

Safe Staffing Literature Review

(August 2019)

Please note – These references are arranged alphabetically by author in each section. URLs are listed for those articles available online as of August 6, 2019.

Safety & Outcomes

Falls

- The authors examined the relationship between registered nurse (RN) workgroup job satisfaction and patient falls on 4 types of acute care hospital units. Using regression analyses of 2009 National Database of Nursing Quality Indicators (NDNQI) hospital, unit-level data, RN workgroup job satisfaction was found to be significantly and inversely associated with patient falls.

Choi, J., & Boyle, D.K. (2013). RN Workgroup Job Satisfaction and Patient Falls in Acute Care Hospital Units. *Journal of Nursing Administration*, 43(11), 586-591.

Retrieved from:

https://www.researchgate.net/publication/258038964_RN_Workgroup_Job_Satisfaction_and_Patient_Falls_in_Acute_Care_Hospital_Units

- In this longitudinal study of unit-level fall data collected during 2004–2009 by NDNQI, the authors sought to examine trends in the rate of total inpatient falls. Although the fall rate in United States hospitals has decreased over time, the large variation in fall rate at both the hospital and unit level indicates much room for improvement remains.

He, J., Dunton, N., & Staggs, V. (2012, September). Unit-level Time Trends in Inpatient Fall Rates of US Hospitals. *Medical Care*, 50(9), 801–807. DOI: 10.1097/MLR.0b013e31825a8b88.

- Patient falls in hospitals continue to be a significant, costly problem. The aim of this study was to determine whether staffing and missed nursing care led to an increase in patient falls. The authors found that although nurse staffing levels affect patient fall rates, that impact is reduced when critical nursing care is completed.

Kalisch, B.J., Tschannen, D., & Lee, K.H. (2012, January/March). Missed Nursing Care, Staffing, and Patient Falls. *Journal of Nursing Care Quality*, 27(1), 6-12. DOI: 10.1097/NCQ.0b013e318225aa23.

Measures Validity

- While improved work environments, better hospital nurse staffing, and more educated nurses have been associated with lower hospital mortality, little exists about what each element plays on improving mortality. Outcomes of 665 hospitals in four large states were analyzed to determine stated nurse variables on hospital mortality.

Aiken, L.H., Cimiotti, J.P., Sloane, D.M., Smith, H.L., Flynn, L., Neff, D.F. (2011, December). The Effects of Nurse Staffing and Nurse Education on Patient Deaths in Hospitals With Different Nurse Work Environments. *Medical Care*, 49(12): 1047– 1053. DOI:10.1097/MLR.0b013e3182330b6e.

- Nursing care hours (NCH) are commonly used to examine factors related to adverse events among inpatients, even though NCH have no standardized definition, nor does much literature exist validating the NCH measure. Using the NDNQI definition for NCH, findings indicate that NCH data of the national database were substantially reliable for use in national comparable benchmarking reports.

Choi, J., Boyle, D.K., & Dunton, N. (2014). A Standardized Measure: NDNQI Nursing Care Hours Indicator. *Western Journal of Nursing Research*, 36(1), 105–116. DOI:10.1177/0193945913501723.

- Nurse staffing measures are frequently used to examine hospital quality of care. In this cross-sectional correlational study, the authors investigated specific measures as related to staffing and quality of care.

Kalisch, B.J., Friese, C.R., Choi, S.H., & Rochman, M. Hospital Nurse Staffing: Choice of Measure Matters. (2011, August). *Medical Care*, 49(8), 775-779. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3291170/>

- A variety of operational definitions of nursing hours of care in measuring nurse staffing for health services research exist. In this study the authors examined whether various nursing hours measures yield different model estimations when predicting patient outcomes.

Park, S.H., Blegen, M.A., Spetz, J., Chapman, S.A., & DeGroot, H.A. (2015, January). Comparison of Nurse Staffing Measurements in Staffing-Outcomes Research. *Medical Care*, 53(1), 1-8. DOI: 10.1097/MLR.0b013e318277eb50.

- The author summarizes the current body of published staffing research while exploring gaps in literature, barriers to application within clinical practice, and recommendations for nurse managers and administrators to apply staffing research at the unit-level.

Paulsen R., (2018) Taking nurse staffing research to the unit level *Nurse Manager* 49(7): 42–48. DOI: 10.1097/01.NUMA.0000538915.53159.b5 Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6039374/>

- Appropriate nurse staffing is a long-standing complex issue affecting both financial and patient outcomes. The authors of this article discuss factors influencing RN supply and demand, special staffing challenges including rural communities, workplace violence, technology, and long-term care, along with implications of insufficient RN staffing for health systems and hospitals.

Scott Blouin, A., Podjasek, K., (2019) The Continuing Saga of Nurse Staffing Historical and Emerging Challenges. *The Journal of Nursing Administration* 49(4) 221-227

Patient Safety and Quality of Care

- The Registered Nurse Forecasting (RN4CAST) study was a worldwide effort to not only quantify the number of professional nurses but to determine the quality of nursing staff on patient outcomes. In this seminal research, the authors assessed whether “differences in patient to nurse ratios and nurse educational qualifications in nine of the 12 RN4CAST countries with similar patient discharge data were associated with variation in hospital mortality after common surgical procedures.”

Aiken, L.H., Sloane, D.M., Bruyneel, L., Van den Heede, K., Griffiths, P., Busse, R.,... Sermeus, W. (2014, May 24). Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study. *The Lancet*, 383 (9931), 1824–1830. Retrieved from:

[http://thelancet.com/journals/lancet/article/PIIS0140-6736\(13\)62631-8/abstract](http://thelancet.com/journals/lancet/article/PIIS0140-6736(13)62631-8/abstract)

- Positive associations exist between the levels of nurse engagement, nurse staffing, and assessments of patient safety. Using secondary analysis of linked cross-sectional data and logistic regression models, the authors examined the relationship between hospital nursing structure (represented by nurse staffing levels and level of nurse engagement in hospital affairs) and outcomes (indicators of patient safety).

Brooks Carthon, J.M., Hatfield, L., Plover, C., Dierkes, A., Davis, L. Hedgeland, T., Sanders, A M., Visco, F., Holland, S., Ballinghoff, J. Del Guidice, M., Aiken, L., (2018), Association of Nurse Engagement and Nurse Staffing on Patient Safety. *Journal of Nursing Care Quality* 34(1). 40-46. DOI: 10.1097/NCQ.0000000000000334

- Previous research has shown 12 h shifts are a common shift pattern for nurses and long work hours result in adverse nurse outcomes. In this systematic review, the authors explored shift length with patient outcomes.

Clendon, J., & Gibbons, V. (2015, July). 12 h shifts and rates of error among nurses: A systematic review. *International Journal of Nursing Studies*, 52(7), 1231– 1242. DOI: 10.1016/j.ijnurstu.2015.03.011.

- Higher numbers of nurses are associated with improved survival rates among patients the very seriously ill. A study determined that seven additional lives would be saved for every 100 patients if nurse numbers increased from four to six per bed. Researchers discovered that the reason survival rates improved with higher numbers of nurses was that nurses spend more time with critically ill patients than other healthcare professionals do, and are more likely to detect early signs of deterioration. Another reason is that fewer permanent staff might mean greater reliance on agency staff who may have less expertise or be unfamiliar with some aspects of a unit's way of working.

Duffin, C. (2014). Increase in nurse numbers linked to better patient survival rates in ICU. *Nursing Standard*, 28(33), 10. DOI: 10.7748/ns2014.04.28.33.10.s8.

- A study of 11 hospitals over a two-year period demonstrated a significant relationship between RNs in the skill mix and medication errors and falls. As the proportion of RNs increased, the medication errors decreased. The study found that for every 20% decrease in staffing below the staffing minimum, medication errors increased by 18%.

Frith, K., Anderson, E., Tseng, F., & Fong, E. (2012). Nurse staffing is an important strategy to prevent medication errors in community hospitals. *Nursing Economics*, 30(5), 288–294. Retrieved from:

https://www.nursingeconomics.net/necfiles/specialissue/2012/Frith_Staffing.pdf

- A quality appraisal of studies reporting correlations and associations between missed care and nurse staffing was conducted to determine evidence for the association of missed care with nurse staffing.

Griffith, P., Recio-Saucedo, A., Dall'Orta, C., Briggs, J., Maruotti, A., Meredith, P., Smith, G., Ball, J., (2018). The association between nurse staffing and omissions in nursing care: A systematic review. *Journal of Advanced Nursing*. 74(7): 1474–1487. Retrieved from:

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6033178/>

- Nurse staffing is a complex issue with no easy quick solution. A literature review concluded that support, not regulation, is needed for safe nurse-patient ratios. There are many variables that affect staffing decisions and the RN needs to be informed and take an active role in determining the best staffing ratio that promotes patient safety.

Hertel, R. (2012). Regulating patient staffing: A complex issue. *Med-Surg Matters*, 21(1), 3–7. Retrieved from:

<https://www.amsn.org/sites/default/files/documents/practice-resources/healthy-work-environment/resources/MSM-Hertel-Jan12.pdf>

- In this cross-sectional study, the authors describe the complexities of missed nursing care and investigate the perception of missed care to the patient care experience.

Lake, E.T., Germack, H.D., & Viscardi, M.K. (2016). Missed nursing care is linked to patient satisfaction: a cross-sectional study of US hospitals. *BMJ Quality & Safety*, 25, 535–543. Retrieved from:

<https://www.nursing.upenn.edu/live/files/110-lakegermackviscardi2016missed-nursing-care-and>

- Nursing surveillance is an important aspect of monitoring quality improvement projects and for the evaluation of effective nursing care. A significant relationship was reported between staffing and length of stay, suggesting that early recognition and treatment of potential adverse events led to earlier discharges.

Lewis-Voepel, T., Pechlavanidis, E., Burke, C., & Talsma, A. (2012). Nursing surveillance moderates the relationship between staffing levels and pediatric postoperative serious adverse events: A nested-case control study.

International Journal of Nursing Studies, 50(7), 905–913. DOI: 10.1016/j.ijnurstu.2012.11.014.

- This report presents findings from a study by the Minnesota Department of Health (MDH) about the relationship between hospital nurse staffing and patient outcomes.

Minnesota Department of Health. (2015, January). Hospital Nurse Staffing and Patient Outcomes: A Report to the Minnesota Legislature. Retrieved from:

https://www.mnhospitals.org/Portals/0/Documents/policy-advocacy/nurstaffing/Nurse_Staffing_Levels_and_Patient_Outcomes_FINAL.PDF

- Efforts to contain hospital costs often involve cutting nursing care, reducing the number of nurses or replacing nurses with unlicensed assistive personnel (UAP). This thought piece reviewed the role of skill mix to patient outcomes.

Needleman, J. (2016). Nursing skill mix and patient outcomes. *BMJ Quality & Safety*, 0,1-4. Retrieved from:

<http://qualitysafety.bmj.com/content/early/2016/12/30/bmjqs-2016-006197>

- A 2014 House Resolution directed the Joint State Government Commission (JSGC) to conduct a study on the staffing levels of professional bedside nurses in Pennsylvania hospitals. In particular, the resolution directed the JSGC to study nurse staffing and its connection to adverse events.

The Joint State Government Commission, General Assembly of the Commonwealth of Pennsylvania. (2015, June). Professional Bedside Nursing In Pennsylvania: A Staff Study. Retrieved from:

<http://jsg.legis.state.pa.us/resources/documents/ftp/publications/2015-413-HR920%20FINAL%20REPORT%206.30.15.pdf>

- High patient turnover contributes to increased demands and stresses resources for care. In this study, the authors evaluated how nurse staffing and failure-to-rescue (FTR) varied with patient turnover.

Park, S.H., Blegen, M.A., Spetz, J., Chapman, S.A., & DeGroot, H. (2012, June). Patient turnover and the relationship between nurse staffing and patient outcomes. *Research in Nursing & Health*, 35(3):277-88. DOI: 10.1002/nur.21474.

- A study of 232,342 surgical patients in Pennsylvania revealed that 4,535 (2%) died within 30 days of discharge. The significantly significant study suggests that the differences in nurse-to-patient staffing ratios (4:1 vs. 8:1) may have been a factor in these patient deaths.

Shekelle, P. (2013). Nurse patient ratios as a patient safety strategy. *Annals of Internal Medicine*, 158, (5), 404–410. Retrieved from:

<http://annals.org/aim/article/1656445/nurse-patient-ratios-patient-safety-strategy-systematic-review>

- Are changes in nursing resources within hospitals overtime related to changes in quality of care and patient safety? The authors of this study utilized data from a panel of 737 hospitals to estimate associations between nursing resources, care quality, and patient safety and improvements in hospital work environments, nurse staffing, and educational composition of nurses.

Sloane, D M., Smith, H L., McHugh, M D., Aiken, L H. (2018) Effect of Changes in Hospital Nursing Resources on Improvements in Patient Safety and Quality of Care: A Panel Study. *Medical Care*. 56(12):1001-1008. DOI: 10.1097/MLR.0000000000001002 Retrieved from:

<https://www.ncbi.nlm.nih.gov/pubmed/30363019>

- A multivariate analysis of nurse staffing and patient outcomes reported that when RN staffing is increased, there were significant improvements in patient mortality following a medical or surgical complication. Additional data showed a decrease in pulmonary embolism, deep vein thrombosis, and sepsis. Further data revealed that higher staffing was linked to shorter lengths of stay.

Spetz, J., Harless, D., Herrera, C., & Mark, B. (2013, August). Using minimum nurse staffing regulations to measure the relationship between nursing and hospital quality of care. *Medical Care Research and Review*, 70(4), 380–399. DOI: 10.1177/1077558713475715.

- Evidence exists that nursing staff composition affects patient outcomes. In this longitudinal study of unit-level data from NDNQI and hospital-level data from the American Hospital Association (AHA) annual survey, the authors reviewed trends and impact on patient outcomes.

Staggs, V. & He, J. (2013, July-August). Recent Trends in Hospital Nurse Staffing in the United States. *The Journal of Nursing Administration*, 43(7/8), 388-393. DOI: 10.1097/NNA.0b013e31829d620c.

- The availability of medical and nursing staff is associated with the survival of critically ill patients and suggests that future studies should focus on the resources of the health care team. The results emphasize the urgent need for a prospective study of staffing levels and the organization of care in ICUs.

West, E., Barron, D., Harrison, D., Rafferty, A., Rowan, K. & Sanderson, C. (2014). Nurse staffing, medical staffing and mortality in intensive care: An observational study. *International Journal of Nursing Studies*, 51(5), 781-794. Retrieved from: [http://www.journalofnursingstudies.com/article/S0020-7489\(14\)00034-0/pdf](http://www.journalofnursingstudies.com/article/S0020-7489(14)00034-0/pdf)

Value Based Purchasing

- The Hospital Value-Based Purchasing (VBP) Program is a Centers for Medicare & Medicaid Services (CMS) initiative that provides incentive payments for the quality of care hospitals provide to Medicare beneficiaries, rather than payments based on quantity of services.

The literature supporting nursing-sensitive value-based purchasing (NSVBP) is reviewed to promote optimal staffing, cut costs and maximize quality of care.

Kavanagh, K.T., Cimiotti, J.P., Abusalem, S., & Coty, M.B. (2012, December). Moving Healthcare Quality Forward With Nursing-Sensitive Value-Based Purchasing. *Journal of Nursing Scholarship*, 44(4), 385–395. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3558794/>

- Quality deficits have important implications for the health and well-being of patients; many quality deficits are particularly sensitive to nursing care. In this longitudinal, hospital-fixed effect model, the effect of nurse staffing levels and skill mix on patient care costs, length of stay, and adverse events was assessed.

Martsof, G.R., Auerbach, D., Benevent, R., Stocks, C., Jiang, H.J., Pearson, M., Gibson, T.B. (2014, November). Examining the Value of Inpatient Nurse Staffing: An Assessment of Quality and Patient Care Costs. *Medical Care*, 52(11), 982–988. DOI: 10.1097/MLR.0000000000000248.

- Hospitals that support a positive work place environment with manageable patient workloads have significantly better patient outcomes. When nurses have a patient-to-nurse ratio of 4.95 or less, they had more time for patient teaching and to prepare the patient to transition home. Lower nurse-to-patient ratios reduced heart failure readmissions by 7%, acute myocardial infarction readmissions by 6%, and pneumonia readmissions by 10%.

McHugh, M., & Ma, C. (2013). Hospital nursing and 30-day readmissions among Medicare patients with health failure, acute myocardial infarction, and pneumonia. *Medical Care*, 51(1), 52–59. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3593602/>

- The purpose of this study was to determine the cost effectiveness of increasing nurse staffing or changing the nursing skill mix in adult medical and/or surgical patients.

Twigg, D. E., Myers, H., Duffield, C., Giles, M., & Evans, G. (2015, May) Is there an economic case for investing in nursing care – what does the literature tell us. *Journal of Advanced Nursing*, 71(5):975-90. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4407837/>

- Nurses differ in their value-added to patient outcomes. The ability to measure this relative value-added creates opportunities to develop performance metrics, performance-based rankings, and merit-based salary schemes to improve patient outcomes and reduce costs.

Yakusheva, O., Lindrooth, R., & Weiss, M. (2014, December). Nurse Value-Added and Patient Outcomes in Acute Care. *Health Services Research* 49(6), 1767- 1786. Retrieved from:
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4254124/>

Workplace Environment

- In this systematic review, the authors analyzed research data related to the effect of nurses' work environments on outcomes for both patients and nurses. They found the work environment was a determining factor for improved healthcare quality and was related to improved outcomes for nurses.

Copanitsanou, P., Fotos, N., & Brokalaki, H. (2017). Effects of work environment on patient and nurse outcomes. *British Journal of Nursing*, 26(3), 172-176. DOI: 10.12968/bjon.2017.26.3.172.

- The authors exhaustively reviewed empirical research from 1990 through 2013 focused on work engagement in nursing. Clear evidence exists the quality of care by nurses improves through engagement.

García-Sierra, R., Fernández-Castro, J., & Martínez-Zaragoza, F. (2016, March). Work engagement in nursing: an integrative review of the literature. *Journal of Nursing Management*, 24(2), 101–111. DOI: 10.1111/jonm.12312.

- A number of studies have not supported mandatory nurse–patient ratios. A report by the California Nursing Outcomes Coalition (2005) documented no statistically significant change in patient safety and quality outcomes such as decreased falls or the prevalence of pressure ulcers.

Hertel, R. (2012). Regulating patient staffing: A complex issue. *Matters*, 21(1), 3–7. Retrieved from:
<https://www.amsn.org/sites/default/files/documents/practice-resources/healthy-work-environment/resources/MSM-Hertel-Jan12.pdf>

- Previous research has indicated teamwork improves productivity. In this study, the authors examined the relationship between unit call light response time as a measure of productivity and the level of teamwork on the unit.

Kalisch, B.J., Labelle, A.E., & Boqin, X. (2013, January-February). Nursing teamwork and time to respond to call lights: an exploratory study. *Revista Latino-Americana de Enfermagem*, 21 (Spec), 242-9. Retrieved from: http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0104-11692013000700030&lng=en&nrm=iso&tlng=en

- The Institute of Medicine's (IOM's) report *To Err is Human* (IOM, 2000) underscores that lack of teamwork leads to patient errors. The aim of this cross-sectional study was to examine the relationship among hospital units, staff characteristics, and nursing teamwork.

Kalisch, B.J., & Lee, K.H. (2013, February). Variations of nursing teamwork by hospital, patient unit, and staff characteristics. *Applied Nursing Research*, 26(1), 2-9. DOI:10.1016/j.apnr.2012.01.002.

- The aim of this study was to detail the relationship between the team and unit size and level of nursing teamwork.

Kalisch, B.J., Russell, K., & Lee, K.H. (2103, February). Nursing teamwork and unit size. *Western Journal of Nursing Research*, 35(2):214-25. DOI: 10.1177/0193945912439107.

- Worker fatigue has long been recognized as a source of adverse patient events as well as negative impacts on nurse safety. In this project, shift lengths were evaluated to determine fatigue levels associated with 12-hour and 8-hour shifts.

Martin, D.M. (2015, March-April). Nurse Fatigue and Shift Length: A Pilot Study. *Nursing Economic\$,* 33(2), 81-87. Retrieved from: <http://www.medscape.com/viewarticle/843884>

- California is the only state to mandate a patient-to nurse ratio for hospitals. In this study, the authors explored the differential effect of California's staffing mandate on safety-net and non-safety-net hospitals.

McHugh, M.D., Carthon, M.B., Sloane, D.M., Wu, E., Kelly, L., & Aiken, L.H. (2012, March). Impact of Nurse Staffing Mandates on Safety-Net Hospitals: Lessons from California. *The Milbank Quarterly*, 90(1): 160–186. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3371663/>

- Good health is essential to the performance of all workers. In this literature review, the authors sought to determine nurses' health-related quality of life indicators and to clarify the implications for nursing management.

Oyama, Y. & Fukahori, H. (2015, July). A literature review of factors related to hospital nurses' health-related quality of life. *Journal of Nursing Management*, 23(5), 661–673. DOI: 10.1111/jonm.12194.

- Abundant research has shown that effective nursing practice is essential to the delivery of high-value care in inpatient acute-care settings. In this Press Ganey Special report, analyses suggest that the work environment of nurses can have as much or greater impact than staffing.

Press Ganey. (2015). Nursing Special Report: The Influence of Nurse Work Environment on Patient, Payment and Nurse Outcomes in Acute Care Settings. Retrieved from: <http://healthcare.pressganey.com/2015-Nursing-SR-Influence-Work-Environment>

- Nurses with a longer tenure in the workforce are more experienced and more prepared to provide care to critically ill patients. Encouraging nurses to stay within the profession by mandating ratios improves job satisfaction, staff morale, and has been proven to save patient lives by decreased patient mortality. After California's AB394 was put into effect, studies have reported that nurses were more satisfied with their work environment. Adequate staffing has given RNs the time for patient education.

Tellez, M. (2012). Work satisfaction among California registered nurses: A longitudinal comparative analysis. *Nursing Economics*, 30(2), 73–81.

- Nurse-sensitive outcomes can be defined as adverse patient outcomes that are used as indicators of the quality of nursing care. As a secondary analysis of administrative data from a large acute care hospital in Western Australia, the authors explored the relationship between understaffed shifts and nurse-sensitive outcomes.

Twigg, D. E., Gelder, L., & Myers, H. (2015). The impact of understaffed shifts on nurse-sensitive outcomes. *Journal of Advanced Nursing* 71(7), 1564–1572. DOI: 10.1111/jan.12616.

- Staff mix which takes into account educational preparation, experience, and professional needs to be a factor when addressing nurse staffing. Managers must evaluate competency levels and critical thinking skills and use this information as a basis for creating a safe patient care environment. An effective staffing model should take into account resources such as support personnel, equipment and supplies as having adequate resources on hand improves the nurse's workflow.

Wallace, B., (2013). Nurse staffing and patient safety: What's your perspective? *Nursing Management*, 44(6), 49-51. DOI:10.1097/01.NUMA.0000430406.50335.51.