



## Principles of Fatigue that Impact Safe Nursing Practice

1. Nurses and their employers have an ethical responsibility to take appropriate steps to provide safe patient care when they are aware of situations of nurse fatigue in the employment setting. (3; 64)
2. Fatigue often causes physiologic changes unforeseen by a nurse and/or their employer. (1)
3. Various factors have been identified as contributors to nurse fatigue. These can be a result of the individual's choice or a demand of the work place and include, but may not be limited to, the following factors: (1; 3)
  - A. Professional Factors (4; 10; 13; 14; 59)
    - i. On call hours (21; 58)
    - ii. Required overtime hours (21; 30; 48; 58)
    - iii. Total number of hours worked per week (4; 30; 58; 64)
    - iv. Shifts (14; 28; 29; 58)
      - Length (hours worked per 24 hour day and total hours worked per week) (4; 48; 59; 64)
      - Sequencing (4; 10; 13; 14)
      - Rotating (4; 14; 15)
    - v. Chronic short staffing (19; 58)
    - vi. Inability to hire additional or qualified staff (2; 13; 58)
    - vii. Working while sick (58)
  - B. Personal Factors
    - i. Working extra jobs (17)
    - ii. Overtime hours (by choice) (64)
    - iii. Additional responsibilities of home and family (4; 17)
    - iv. Age (22; 28; 43; 51; 52)
    - v. Overall physical and mental health
4. Nurse fatigue has been linked to adverse effects on job performance, and nurse quality of life that may result in any one or combinations of the following negative outcomes. (1; 4; 13; 64)
  - A. Nurses job performance/ patient outcomes (14)
    - i. Alterations in cognitive abilities (13; 50; 51; 53; 59; 60)
      - Memory lapses (17; 30; 51; 52)
      - Lapse in concentration leading to an inability to focus and pay full attention to a task on hand (17)
      - Delayed reaction time in decision making (17; 30; 53; 56)
      - Faulty information processing or judgment (30)
    - ii. Decreased productivity (17; 21; 28; 30)
    - iii. Decreased effectiveness in problem solving (30)
    - iv. Increased risk for errors and patient injury/ adverse patient outcomes (4; 10; 14; 30; 35; 64)
      - Increased risk for medication errors (14; 48; 64)
    - v. Decreased ability to communicate (30)

- vi. Loss of empathy (30)
- vii. Decreased ability to get along with coworkers (30)
- viii. Diminished ability to detect subtle changes in patient's status (30)
- ix. Delayed psychomotor reaction time (21; 30)
- x. Decreased job satisfaction (22)

#### B. Nurses health

- i. Increased risk for
  - a. occupational injury (21; 58)
  - b. accident and injury (inside and away from workplace) (1; 11; 24; 28; 35; 57; 59)
  - c. addictive behavior
  - d. obesity (17)
  - e. mood disorders including depression (17; 28; 29)
  - f. acute and chronic illness (17; 28; 29)
  - g. cancer (Buus-Frank, 2005)
  - h. mortality and morbidity (17; 28; 29; 57)
- ii. Increased utilization of health services (17)
- iii. Reduced motivation(30)

#### 5. Fatigue countermeasures can be implemented to correct and/or reduce the effects of nurse fatigue.

##### A. Work setting strategies (3)

- i. Cultures that encourage nurses not to work when fatigued (4; 14; 17; 64)
- ii. Adjustment of weekly work hours to individual performance (64)
- iii. Redesign/ manipulation of work schedules, length of shift hours per day to minimize fatigue(4; 14; 17; 64)
- iv. Nurse input in creating their work schedules (33)
- v. Application of best practices learned from other disciplines (1; 10; 12; 13; 14; 30)
- vi. Provision for breaks and meals (28; 29; 51; 52; 59; 64)
- vii. Allowance of time and space for nap periods (15 to 30 minutes, especially for those working long or off shifts) (17; 28; 29; 30; 51; 52; 64)
- viii. Identification, education, counseling, support, and referral of co-workers impaired with fatigue in the workplace (3; 30; 64)
- ix. Application of evidence based research for fatigue reduction in the work setting (translational research). (3; 14; 51; 52)

##### B. Nurse strategies (4; 51; 52)

- i. Promotion of healthy work behaviors (51; 52)
- ii. Optimal nutrition (30; 51; 52)
- iii. Caffeine limitation (10; 30; 51; 52)
- iv. Physical exercise (30; 51; 52)
- v. Adequate rest (13; 17; 30; 51; 52; 64)
- vi. Scheduled time away from work to recover from fatigue (17; 30; 51; 52; 64)
- vii. Limited hours of work per week (1; 17; 64)

6. Additional research is needed to identify adverse outcomes from nurse fatigue and specific evidence based strategies to reduce the incidence of nurse fatigue. (3; 14; 24)

7. Information and research findings on the topic of nurse fatigue and sleep deprivation with subsequent adverse effects on patient outcomes and nurses' ability to function must be disseminated to professional nurses and administrative leadership of organizations employing nurses. Suggested avenues and methods to distribute such information can include the following: (3)

- A. Presentation of this topic at nursing organization (s) conferences
- B. Publication of meta-analysis article (s) in nursing organizational journals
- C. Development of education programs for distribution at regional and local presentations to nursing groups and/or facilities employing nurses
- D. Development of bibliography/ reference list of related articles for dissemination in selected nursing journals
- E. Publication of “fatigue” article(s) in State Board of Nursing publications (including newsletters)
- F. Implementation of a Listserve by the Nursing Organizations Alliance for the dissemination of fatigue information
- G. Creation of public service announcements (PSAs) and other marketing techniques to create awareness
- H. Exploration by nursing organizations of potential collaborative work groups with other like-minded entities such as Johnson & Johnson (J&J) and Institute of Medicine (IOM)
- I. Dissemination of information to agencies that deal with traveling/float pool/agency nurses
- J. Distribution of fatigue-related work information by State Boards of Nursing
- K. Dissemination of The Alliance fatigue principles to nursing faculty in nursing education programs

This document was created in 2006 by a self forming Nursing Organizations Alliance work team. The Alliance accepts no responsibility for the opinions and information contained in the document and disclaims all warranties with regard to such information, regardless of its source.

## FATIGUE REFERENCES

1. Study shows 12-hour shifts increase errors. *Healthcare Benchmarks & Quality Improvement*. 2004;11:105-106.
2. Hospitals in crisis: Overcrowding and staff shortages lead to new recommendations. *Am J Nurs*. 2002;102:20.
3. NursingWorld | Code of Ethics. Available at: [http://nursingworld.org/ethics/code/protected\\_nwcoe813.htm](http://nursingworld.org/ethics/code/protected_nwcoe813.htm). Accessed 9/11/2007, 2007.
4. Batelle Report. Available at: <http://cf.alpa.org/internet/projects/ftdt/backgr/batelle.htm>. Accessed 9/11/2007, 2007.
5. Public Citizen | Publications - Petition to the Occupational Safety and Health Administration requesting that limits be placed on hours worked by medical residents (HRG Publication #1570). Available at: <http://www.citizen.org/publications/release.cfm?ID=6771&secID=1164&catID=126>. Accessed 9/11/2007, 2007.
6. Research Activities, November 2004: Patient Safety/Quality: Limiting medical interns' work to 16 consecutive hours can substantially reduce serious medical errors in ICUs. Available at: <http://www.ahrq.gov/research/nov04/1104RA2.htm>. Accessed 9/11/2007, 2007.
7. In the matter of Lorraine Deland v. Hutchings Psychiatric Center et al. 203 A.D. 2d 776 (N.Y. App Div. 1994).
8. Akerstedt T. Work hours and sleepiness. *Neurophysiologie Clinique*. 1995;25:367-375.
9. American Academy of Sleep Medicine. Sleep, Alertness and Fatigue Education in Residency (SAFER). Available at: <http://www.aasmnet.org/store/ProductDetails.aspx?pid=116>. Accessed 05/08, 2007.
10. American Nurses Association. *Nursing : Scope and Standards of Practice*. Washington, D.C: Nursesbooks.org ;; American Nurses Association; 2004.
11. Arnedt JT, Wilde GJ, Munt PW, MacLean AW. How do prolonged wakefulness and alcohol compare in the decrements they produce on a simulated driving task?. *Accident Analysis & Prevention*. 2001;33:337-344.
12. Balas MC, Scott LD, Rogers AE. The prevalence and nature of errors and near errors reported by hospital staff nurses. *Applied Nursing Research*. 2004;17:224-230.
13. Barger LK, Cade BE, Ayas NT, Cronin JW, Rosner B, Speizer FE, Czeisler CA. Harvard Work Hours, Health, and Safety Group. Extended work shifts and the risk of motor vehicle crashes among interns. *N Engl J Med*. 2005;352:125-134.
14. Beyea SC. Too tired to work safely?. *AORN J*. 2004;80:559-562.
15. Bond CA, Raehl CL, Pitterle ME, Franke T. Health care professional staffing, hospital characteristics, and hospital mortality rates.see comment. *Pharmacotherapy*. 1999;19:130-138.

16. Boulton M. Patient safety. the fatigue factor. *Health Serv J*. 2005;115:34-35.
17. Buus-Frank ME. Practicing under the influence of fatigue (PUIF): A wake-up call for patients and providers.[see comment]. *Advances in Neonatal Care*. 2005;5:55-61.
18. Canadian Center for Occupational Health and Safety. OSH Answers: Extended Workday:Health and Safety Issues. Available at: [http://www.ccohs.ca/oshanswers/work\\_schedules/workday.html](http://www.ccohs.ca/oshanswers/work_schedules/workday.html). Accessed September 10, 2007.
19. Carayon P, Gurses AP. A human factors engineering conceptual framework of nursing workload and patient safety in intensive care units. *Intensive & Critical Care Nursing*. 2005;21:284-301.
20. Fletcher KE, Davis SQ, Underwood W, Mangrulkar RS, McMahon LF,Jr, Saint S. Systematic review: Effects of resident work hours on patient safety. *Ann Intern Med*. 2004;141:851-857.
21. Gaba DM, Howard SK. Patient safety: Fatigue among clinicians and the safety of patients. *N Engl J Med*. 2002;347:1249-1255.
22. Halm M, Peterson M, Kandels M, et al. Hospital nurse staffing and patient mortality, emotional exhaustion, and job dissatisfaction. *Clinical Nurse Specialist*. 2005;19:241-251.
23. Hancock PA, Desmond PA. *Stress, Workload, and Fatigue*. Mahwah, N.J: Lawrence Erlbaum Associates; 2001.
24. Hanecke K, Tiedemann S, Nachreiner F, Grzech-Sukalo H. Accident risk as a function of hour at work and time of day as determined from accident data and exposure models for the German working population. *Scand J Work Environ Health*. 1998;24:43-48.
25. Hart RP, Buchsbaum DG, Wade JB, Hamer RM, Kwentus JA. Effect of sleep deprivation on first-year residents' response times, memory, and mood. *J Med Educ*. 1987;62:940-942.
26. Hickam DH, Severance S, Feldstein A, et al. The effect of health care working conditions on patient safety. *Evidence Report: Technology Assessment (Summary)*. 2003:1-3.
27. Hill J. Sleep deprivation. *Lancet*. 2004;363:996.
28. Howard SK, Gaba DM, Rosekind MR, Zarcone VP. The risks and implications of excessive daytime sleepiness in resident physicians. *Academic Medicine*. 2002;77:1019-1025.
29. Howard SK, Rosekind MR, Katz JD, Berry AJ. Fatigue in anesthesia: Implications and strategies for patient and provider safety.see comment. *Anesthesiology*. 2002;97:1281-1294.
30. Hughes RG, Rogers AE. Are you tired?[see comment]. *Am J Nurs*. 2004;104:36-38.
31. Jacobsen C, Holson D, Farley J, Charles J, Suel P. Surviving the perfect storm: Staff perceptions of mandatory overtime. *JONA's Healthcare Law, Ethics, & Regulation*. 2002;4:57-66.
32. Jagsi R, Kitch BT, Weinstein DF, Campbell EG, Hutter M, Weissman JS. Residents report on adverse events and their causes. *Arch Intern Med*. 2005;165:2607-2613.

33. Kerin KJ. Employee involvement in shift scheduling. Available at: <http://www.circadian.com/publications/whitepapers.html#mandate>. Accessed 9/12/2007, 2007.
34. Leape L. Lucian leape on patient safety in U.S. hospitals. interview by peter I buerhaus.see comment. *Journal of Nursing Scholarship*. 2004;36:366-370.
35. Lee KA, Landis C, Chasens ER, et al. Sleep and chronobiology: Recommendations for nursing education. *Nurs Outlook*. 2004;52:126-133.
36. Lockley SW. Cronin JW. Evans EE. Cade BE. Lee CJ. Landrigan CP. Rothschild JM. Katz JT. Lilly CM. Stone PH. Aeschbach D. Czeisler CA. 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.
37. MacDonald R. How protective is the working time directive?see commenterratum appears in BMJ. 2004 sep 11;329(7466):621. *BMJ*. 2004;329:301-302.
38. Mills ME, Arnold B, Wood CM. Core-12: A controlled study of the impact of 12-hour scheduling. *Nurs Res*. 1983;32:356-361.
39. Mitler MM, Miller JC, Lipsitz JJ, Walsh JK, Wylie CD. The sleep of long-haul truck drivers. *N Engl J Med*. 1997;337:755-761.
40. O'Malley PG, Khandekar JD, Phillips RA. Residency training in the modern era: The pipe dream of less time to learn more, care better, and be more professional.comment. *Arch Intern Med*. 2005;165:2561-2562.
41. Page A, Institute of Medicine (U.S.), Committee on the Work Environment for Nurses and Patient Safety. *Keeping Patients Safe : Transforming the Work Environment of Nurses*. Washington, DC: National Academies Press; 2004.
42. Parthasarathy S. Sleep and the medical profession. *Curr Opin Pulm Med*. 2005;11:507-512.
43. Reid K, Dawson D. Comparing performance on a simulated 12 hour shift rotation in young and older subjects. *Occupational & Environmental Medicine*. 2001;58:58-62.
44. Robbins J, Gottlieb F. Sleep deprivation and cognitive testing in internal medicine house staff. *West J Med*. 1990;152:82-86.
45. Roehrs T, Timms V, Zwyghuizen-Doorenbos A, Roth T. Sleep extension in sleepy and alert normals. *Sleep*. 1989;12:449-457.
46. Rogers AE. Sleep deprivation and the ED night shift. *Journal of Emergency Nursing*. 2002;28:469-470.
47. Rogers AE, Hwang WT, Scott LD. The effects of work breaks on staff nurse performance. *J Nurs Adm*. 2004;34:512-519.
48. Rogers AE, Hwang WT, Scott LD, Aiken LH, Dinges DF. The working hours of hospital staff nurses and patient safety. *Health Aff*. 2004;23:202-212.
49. Rosa RR. Extended workshifts and excessive fatigue. *J Sleep Res*. 1995;4, Supplement 2:51-56.

50. Rosa RR, Colligan MJ. Long workdays versus restdays: Assessing fatigue and alertness with a portable performance battery. *Hum Factors*. 1988;30:305-317.
51. Rosekind MR, Gander PH, Gregory KB, et al. Managing fatigue in operational settings 2: An integrated approach. *Hosp Top*. 1997;75:31-35.
52. Rosekind MR, Gander PH, Gregory KB, et al. Managing fatigue in operational settings 1: Physiological considerations and counter-measures. *Hosp Top*. 1997;75:23-30.
53. Rubin R, Orris P, Lau SL, Hryhorczuk DO, Furner S, Letz R. Neurobehavioral effects of the on-call experience in housestaff physicians. *Journal of Occupational Medicine*. 1991;33:13-18.
54. Samkoff JS, Jacques CH. A review of studies concerning effects of sleep deprivation and fatigue on residents' performance. *Academic Medicine*. 1991;66:687-693.
55. Schaffner M. Fighting fatigue. more than just a resident issue? *Gastroenterology Nursing*. 2003;26:82-83.
56. Scott JP, McNaughton LR, Polman RC. Effects of sleep deprivation and exercise on cognitive, motor performance and mood. *Physiol Behav*. 2006;87:396-408.
57. Shannon V, French S. The impact of the re-engineered world of health-care in canada on nursing and patient outcomes. *Nurs Inq*. 2005;12:231-239.
58. Trinkoff A, Geiger-Brown J, Brady B, Lipscomb J, Muntaner C. How long and how much are nurses now working?. *Am J Nurs*. 2006;106:60-71.
59. Trossman S. Beyond mandatory overtime. *Am J Nurs*. 2005;105:73-74.
60. Tucker P. The impact of rest breaks upon accident risk, fatigue and performance: A review. *Work & Stress*. 2003;17:123-137.
61. Tucker P, Barton J, Folkard S. Comparison of eight and 12 hour shifts: Impacts on health, wellbeing, and alertness during the shift. *Occupational & Environmental Medicine*. 1996;53:767-772.
62. Ulrich BT, Buerhaus PI, Donelan K, Norman L, Dittus R. How RNs view the work environment: Results of a national survey of registered nurses. *J Nurs Adm*. 2005;35:389-396.
63. Weingart SN, Farbstein K, Davis RB, Phillips RS. Using a multihospital survey to examine the safety culture. *Joint Commission Journal on Quality & Safety*. 2004;30:125-132.
64. Zimmermann PG. Cutting edge discussions of management, policy, and program issues in emergency care. *Journal of Emergency Nursing*. 2005;31:476-483.