



Statement on Fatigue

Committee of Origin: Ethics

Committee of Review: Quality Management and Departmental Administration

(Approved by the House of Delegates on October 15, 2014, and last amended on October 13, 2021)

Anesthesiologists have the responsibility to maintain their health in order to ensure they remain vigilant to their patients. Fatigue mitigation is an integral component of provider health and patient safety. Fatigue has been associated with patient adverse events, physician burnout, and with poor physician health. Fatigue also increases physicians' involvement in a motor vehicle accident,¹ incidence of depression², as well as symptoms of anxiety and anger.³

Recommendations

1. All anesthesia providers, hospitals, employers, and surgeons need to recognize the significance of fatigue on patient safety and provider well-being.
2. Anesthesia providers must receive training in fatigue recognition and countermeasures to minimize the effects of fatigue.
3. Anesthesia practices must have a fatigue risk mitigation policy addressing fatigue-related provider impairment to include potential staffing solutions.
4. Individual anesthesia providers must be able to report and request relief from duties due to fatigue-related impairment without fear of disciplinary action by their employer or health care system.

Background Summary of the Literature

Fatigue is an impairment that may jeopardize both patient safety and physician well-being.⁴ It is a complex issue that can be affected by the individual provider, other personnel involved in the patient's care, and the organizations where that care is provided. Factors contributing to the decline in performance associated with fatigue may include: sleep loss, high patient acuity, high case volume, poor facility conditions, personal stressors, advancing age, infrequent breaks, irregular meals, rotating schedules, and prolonged waiting.^{5,6} Twenty-four hours of wakefulness have been shown to impair performance.⁷

Inside Health Care

Multiple studies have demonstrated that medical errors are increased when the providers are fatigued. Physicians experience cognitive impairment when engaging in activities that require critical thinking as well as routine tasks. Surgery residents performing simulated laparoscopic cholecystectomies required additional time and committed 2-3 times additional errors following a night of call.^{8,9}

The impact of fatigue on attending physicians has also been studied. When surgeons receive less than six hours of sleep, their patients experienced a 2.7 times greater incidence of complications. Similarly, when their work days were greater than twelve hours in length, their patients had almost a 50% increase in complication rate.¹⁰



Inside Anesthesiology

Losing a night of sleep, as is common during call shifts, is associated with reduced time to falling asleep (sleep latency) approaching levels seen in narcoleptics.¹¹ When psychomotor testing was performed during a 4-hour simulated anesthetic case, sleep-deprived anesthesiology residents demonstrated progressive deficits in both vigilance and memory.¹²

Consistent with data seen in the surgical literature, performance of a case at nights or on a weekend has been identified as an independent risk factor for the occurrence of adverse events.^{13,14} While there are probably confounding factors, including hospital resource availability, the impact of performing a surgical case while fatigued cannot be ignored.

Across Industries

Fatigue has been studied extensively in other industries that require high-risk activity during non-traditional work hours, such as aviation and nuclear industries. While the specific types of work being performed may be different, understanding the lessons learned from their studies of human physiology can be instrumental in development of rational policy. There are workday limits for airline crews, which also include minimum rest periods between shifts and minimizing transitions between daytime and overnight shifts.

Fatigue Mitigation

The only way to eliminate the effects of fatigue is through sleep. Fatigue risk mitigation may include system backups (using alarms and clinical reminders) and physiologic approaches (increased frequency of breaks, walking, naps, and caffeine consumption). Scheduling interventions that allow for increased sleep opportunity are the most effective method of preventing fatigue.¹⁵

Taking naps prior to experiencing a period of sleep deprivation has been shown to improve alertness and overall performance. The benefits are seen in a dose-dependent fashion. Compared to individuals who did not nap, individuals taking a 90 minute nap had only mild improvement on subsequent cognitive examinations versus take longer naps.¹⁶ Naps do not restore performance to baseline levels unless they are uninterrupted for four to six hours.¹⁶

Strategic napping, defined as short-duration naps intentionally occurring during overnight shifts, have been extensively studied. Naps less than 20-40 minutes do provide some improvement in performance. Longer duration naps are associated with impaired alertness immediately following waking up due to sleep inertia associated with the progression to deep sleep cycles. The sleep inertia decline in performance can be seen as long as 30-minutes after waking up from deep sleep.¹⁷

Closed Claims/Medico-Legal Information

There are few cases within the ASA Closed Claims Database linking the adverse event to physician fatigue. One criminal case has been identified where the anesthesiologist was allegedly falling asleep during the surgical case and the patient subsequently died. Because claims of fatigue are unlikely to be used in defense of a medical malpractice case, the role of fatigue in the Closed Claims Database is probably underreported. Additionally, there is no national database where



reports of sleep deprivation resulting in adverse events may be reported, limiting complete understanding of how sleep deprivation affects patient outcomes.

Methods of Fatigue Identification

It is extremely difficult for individuals to self-identify impairment. One study examining the long-term effects of sleep restriction identified steady degradation in performance over a two-week interval, yet individuals enrolled in the study did not self-identify decreased performance after the first two days.¹⁸ Other studies have identified self-identification of fatigue deteriorate when long shifts and fatigue become the norm.¹⁹ Once someone identifies as being fatigued, their performance is almost certainly diminished.

There are no currently available tests and devices to prospectively identify clinical performance degradation. There are no effective monitoring tools to identify when someone is unable to maintain the vigilance and perform the tasks required of an Anesthesiologist. Additionally, self-assessment and awareness tools also have not been demonstrated to accurately reduce risk.

Final Statement

Anesthesia groups and departments should develop and implement policies to address fatigue-related provider impairment. These policies should address staffing and the safe delivery of patient care. Given the multi-factorial nature of fatigue, policies should allow for flexibility based on the group or facility's unique circumstances while maintaining patient safety as the top priority. Policies should include features designed to encourage staff to report their own fatigue or the suspected fatigue of a colleague without fear of reprisal to any of the parties involved.

Education about fatigue and mitigation strategies should include training on awareness and tools to respond at the individual, group, and organization levels.

¹ Steele MT, Ma OJ, Watson WA, Thomas HA Jr, Muelleman RL. The occupational risk of motor vehicle collisions for emergency medicine residents. *Acad Emerg Med*. 1999;6(10):1050-1053.

² West CP, Tan AD, Habermann TM, Sloan JA, Shanafelt TD. Association of resident fatigue and distress with perceived medical errors. *JAMA*. 2009;302(12):1294-1300.

³ Howard SK, Rosekind MR, Katz JD, Berry AJ. Fatigue in anesthesia: implications and strategies for patient and provider safety. *Anesthesiology*. 2002;97(5):1281-1294.

⁴ Ferguson BA, Shoff HW, McGowan JE, Huecker MR. Remember the Drive Home? An Assessment of Emergency Providers' Sleep Deficit. *Emerg Med Int*. 2018;2018:4501679. Published 2018 Jan 23.

⁵ 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(18):1838-1848.

⁶ Sugden C, Athanasiou T, Darzi A. What are the effects of sleep deprivation and fatigue in surgical practice? *Semin Thorac Cardiovasc Surg*. 2012;24(3):166-175.

⁷ Dawson D, Reid K. Fatigue, alcohol and performance impairment. *Nature*. 1997;388(6639):235.

⁸ Grantcharov TP, Bardram L, Funch-Jensen P, Rosenberg J. Laparoscopic performance after one night on call in a surgical department: prospective study. *BMJ*. 2001;323(7323):1222-1223.

⁹ Eastridge BJ, Hamilton EC, O'Keefe GE, et al. Effect of sleep deprivation on the performance of simulated laparoscopic surgical skill. *Am J Surg*. 2003;186(2):169-174.



-
- ¹⁰ Rothschild JM, Keohane CA, Rogers S, et al. Risks of complications by attending physicians after performing nighttime procedures. *JAMA*. 2009;302(14):1565-1572.
- ¹¹ Howard SK, Gaba DM, Rosekind MR, Zarcone VP. The risks and implications of excessive daytime sleepiness in resident physicians. *Acad Med*. 2002;77(10):1019-1025.
- ¹² Howard SK, Gaba DM, Smith BE, et al. Simulation study of rested versus sleep-deprived anesthesiologists. *Anesthesiology*. 2003;98(6):1345-55; discussion 5A.
- ¹³ O'Reilly-Shah VN, Lynde GC, Jabaley CS. Anesthesia Care Handovers and Risk of Adverse Outcomes. *JAMA*. 2018;319(21):2235.
- ¹⁴ Terekhov MA, Ehrenfeld JM, Dutton RP, Guillamondegui OD, Martin BJ, Wanderer JP. Intraoperative Care Transitions Are Not Associated with Postoperative Adverse Outcomes. *Anesthesiology*. 2016;125(4):690-699.
- ¹⁵ Wong LR, Flynn-Evans E, Ruskin KJ. Fatigue Risk Management: The Impact of Anesthesiology Residents' Work Schedules on Job Performance and a Review of Potential Countermeasures. *Anesth Analg*. 2018;126(4):1340-1348.
- ¹⁶ Bonnet MH. The effect of varying prophylactic naps on performance, alertness and mood throughout a 52-hour continuous operation. *Sleep*. 1991;14(4):307-315.
- ¹⁷ Tremaine R, Dorrian J, Lack L, et al. The relationship between subjective and objective sleepiness and performance during a simulated night-shift with a nap countermeasure. *Appl Ergon*. 2010;42(1):52-61.
- ¹⁸ Van Dongen HP, Baynard MD, Maislin G, Dinges DF. Systematic interindividual differences in neurobehavioral impairment from sleep loss: evidence of trait-like differential vulnerability. *Sleep*. 2004;27(3):423-433.
- ¹⁹ Berastegui P, Jaspar M, Ghuysen A, Nyssen AS. Fatigue-related risk perception among emergency physicians working extended shifts. *Appl Ergon*. 2020;82:102914.