

What do  
**YOU**  
THINK?

Do you see alertness fade slowly or quickly among colleagues on extended on-call? Answer the INSTANT POLL on page 16 and at [www.obgmanagement.com](http://www.obgmanagement.com)



**Robert L. Barbieri, MD**  
Editor-in-Chief

## Fatigue: It's a fickle member of the obstetrical team

Extended on-call shifts might take a toll on OBs' performance and judgment. Is a change in order?

**R**outinely, obstetricians are scheduled for on-call shifts that range from 24 hours to 60 hours—sometimes, even longer.<sup>1,2</sup> Is there a positive side to this practice? There can be: An extended on-call shift maximizes the likelihood that an OB will be available to provide personalized care to her (his) patient from the beginning of active labor through delivery, and most clinicians and patients believe that such continuity enhances care and outcomes.

But there is also a major disadvantage to the extended on-call shift: It may require the OB to be not only awake, but alert, for a long period—more than 24 hours, on occasion.

Sleep research shows that going 24 hours or longer without sleep has adverse effects on alertness, decision-making, task performance, and emotional function. The question is: Does an extended period of wakefulness impair the decision-making and surgical proficiency of OBs?

### Extended-duty hours impair performance...

- **The risk of an auto crash more than doubles right after an intern's extended-duty shift.**

It's long been recognized in the transportation industry that extended time at work—that is, beyond the typical length of a work day—without sleep is associated with an increase in the rate of

accidents.<sup>3</sup> Consequently, in those occupations, extended-duty shifts are restricted by law to reduce the risk of a crash.

Interesting research has extended these observations to examine motor vehicle crashes involving physicians who have just experienced prolonged wakefulness as a result of extended-duty hours. Barger and colleagues used Web-based methods to survey 2,737 medical interns about the relationship among motor vehicle crashes, “near misses,” and work shifts that were less than 24 hours or longer than 24 hours. Using the number of motor vehicle crashes that occurred after shifts of less than 24 hours as the referent category, shifts longer than 24 hours were associated with a 2.3-fold increase in the risk of a crash immediately after the extended shift (95% confidence interval, 1.6–3.3).<sup>4</sup>

There is more: Extended-duty hours have been reported to increase dangerous driving behaviors among physicians and nurses in a simulated driving test: Clinicians completing a night shift often drove off the road or into oncoming traffic.<sup>5</sup>

If an extended shift can cause deterioration in driving performance, it might also affect how well a clinician performs standardized surgical tasks. In a preliminary study, needlestick injuries were more common among physicians toward the end of an extended-duty shift and during a nighttime shift.<sup>6</sup> More research is needed to directly address what impact fatigue has on surgical tasks.

### FAST TRACK

**Going 24 hours or longer without sleep has adverse effects on alertness, decision-making, task performance, and emotional function**

CONTINUED

## ...and decision-making

### • Interns on an extended-duty shift showed EEG signs of early sleep.

Lockley and colleagues performed a randomized study that compared the effect of extended-duty work hours and of reduced-duty work hours on how well medical interns performed in an intensive care unit.<sup>7</sup> Interns were randomly assigned to a traditional, every-third-night, on-call schedule (work every weekday and, in addition, work all night every third night and every third weekend day) or a reduced-duty-hours schedule (take a day off after working an evening-night shift). The average workweek was 85 hours for an extended-duty-hours intern and 65 hours for a reduced-duty-hours intern.

One endpoint of the study was the rate at which continuous ambulatory EEG monitoring demonstrated intrusion of episodes of slow-rolling eye movements lasting longer than 30 seconds into wakefulness during work hours. (These movements, a measure of reduced attentiveness, are often observed at the beginning of a sleep cycle.) Interns working extended-duty hours had 5.5 episodes of slow-rolling eye movements for every overnight shift; subjects working reduced-duty hours had 2.6 episodes for every overnight shift.<sup>7</sup>

A second endpoint was the rate of serious decision-making errors in the two groups. Interns on an extended shift were prospectively observed to make 193 serious errors for every 1,000 patient-days worked—compared with 158 serious errors for every 1,000 patient-days worked among interns on reduced-duty hours ( $P < .001$ ).<sup>8</sup>

There is a humorous, but horrifying, footnote to this study: Interns standing with their team at attending rounds sometimes demonstrated an EEG pattern consistent with sleep.

### Caffeine? It may help

Without belaboring the obvious, clinicians who work an extended-hour shift have used coffee or other caffeinated

beverages to help them remain alert. Research shows that caffeine may help fend off detrimental cognitive effects resulting from a long interval of wakefulness.<sup>9,10</sup>

### A nap can improve function

For centuries, OBs have taken a nap to reduce the adverse impact of an extended period of wakefulness. Does this practice work?

Yes, it appears. In a randomized trial, physicians and nurses who worked consecutive 12-hour night shifts in an emergency department were randomized to take a nap or to not nap during their shift. Those in the nap group were able to sleep, on average, 25 minutes.

At the end of the 12-hour shift, clinicians who took a nap demonstrated, overall, 25% fewer lapses in performance than controls did as measured by a standardized test of psychomotor task vigilance and recall memory tasks. Clinicians who took a nap were also capable of completing more quickly simulated intravenous line insertion.<sup>5</sup>

**But beware of sleep inertia!** Decision-making is significantly impaired in the 30 minutes immediately after awakening from a nap or sleep, research shows.<sup>11</sup> A nap improves productivity over an extended period of wakefulness, but be aware that you may be at increased risk of making a medical error immediately after you awake from a nap.

Often, an OB who is on-call is awakened from a nap and required to make important clinical decisions or perform surgical interventions. Consequently, an earlier nap may improve performance later, during the last hours of an extended shift, but a nap may diminish performance in the 30 minutes right after awakening.

### Contingency planning—more a good idea than a practice

Sometimes, an extended-duty shift is marked by few complex cases—and the clinician can sleep for a significant period. Occasionally, however, several high-

CONTINUED

## FAST TRACK

**A 25-minute nap during a 12-hour shift meant fewer lapses in performance in a study of physicians and nurses**

acuity cases transpire in rapid sequence during an extended-duty shift—and the OB must stay awake for an extended period. OB groups that schedule extended on-call shifts of 24 to 60 hours should consider contingency planning for the occasional interval of exceptionally busy patient care activity. Such a plan might include having a backup call physician to take over cases when the primary on-call physician has been awake continuously for 24 hours or longer.

Yet such planning remains more a good idea than a practice: In one recent survey, approximately 75% of OB care groups reported that they did not have a contingency plan.<sup>2</sup>

### Shrinking the shift

An alternative to formal contingency planning is to adopt call schedules that strictly limit shifts to 12 to 14 hours. The work shifts of airline pilots and interstate truck drivers, for example, are strictly limited. That policy is based on a belief that a long interval of wakefulness increases the risk of commercial airline and motor vehicle accidents.

Other developed countries are shortening call schedules. In the United Kingdom, maximum duty hours for a resident are 56 a week, 13 consecutively. Compare the United States, where they are 80 hours a week, 30 consecutively.

Some investigators claim that heavy call shifts (90 hours a week) erode physician performance on attention, vigilance, and task testing more than moderate alcohol consumption does (blood alcohol level, 0.05).<sup>12</sup> That research has serious limitations, but some pundits may conclude that physicians who undergo an extended period of wakefulness are “impaired” just as if they drank alcohol on the job...

### Stay tuned, and stay awake!

Maximum work hours per week and consecutive hours of wakefulness are likely to remain priority issues in obstetrics.

We can lead the charge to reengineer OB call schedules by adopting formal contingency plans, with backup call coverage or strict limitations on work hours, and by identifying other innovative methods to reduce fatigue.

In the absence of continuing physician leadership, however, the federal and state governments will likely become actively engaged on the matter of extended-duty fatigue—and may consider legislating work rules similar to those that have been placed on airline pilots.



obg@dowdenhealth.com

#### References

1. Promecene PA, Schneider KM, Monga M. Work hours for practicing obstetrician-gynecologists: the reality of life after residency. *Am J Obstet Gynecol.* 2003;189:631–633.
2. Schauburger CW, Gribble RK, Rooney BL. On call: a survey of Wisconsin obstetric groups. *Am J Obstet Gynecol.* 2007;196:39e1–39e4.
3. National Transportation Safety Board. Evaluation of U.S. Department of Transportation efforts in the 1990s to address operator fatigue. Safety report. Washington, DC: National Transportation Safety Board. NTSB Report Number SR-99/01. NTIS Report Number PB99-917002.
4. Barger LK, Cade BE, Ayas NT, et al; Harvard Work Hours, Health, and Safety Group. Extended work shifts and risk of motor vehicle crashes among interns. *N Engl J Med.* 2005;352:125–134.
5. Smith-Coggins R, Howard SK, Mac DT, et al. Improving alertness and performance in emergency department physicians and nurses: the use of planned naps. *Ann Emerg Med.* 2006;48:596–604.
6. Ayas NT, Barger LK, Cade BE, et al. Extended work duration and the risk of self-reported percutaneous injuries in interns. *JAMA.* 2006;296:1055–1062.
7. Lockley SW, Cronin JW, Evans EE, et al; Harvard Work Hours, Health and Safety Group. Effect of reducing interns' weekly work hours on sleep and attentional failures. *N Engl J Med.* 2004;351:1829–1837.
8. Landrigan CP, Rothschild JM, Cronin JW, et al. Effect of reducing interns' work hours on serious medical errors in intensive care units. *N Engl J Med.* 2004;351:1838–1848.
9. Lorist MM, Tops M. Caffeine, fatigue and cognition. *Brain Cogn.* 2003;53:82–94.
10. Wesensten NJ, Killgore WD, Balkin TJ. Performance and alertness effects of caffeine, dextroamphetamine and modafinil during sleep deprivation. *J Sleep Res.* 2005;14:255–266.
11. Jewett ME, Wyatt JK, Ritz-De Cecco A, Khalsa SB, Dijk DJ, Czeisler CA. Time course of sleep inertia dissipation in human performance and alertness. *J Sleep Res.* 1999;8:1–8.
12. Arnedt JT, Owens J, Crouch M, Stahl J, Carskadon MA. Neurobehavioral performance of residents after heavy call vs. after alcohol ingestion. *JAMA.* 2005;294:1025–1033.

#### FAST TRACK

**Heavy call shifts may erode performance on attention and vigilance testing more than moderate alcohol consumption does**