The Longer The Shifts For Hospital Nurses, The Higher The Levels Of Burnout And Patient Dissatisfaction

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Abstract

Extended work shifts of twelve hours or longer are common and even popular with hospital staff nurses, but little is known about how such extended hours affect the care that patients receive or the well-being of nurses. Survey data from nurses in four states showed that more than 80 percent of the nurses were satisfied with scheduling practices at their hospital. However, as the proportion of hospital nurses working shifts of more than thirteen hours increased, patients' dissatisfaction with care increased. Furthermore, nurses working shifts of ten hours or longer were up to two and a half times more likely than nurses working shorter shifts to experience burnout and job dissatisfaction and to intend to leave the job. Extended shifts undermine nurses' well-being, may result in expensive job turnover, and can negatively affect patient care. Policies regulating work hours for nurses, similar to those set for resident physicians, may be warranted. Nursing leaders should also encourage workplace cultures that respect nurses' days off and vacation time, promote nurses' prompt departure at the end of a shift, and allow nurses to refuse to work overtime without retribution.

Traditional eight-hour shifts for hospital nurses are becoming a thing of the past:[1,2] Nurses increasingly work twelve-hour shifts. This schedule gives nurses a three-day work week, potentially providing better work-life balance and flexibility.[3,4] However, actual shift lengths are often unpredictable[5] because of fluctuations in patient needs and unanticipated staffing changes. As a result, nurses often must put in unplanned overtime beyond the scheduled shift length. When long shifts are combined with overtime, shifts that rotate between day and night duty, and consecutive shifts, nurses are at risk for fatigue and burnout, which may compromise patient care.[5]

Despite regulations on shift length and cumulative working hours for resident physicians and people in other industries, there are no national work-hour policies for registered nurses. Several states, such as Maryland and California, have prohibited mandatory overtime for nurses, but there is no limit to nurses' voluntary overtime hours. Furthermore, the distinction

between voluntary and mandatory is often blurred: Nurses report feeling coerced into working "voluntary" overtime. Nurse shortages, coupled with a weak economy, have motivated nurses to work past the end of their scheduled shift or to work additional shifts.

There is limited research on the impact of long shifts on nurses[6] or on the quality of the care they provide to patients.[5,7–10] In addition, there is inadequate understanding of whether patients' satisfaction with care is affected by the extended hours worked by nurses.

In this study we investigated the relationship between hospital nurses' shift length and three nurse outcomes: burnout, job dissatisfaction, and intention to leave the job. Burnout is characterized by emotional exhaustion, depersonalization of patients, and feelings of lack of personal accomplishment by caregivers,[11,12] which could negatively affect nurse job satisfaction and voluntary turnover.[13,14]

Our study also examined the relationship between nurses' shift length and patient outcomes, using data from the Hospital Consumer Assessment of Healthcare Providers and Systems Survey, a national, standardized hospital-level data set that includes information about patients' assessment of overall care and nursing care in acute care hospitals.[15] Previous research has documented that hospitals in which a higher proportion of nurses experience burnout have lower patient satisfaction.[16] However, to the best of our knowledge this is the first study to explore whether nurses' shift length specifically is associated with patient satisfaction.

Study Data And Methods

DESIGN AND DATA

This study involved a secondary analysis of cross-sectional data from three sources linked by common hospital identifiers. The first source was the Multi-State Nursing Care and Patient Safety Study,[17] which surveyed nurses in four states from 2005 to 2008 about their shift length, working conditions, burnout, job satisfaction, and intentions to leave their employer. The second was the Hospital Consumer Assessment of Healthcare Providers and Systems survey for 2006–07.[15] This survey is a publicly available source of data on patients' experiences during acute care hospitalizations. The third was the American Hospital Association Annual Survey of Hospitals for 2006, which we consulted to obtain information about additional characteristics of the study hospitals.

STUDY SAMPLE

We used a sample of 22,275 registered nurses from the Multi-State Nursing Care and Patient Safety Study. The nurses in our study worked in 577 hospitals in California, New Jersey, Pennsylvania, and Florida. The sample included at least 10 nurses per hospital with an average of 39 nurses per hospital (the range was 10–205). A full description of the Multi-State Study is available elsewhere,[17] and the online Technical Appendix includes explanations of the sampling methods we used.[18]

We included in our analysis nurse respondents in the Multi-State Study who reported working 1–24 hours on their last shift and providing care to at least one but fewer than twenty patients. These selection criteria were designed to eliminate nurses who were not working directly with patients, including those in supervisory or "on call" roles.

The analyses were further restricted to nurses on medical or surgical units and in intensive care units. We excluded nurses working in long-term care, outpatient services, and the operating room because they do not usually follow the same shift patterns as inpatient hospital units.

SHIFT LENGTH

Nurses' shift length was calculated as the difference between the start and end time of the most recent shift that the nurse worked. Shift length was grouped into four categories: 8–9 hours, 10–11 hours, 12–13 hours, and more than 13 hours. These ranges were used to account for changes in planned shifts. For example, shifts in the category of 10–11 hours might have involved overtime after an 8-hour shift. Scheduled shifts are typically eight or twelve hours in length.

We used the length of individual nurse shifts for our analyses of the nurse outcomes. For our analyses of patient outcomes, including patient satisfaction, we used the hospital-level proportion of nurses working each of the four shift-length categories. Patient outcomes data were available only at the hospital level. In our analyses, we estimated the effects of the four different shift category proportions—that is, the proportion of nurses working each shift category—on each patient outcome.

NURSE OUTCOMES

Job satisfaction was assessed using a four-point Likert scale–type question, "How satisfied are you with your job?" Responses, which ranged from very satisfied to very dissatisfied, were dichotomized to contrast satisfied and dissatisfied respondents.

Burnout was measured using the nine-item emotional exhaustion subscale of the Maslach Burnout Inventory, a reliable and valid instrument for assessing burnout in human service professions.[11,12] Scores totaling twenty-seven or more are considered an indication of high emotional exhaustion,[19] and our analysis contrasted nurses with burnout scores of twenty-seven and above and those with scores below that point.[14,20–22]

Nurses' intent to leave their employer within the next year was assessed using a single yes/no item.

PATIENT SATISFACTION

We used data on patients' assessment of their care experience during short-term, acute care hospitalizations from the Hospital Consumer Assessment of Healthcare Providers and Systems survey that we found on the Hospital Compare website of the Centers for Medicare and Medicaid Services. The survey was conducted during 2006 and 2007, which was right in the middle of the period during which the Multi-State Nursing Care and Patient Safety Study data were collected (from late 2005 to early 2008). Thus patients and nurses were responding about hospital conditions at roughly the same time.

We analyzed all of the publicly reported items in the Hospital Consumer Assessment of Healthcare Providers and Systems survey, including two questions on global assessments of care; three questions on communication with doctors, nurses, and staff; three questions on nursing care; and two questions on hospital environment. All items were available only in aggregated form, and they were risk-adjusted for each hospital prior to release to the public.[23]

CONTROL VARIABLES

We used a variety of controls in our models to account for nurse characteristics, nursing organizational features, and hospital structural characteristics that have been shown to be related to our outcomes. For individual nurses, we included age and sex, characteristics that may influence intentions to leave.[24] We controlled for the type of hospital unit to account for differences between intensive care and general care units in the acuity of patients' conditions and nurse workloads. We controlled for two nursing organizational features—

nurse staffing and the professional practice environment—that have been found to be associated with both nurse outcomes and patient satisfaction.[20,25]

Our measure of nurse staffing was calculated from the survey data as the average ratio of patients to nurses reported by the nurse respondents on their units during their last shift, aggregated to the hospital level. This method has been established in the literature.[14,17]

We also conducted parallel analyses using the American Hospital Association's nurse staffing measure. We do not report these results because they were substantially similar to the results we obtained using the survey-based staffing measure. The nurses' professional practice environment was measured using the Practice Environment Scale of the Nursing Work Index, endorsed by the National Quality Forum.[26,27] The Technical Appendix[18] describes how we categorized the environment based on the subscales of the Practice Environment Scale.

Finally, we used data from the American Hospital Association Annual Survey of Hospitals to control for hospital structural characteristics that have been associated with differences in patient outcomes.[28–30] We defined *high-technology hospitals* as those that performed major organ transplant surgery, open heart surgery, or both. Teaching status was determined by the ratio of postgraduate medical residents to beds, and bed size was the number of licensed beds. Ownership, hospital state, and core-based statistical area—a measure of population density—were also included as hospital-level control variables in the patient satisfaction models.

DATA ANALYSIS

Descriptive statistics were used to examine the major outcomes of interest and characteristics of nurses and hospitals by shift length category. First, we examined the bivariate relationship between nurses' shift length and the nurse outcomes (burnout, job dissatisfaction, and intent to leave), using separate generalized estimating equation models. All comparisons between shift length categories were made using the category of 8–9 hours as the reference group.

Next, we added controls to the three nurse outcome models. All of the models used generalized estimating equations to take account of the clustering of nurses within hospitals.

Then we used the measures from the Hospital Consumer Assessment of Healthcare Providers and Systems survey to examine the relationship between the proportion of nurses in each hospital working each type of shift and patient satisfaction, using hospital-level data and estimating ordinary least squares regression models. After first estimating bivariate models, we added hospital-level controls to the models.

All analyses were completed using the statistical analysis software SAS, version 9.3. The significance level was $p < 0.05$ for a two-tailed test. This study was approved by the Institutional Review Board of the University of Pennsylvania.

LIMITATIONS

Our study was cross-sectional, which limited our ability to make causal inferences about the effect of nurses' shift length on nurse or patient outcomes. We attempted to include all known confounding factors in our models, but it is possible that some were not included.

Our sample was not national. However, the four states included in the study represented approximately 25 percent of the US population[31] and 20 percent of annual US hospitalizations.[17]

In 2006–07, reporting on the Hospital Consumer Assessment of Healthcare Providers and Systems survey was voluntary. Therefore, the hospitals included in our analyses may not be representative of all hospitals. However, the controls in our models for hospital size, teaching status, and ownership adjust for some of the differences between the sampled and non-sampled hospitals that might otherwise represent a threat to external validity, or our ability to generalize our results.[25]

The response rate to the Multi-State Nursing Care and Patient Safety Study was 39 percent. In an intensive follow-up survey of a sample of 1,300 nonresponders, we achieved a 91 percent response rate. We found no major differences relevant to the variables of proximal interest in our study between the responses of the initial responders and those of the later responders.

Study Results

HOSPITAL AND NURSE CHARACTERISTICS

Sixty-five percent of nurses worked shifts of 12–13 hours (Exhibit 1). Twenty-six percent worked shifts of 8–9 hours, and the remaining nurses worked shifts of either 10–11 hours or more than 13 hours. When we examined the hospital characteristics by shift length category, we found that nurses working shifts of twelve hours or longer were more numerous in teaching and high-technology hospitals.

Nurses working shifts that were twelve hours or longer were disproportionately male and nonwhite; their mean age was also lower than that of nurses in other categories of shift length (Exhibit 1). Nurses working in intensive care units were also more likely than medical or surgical nurses to work longer shifts.

The majority of nurses were non-Latino, white, and female. Most had less than a bachelor's degree. In general, these demographics reflect the national profile of nurses found in the 2008 National Sample Survey of Registered Nurses, a survey conducted every four years to evaluate trends in the nursing profession.[32]

Most of the hospitals in the study had more than 100 beds; were high-technology institutions; and were minor teaching hospitals or non-teaching hospitals, rather than major teaching hospitals (Exhibit 1).

NURSES' SCHEDULING PRACTICES AND OUTCOMES

Across the four shift length categories, more than 80 percent of the nurses reported being satisfied with scheduling practices at their hospital (Exhibit 2). The percentages of nurses reporting burnout and an intention to leave the job increased incrementally as shift length increased. The percentage of nurses who were dissatisfied with the job was similar for nurses working the most common shift lengths, 8–9 hours and 12–13 hours, but it was higher for nurses working shifts of 10–11 hours and more than 13 hours.

NURSES' SHIFT LENGTH AND OUTCOMES

We assessed the bivariate relationship between nurses' shift length and nurse outcomes. Increases in shift length were associated with significant increases in the odds of burnout, job dissatisfaction, and intention to leave the job. The odds of burnout and job dissatisfaction were up to two and a half times higher for nurses who worked longer shifts than for nurses who worked shifts of 8–9 hours.

Even after we adjusted for potential confounding factors, the significant relationship between longer shift lengths and nurse reports of burnout and job dissatisfaction persisted.

Compared to nurses who worked shifts of 8–9 hours, nurses who worked shifts of 10–11 hours had a greater likelihood of being burned out, being dissatisfied with the job, and intending to leave the job (Exhibit 3). So did nurses who worked shifts of 12–13 hours, although the impact of shift length was smaller for them than for nurses in the shift category of 10–11 hours. The odds of these unfavorable outcomes were highest for nurses who worked shifts of more than 13 hours.

NURSES' SHIFT LENGTH AND PATIENT SATISFACTION

We also found that nurses' shift length was significantly associated with patient satisfaction, as measured by the Hospital Consumer Assessment of Healthcare Providers and Systems survey. In this analysis, we used a subset of nurses (n ¼ 16; 241) and hospitals (n ¼ 396), with an average of 41 nurses per hospital that participated in the survey.

In the fully adjusted linear regression models, we found that seven of the ten outcomes were significantly and adversely affected by the proportion of nurses in the hospital working shifts of more than thirteen hours, including both of the global assessments of care— patients' rating of the hospital overall, and whether patients would recommend the hospital (Exhibit 4). That is, increases in the proportion of nurses working shifts of more than thirteen hours were associated with increases in patient dissatisfaction.

Although only 5 percent of the nurses in our sample worked shifts of more than thirteen hours, the hospitals in the sample varied considerably in terms of the percentages of their nurses working those shifts, from 0 percent to nearly 40 percent. A change from 0 percent to 40 percent of nurses working those shifts would result in nearly a five-percentage-point increase in the patients who gave the hospital a low rating.

We found a number of significant relationships between the other shift length categories and patient satisfaction. Notably, having higher proportions of nurses working shorter shifts—8–9 hours or 10–11 hours—resulted in decreases in patient dissatisfaction. Although not all of the coefficients in Exhibit 4 are significant, it is note-worthy that all of the significant ones associated with shifts of 12–13 hours and of more than 13 hours are positive (that is, they indicate more dissatisfaction), while all of the significant coefficients associated with shifts of 10–11 hours and 8–9 hours are negative (indicating less dissatisfaction).

Discussion

This study provides new and valuable insights into the relationship between nurses' shift length and patient and nurse outcomes. Specifically, we found that the longer the shift, the greater the likelihood of adverse nurse outcomes such as burnout. Patients were less satisfied with their care when there were higher proportions of nurses working shifts of thirteen or more hours and were more satisfied when there were higher proportions of nurses working eleven or fewer hours.

We also found that, despite poor nurse outcomes associated with longer shift lengths, nurses seem to be satisfied with their schedules. Most hospitals have transitioned to a regular use of the twelve-hour shift.

This study is the first to investigate the relationship between nurses' shift length and patients' assessment of care using the Hospital Consumer Assessment of Healthcare Providers and Systems survey. In hospitals in which a higher proportion of nurses reported working more than thirteen hours on their last shift, higher percentages of patients reported that they would not recommend the hospital to friends and family and gave the hospital lower overall ratings.

Furthermore, larger percentages of the patients in the hospitals with more nurses working the longest shifts reported that nurses sometimes or never communicated well; pain was sometimes or never well controlled; and they sometimes or never received help as soon as they wanted. For many patient outcomes, dissatisfaction decreased as the proportion of nurses working shifts of 8–9 hours or 10–11 hours increased. In sum, our results suggest that patients perceive worse care (overall and in nursing-specific domains) in hospitals that have high proportions of nurses working shifts of more than thirteen hours.

These findings are important given the changes being implemented in reimbursement by the Centers for Medicare and Medicaid. Beginning in fiscal year 2013, hospitals will face reductions in reimbursement if they do not meet national benchmarks on the two global measures of care on the Hospital Consumer Assessment of Healthcare Providers and Systems survey used in this study. Nurse working conditions, including shift length, is one area related to these benchmarks that we believe is readily amenable to change.

Nurses' shifts of more than thirteen hours were also associated with greater likelihood of nurse burnout, job dissatisfaction, and intention to leave the job. The current literature cites twelve-hour shifts as a way to recruit and retain nurses because it is the preferred shift length among nurses.[1,9] We found that most nurses said they were satisfied with their schedule and that the majority of our sample worked shifts of at least twelve hours. But we also found that the nurses who worked shifts of 12–13 hours were more likely to intend to leave the job than nurses who worked shorter shifts, contrary to what the literature suggests.

One possible explanation for the findings is that nurses underestimate the impact of working long shifts because the idea of working three days a week instead of five seems appealing. Working longer but fewer shifts may also attract nurses who work a second job. However, the strain of those three long work days and the rest and recovery time needed may offset any perceived benefit, if our survey results are any indication. When a three-day week turns into more days or additional, unplanned-for overtime, nurses' satisfaction appears to decrease.

Implications For Policy And Practice

Our findings contribute to a growing body of research associating nurses' shift length with patient safety issues.[5,7,8,10] The results also highlight an area of health care ripe for policy development at both national and institutional levels.

Policies by the Accreditation Council for Graduate Medical Education have resulted in mandatory restrictions in resident physicians' duty hours to no more than eighty hours a week. Our results suggest that similar policies for nurses—perhaps restricting the number of consecutive hours worked—should be considered by accrediting bodies, such as the Joint Commission. Shift lengths could also become reportable evidence for magnet recognition by the American Nurses Credentialing Center, which denotes nursing excellence in hospitals.

In 2011 a "sentinel event" alert was issued by the Joint Commission,[33] which called for hospitals to intensify their efforts to monitor and address health care workers' risk for fatigue caused by extended shifts. A "sentinel event" indicates the risk for, or an actual unexpected occurrence of, death or serious injury in the health care setting. The Joint Commission recommended nine evidence-based actions, including assessment of off-shift hours and consecutive shifts worked, and the inclusion of staff in the design of work schedules to reduce risk for fatigue. Now a matter of hospitals' policing themselves, these recommendations may become part of accrediting standards.

At the state level, boards of nursing should consider whether restrictions on nurse shift length and voluntary overtime are advisable. This idea has been raised in the past, but it has been met with emphatic pushback from nurses who wish to maintain the status quo.[34]

In addition, policies should be adopted by nursing management within hospitals to monitor nurses' hours worked, including hours worked in second jobs. For example, chronic understaffing at a hospital may lead to nurses' working longer shifts or overtime to make up for the staffing shortages. Hospitals that do not require overtime but are short staffed may also face quality-of-care issues. At a minimum, hospital administrators should establish practices designed to comply with the Institute of Medicine's recommendations to limit nurses' work hours to twelve hours in a twenty-four-hour period and to sixty hours in a week.[35]

Nursing leadership should also encourage a workplace culture that respects nurses' days off and vacation time, promotes nurses' prompt departure at the end of a scheduled shift, and allows nurses to refuse to work overtime without retribution.[36] These types of policies that facilitate manageable work hours can contribute to the development of a healthier nursing workforce, prepared to manage the complex care needs of patients and their families.

Acknowledgments

NOTES

1. Geiger-Brown J, Trinkoff AM. Is it time to pull the plug on 12-hour shifts?: Part 1. The evidence. J Nurs Adm. 2010; 40(3):100–102. [PubMed: 20485206]

2. American Nurses Association. Safe staffing saves lives. Silver Spring (MD): ANA; [Internet]. [updated 2010] Available from: http://www.safestaffingsaveslives.org//WhatisANADoing/PollResults.aspx

3. Richardson A, Turnock C, Harris L, Finley A, Carson S. A study examining the impact of 12-hour shifts on critical care staff. J Nurs Manag. 2007; 15(8):838–846. [PubMed: 17944610]

4. Richardson A, Dabner N, Curtis S. Twelve-hour shift on ITU: a nursing evaluation. Nurs Crit Care. 2003; 8(3):103–108. [PubMed: 12859080]

5. Rogers AE, Hwang WT, Scott LD, Aiken LH, Dinges DF. The working hours of hospital staff nurses and patient safety. Health Aff (Millwood). 2004; 23(4):202–212. [PubMed: 15318582]

6. Trinkoff AM, Le R, Geiger-Brown J, Lipscomb J. Work schedule, needle use, and needlestick injuries among registered nurses. Infect Control Hosp Epidemiol. 2007; 28(2):156–164. [PubMed: 17265396]

7. Trinkoff AM, Johantgen M, Storr CL, Gurses AP, Liang Y, Han K. Nurses' work schedule characteristics, nurse staffing, and patient mortality. Nurs Res. 2011; 60(1):1–8. [PubMed: 21127449]

8. Stone PW, Mooney-Kane C, Larson EL, Horan T, Glance LG, Zwanziger J, et al. Nurse working conditions and patient safety outcomes. Med Care. 2007; 45(6):571–578. [PubMed: 17515785]

9. Stone PW, Du Y, Cowell R, Amsterdam N, Helfrich TA, Linn RW, et al. Comparison of nurse, system and quality patient care outcomes in 8-hour and 12-hour shifts. Med Care. 2006; 44(12): 1099–1106. [PubMed: 17122714]

10. Scott LD, Rogers AE, Hwang WT, Zhang Y. Effects of critical care nurses' work hours on vigilance and patients' safety. Am J Crit Care. 2006; 15(1):30–37. [PubMed: 16391312]

11. Maslach C, Jackson SE. The measurement of experienced burnout. J Organ Behav. 1981; 2(2):99–113.

12. Maslach C, Schaufeli WB, Leiter MP. Job burnout. Annu Rev Psychol. 2001; 52:397–422. [PubMed: 11148311]

13. Lake ET. Advances in understanding and predicting nurse turnover. Res Sociol Health Care. 1998; 15:147–171.

14. Aiken LH, Clarke SP, Sloane DM, Sochalski J, Silber JH. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. JAMA. 2002; 288(16):1987–1993. [PubMed: 12387650]

15. CMS.gov. Baltimore (MD): Centers for Medicare and Medicaid Services; HCAHPS: patients' perspectives of care survey. [Internet]. last modified 2012 May 14; Available from: http://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/HospitalQualityInits/HospitalHCAHPS.html

16. Vahey DC, Aiken LH, Sloane DM, Clarke SP, Vargas D. Nurse burnout and patient satisfaction. Med Care. 2004; 42(2 Suppl):II57–II66. [PubMed: 14734943]

17. Aiken LH, Cimiotti JP, Sloane DM, Smith HL, Flynn L, Neff DF. Effects of nurse staffing and nurse education on patient deaths in hospitals with different nurse work environments. Med Care. 2011; 49(12):1047–1053. [PubMed: 21945978]

18. To access the Appendix, click on the Appendix link in the box to the right of the article online.

19. Maslach, C.; Jackson, SE. Maslach Burnout Inventory manual. 2nd ed.. Palo Alto (CA): Consulting Psychologists Press; 1986.

20. Aiken LH, Clarke SP, Sloane DM, Lake ET, Cheney T. Effects of hospital care environment on patient mortality and nurse outcomes. J Nurs Adm. 2008; 38(5):223–229. [PubMed: 18469615]

21. McHugh MD, Kutney-Lee A, Cimiotti JP, Sloane DM, Aiken LH. Nurses' widespread job dissatisfaction, burnout, and frustration with health benefits signal problems for patient care. Health Aff (Millwood). 2011; 30(2):202–210. [PubMed: 21289340]

22. Neff DF, Cimiotti JP, Heusinger AS, Aiken LH. Nurse reports from the frontlines: analysis of a statewide nurse survey. Nurs Forum. 2011; 46(1):4–10. [PubMed: 21306390]

23. Elliott MN, Zaslavsky AM, Goldstein E, Lehrman W, Hambarsoomians K, Beckett MK, et al. Effects of survey mode, patient mix, and nonresponse on CAHPS hospital survey scores. Health Serv Res. 2009; 44(2 Pt 1):501–518. [PubMed: 19317857]

24. Flinkman M, Leino-Kilpi H, Salanterä S. Nurses' intention to leave the profession: integrative review. J Adv Nurs. 2010; 66(7):1422–1434. [PubMed: 20497270]

25. Kutney-Lee A, McHugh MD, Sloane DM, Cimiotti JP, Flynn L, Neff DF, et al. Nursing: a key to patient satisfaction. Health Aff (Millwood). 2009; 28(4):w669–w677. [PubMed: 19525287]

26. Aiken LH, Patrician PA. Measuring organizational traits of hospitals: the Revised Nursing Work Index. Nurs Res. 2000; 49(3):146–153. [PubMed: 10882319]

27. Lake ET. Development of the practice environment scale of the Nursing Work Index. Res Nurs Health. 2002; 25(3):176–188. [PubMed: 12015780]

28. Hartz AJ, Krakauer H, Kuhn EM, Young M, Jacobsen SJ, Gay G, et al. Hospital characteristics and mortality rates. N Engl J Med. 1989; 321(25):1720–1725. [PubMed: 2594031]

29. Ayanian JZ, Weissman JS, Chasan-Taber S, Epstein AM. Quality of care for two common illnesses in teaching and nonteaching hospitals. Health Aff (Millwood). 1998; 17(6):194–205. [PubMed: 9916369]

30. Ayanian JZ, Weissman JS. Teaching hospitals and quality of care: a review of the literature. Milbank Q. 2002; 80(3):569–593. v. [PubMed: 12233250]

31. Census Bureau. Washington (DC): Census Bureau; Population estimates: national totals: vintage 2009. [Internet]. Available from: http://www.census.gov/popest/data/national/totals/2009/index.html

32. Health Resources and Services Administration. The registered nurse population: findings from the 2008 National Sample Survey of Registered Nurses. Rockville (MD): HRSA; 2008.

33. Joint Commission. Sentinel event alert. Oakbrook Terrace (IL): Joint Commission; 2011 Dec 14. [Internet]. (Issue 48). Available from: http://www.joint-commission.org/assets/1/18/SEA_48.pdf

34. Texas Board of Nursing. Nurses offer feedback on proposed nursing work hours position statement. Austin (TX): The Board; [Internet]. Available from: http://www.bon.state.tx.us/practice/pdfs/nwh-summary.pdf

35. Institute of Medicine. Keeping patients safe: transforming the work environment of nurses. Washington (DC): National Academies Press; 2003.

36. Geiger-Brown J, Trinkoff AM. Is it time to pull the plug on 12-hour shifts?: Part 3. Harm reduction strategies if keeping 12-hour shifts. J Nurs Adm. 2010; 40(9):357–359. [PubMed: 20798617]

Biographies

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In this month's *Health Affairs*, Amy Stimpfel and coauthors report on their study of the length of hospital nurses' shifts, nurses' job dissatisfaction and intention to leave their jobs, and patients' dissatisfaction. Although survey data from four states showed that four out of five nurses were satisfied with scheduling practices at their hospital, nurses working shifts of ten hours or longer were up to two and a half times more likely than nurses working shorter shifts to experience burnout and job dissatisfaction. What's more, as the proportion of hospital nurses working shifts of more than thirteen hours increased, patients' dissatisfaction with care also increased. The authors observe that policies regulating work hours for nurses, similar to those set for resident physicians, may be warranted.

Stimpfel is a research fellow at the Center for Health Outcomes and Policy Research at the University of Pennsylvania School of Nursing. Her research is focused on nurses' working conditions and patient and nurse outcomes. Stimpfel holds a doctorate in nursing from the University of Pennsylvania.

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EXHIBIT 1

Characteristics Of Hospitals And Nurses, By Shift Length

Characteristic	Shift length, hours			
	8–9	10–11	12–13	>13
SIZE OF NURSE POPULATION				
Number of nurses	5,677	904	14,370	991
Percent of nurses	26	4	65	5
HOSPITAL CHARACTERISTICS[a]				
High-technology status	23.1%	4.0%	68.6%	4.4%
Teaching status				
Nonteaching	25.2	4.2	66.0	4.6
Minor teaching	29.0	4.1	62.4	4.4
Major teaching	19.9	3.8	72.1	4.2
Number of beds				
100	20.8	4.2	69.5	5.6
101–250	33.0	3.9	58.8	4.3
>250	23.1	4.2	68.2	4.6
NURSE CHARACTERISTICS[b]				
Mean age, years	44[c]	46[d]	42[e]	43[e]
Baccalaureate or higher	24.6%	2.0%	67.0%	4.4%
Sex				
Female	26.4	4.2	64.9	4.5
Male	18.6	3.1	73.7	4.7
Race/ethnicity				
White	27.2	0.5	63.7	0.5
Black	16.8	0.3	73.7	0.6
Hispanic/Latino	18.3	0.3	74.4	0.5
Type of unit, last shift				
Medical/surgical	30.4	5.0	60.3	4.4
Intensive care	14.7	1.7	79.6	4.5

SOURCE Authors' analysis of data from the American Hospital Association Annual Survey of Hospitals, 2006; and the Multi-State Nursing Care and Patient Safety Study (Note 17 in text), 2005–08.

NOTES High-technology hospitals can perform open heart surgery, major organ transplant surgery, or both. Nonteaching hospitals have no postgraduate medical trainees; minor teaching hospitals are those with 1:4 ratios of trainees to beds; major teaching hospitals are those with >1:4 ratios of trainees to beds. Percentages may not sum to 100 because of rounding.

[a] Data on characteristics of hospitals ($N = 577$) are from American Hospital Association Annual Survey of Hospitals, 2006.

[b] Data on characteristics of nurses ($N = 22, 275$) are from the Multi-State Nursing Care and Patient Safety Study, 2005–08.

[c] Standard deviation = 14.

[d]Standard deviation = 13.

[e]Standard deviation = 12.

EXHIBIT 2

Nurse Satisfaction With Scheduling And Nurse Outcomes, By Shift Length

	Shift length, hours			
	8–9	10–11	12–13	>13
SATISFACTION WITH SCHEDULING				
Satisfied with schedule				
Strongly agree/agree	85%	82%	88%	84%
Strongly disagree/disagree	15	18	12	16
Actively participate in scheduling				
Strongly agree/agree	66	66	79	73
Strongly disagree/disagree	34	34	21	27
Flexible work schedules are available				
Strongly agree/agree	67	65	73	66
Strongly disagree/disagree	32	35	27	34
OUTCOMES				
Burnout score[a]				
27	20	31	44	56
<27	80	69	56	44
Job dissatisfaction				
Little/very dissatisfied	24	35	25	43
Very/moderately satisfied	76	65	75	57
Intention to leave employer within a year				
No	11	15	15	25
Yes	89	85	85	75

SOURCE Authors' analysis of data from the Multi-State Nursing Care and Patient Safety Study (Note 17 in text), 2005–08.

NOTES Percentages may not sum to 100 because of rounding. $N = 22, 275$.

[a]From Maslach Burnout Inventory (Note 19 in text).

EXHIBIT 3

Relationship Between Nurses' Shift Length And Outcomes For Nurses

Shift length, hours	Unadjusted		Fully adjusted[a]	
	OR	95% CI	OR	95% CI
BURNOUT				
10–11	1.71	1.48, 1.97	1.58	1.35, 1.84
12–13	1.13	1.04, 1.22	1.11	1.02, 1.20
>13	2.85	2.47, 3.28	2.70	2.32, 3.15
JOB DISSATISFACTION				
10–11	1.72	1.47, 2.02	1.67	1.40, 1.99
12–13	1.10	1.00, 1.20	1.12	1.03, 1.22
>13	2.42	2.09, 2.81	2.38	2.04, 2.79
INTENTION TO LEAVE EMPLOYER WITHIN A YEAR				
10–11	1.49	1.21, 1.85	1.55	1.24, 1.95
12–13	1.53	1.37, 1.71	1.45	1.30, 1.63
>13	2.79	2.32, 3.35	2.57	2.10, 3.15

SOURCE Authors' analysis of data from the Multi-State Nursing Care and Patient Safety Study (Note 17 in text), 2005–08.

NOTES The reference group is the shift category of 8–9 hours. Odds ratios (ORs) and confidence intervals (CIs) are derived from generalized estimated equation models that accounted for clustering of observations within hospitals. If both sides of the 95 percent confidence interval of the odds ratio are greater than 1, or both sides are less than 1, the result is considered significant

[a] Fully adjusted models account for nurse age, sex, type of unit, nurse staffing (see the text), professional practice environment (see the text), number of beds, and hospital teaching and technology status (see the text).

EXHIBIT 4

Relationship Between Nurses' Shift Length And Outcomes For Patients

Patient outcome	Adjusted coefficients for percent of nurses working in the shift length category			
	>13 hours	12–13 hours	10–11 hours	8–9 hours
Patients rated hospital 6 of 10[a]	1.2[**]	0.1	−1.2	−0.1
Patients would not recommend the hospital[b]	0.8[**]	0.1[**]	−1.2[**]	−0.2[**]
PATIENT OUTCOMES REPORTED AS "SOMETIMES" OR "NEVER"				
Nurses communicated well[c]	1.0[***]	0.2[***]	−1.4[***]	−0.2[***]
Staff explained medications[d]	1.1[**]	0.2[**]	−1.1	−0.2[**]
Pain was controlled[e]	0.9[***]	0.2	−0.9[**]	−0.1
Patients received help as soon as they wanted[f]	2.1[***]	0.3[**]	−1.3	−0.3[***]
Room was clean[g]	0.8	0.3[***]	−1.7[***]	−0.4
Staff gave patients discharge information[h]	0.5[**]	0.3[***]	−2.0[***]	−0.3[***]
Doctors communicated well[i]	0.3	0.2[***]	−0.9[***]	−0.2[***]
Quiet at night[j]	0.6	−0.2	−1.1	0.2

SOURCE Authors' analysis of Multi-State Nursing Care and Patient Safety Study (Note 17 in text), 2005–08, and Hospital Consumer Assessment of Healthcare Providers and Systems survey (Note 15 in text), 2006–07.

NOTES N = 396 hospitals. Adjusted models include nurse age, nurse staffing (see the text), and professional practice environment (see the text); and hospital state, teaching status, ownership, core-based statistical area (a measure of population density), and number of beds. Coefficients are scaled by 10 percent.

[a]Mean 13; standard deviation 6; range 36.

[b]Mean 8; standard deviation 4; range 25.

[c]Mean 8; standard deviation 4; range 20

[d]Mean 27; standard deviation 6; range 35.

[e]Mean 9; standard deviation 4; range 22.

[f]Mean 17; standard deviation 6; range 35.

[g]Mean 13; standard deviation 4; range 24.

[h]Mean 24; standard deviation 5; range 28.

[i]Mean 6; standard deviation 2; range 14.

[j]Mean 20; standard deviation 6; range 35.

[**]$p < 0.05$

[***]$p < 0.01$