected educational learning time during the half day didactic schedule.<sup>5</sup>

#### Experiential Resident Education

Educators continue to discuss resident experiential learning in different work hour environments.

Philibert et al reviewed more than 30 articles and concluded that although work hour limits are supported, particularly reducing frequency of overnight call and weekly hours, a number of under-

investigated areas remain.<sup>6</sup> Philibert states that the most prominent is the impact of work hour limits on resident education.<sup>6</sup> We agree with Philibert et al and believe that additional studies are needed to evaluate the effects of resident continuity with patients during regular and extended work hours, looking at not only patient numbers but the knowledge gained by allowing trainees to observe a patient's disease progression and response to management decisions.

### Sleep and wellness

In our study, we concluded that a shift schedule improved sleep duration and pattern. In a novel use of commercial sleep devices, Morhardt et al. reports how urology residents wore the device to monitor time in bed and total sleep.<sup>7</sup> As in our study, urology resident sleep patterns were improved on the post call night.<sup>7</sup> Interestingly, resident-reported alertness assessed by a single question survey did not correlate with estimated sleep duration.<sup>7</sup> Using readily available monitors may further inform issues related to resident sleep deprivation.

To understand safety and sleep deprivation more fully, Yaghmour et al reviewed mortality of a cohort of nearly 400,000 trainees in ACGME accredited residency programs.<sup>8</sup> Over 15 years, the age and gender matched death rate of resident physicians was less than the general population, as were resident car crash deaths<sup>8</sup>. Although resident post-call fatigue is real, fatigue may not lead to an increased car crash rate. Continued attentiveness to the impact of extended shifts on resident safety is crucial.

Novel scheduling may assist in improving resident wellness and sleep.<sup>9</sup> A cross-sectional observational study compared internal medicine residents in a one week of outpatient clinic after every three weeks of medical intensive care (MICU) rotation compared to traditional four-week block schedule. Total sleep time, wellness and stress were monitored in both systems. Residents slept longer during the ambulatory

block ( $p < 0.0005$ ), less during night call ( $p < 0.0005$ ). Stress and drowsiness declined during ambulatory clinic week also. Bordley et al concluded block scheduling may be used to improve resident wellness and repay the sleep debt incurred while on busy inpatient months.<sup>9</sup>

### Future Work

Emphasizing resident wellbeing, clinical care and education presents educators with many opportunities for additional investigations. In a survey by Branch et al, psychiatry residents reported improved wellness when focusing on team dynamic rather than long hours or schedules.<sup>10</sup> Thomas Nasca's 2016 open letter to the Graduate Medical Education Community (in which he announces further revisions to the ACGME common program requirements) describes a paradigm shift to emphasize that residents' responsibility to the safe care of their patients supersedes obligation to a schedule.<sup>1</sup> As word choice matters, he suggested replacing terms such as "duty hours" with "clinical experience and education." Within the ACGME requirements, Nasca urges "a focus on training residents to develop a sense of professionalism, rather than by imposing unnecessary restrictive rules"<sup>1</sup> while delivering high-quality, safe care. Future educational efforts must focus on partnering with trainees to ensure high-quality experiential learning while emphasizing patient ownership rather than attention to the clock.

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