



The Costs and Benefits of Safe Staffing Ratios

The United States is experiencing a severe shortage of nurses that will intensify as baby boomers age and the need for health care grows. Registered nurses (RNs) are expected to generate 587,000 new jobs between 2006 and 2016, the largest number of new jobs for any occupation during this time period.¹ According to a projection from *Health Affairs*, the shortage of RNs is expected to increase to 340,000 by 2020.² While this is lower than past projections, the nursing shortage remains the longest-running occupational shortage in the U.S. In April 2006, the Health Resources and Services Administration projected that all 50 states will experience a nursing shortage by 2015.

In 2006, the American Hospital Association found that hospitals need approximately 118,000 RNs. With 49% of hospital CEOs reporting that they have difficulty recruiting nurses, the national vacancy rate has risen to 8.5%. The Health Resources and Services Administration, Bureau of Health Professions estimates that in 2020, 800,000, or 29%, of all RN positions will go unfilled, creating a massive nursing shortage.³

An earlier study by Peter Hart and Associates found one in five nurses is quitting patient care. Most are leaving because of inadequate staffing. There are insufficient nurses to do what needs to be done on any given shift and those who are on duty are exhausted and stressed.⁴ Moreover, the Nursing Management Aging Workforce Survey found that 55% of nurses, predominantly managers, claim they will retire between 2011 and 2020.⁵

Some nurses are leaving hospitals to work in less stressful environments. A study found that although Massachusetts has more nurses per capita than any other state, only 50% of them work in hospitals and nearly 60% of hospital nurses are working part-time. A 2005 survey of Massachusetts nurses found that 65% of RNs would return to work in hospitals if the Patient Safety Act was passed. This act would limit the nurse-to-patient ratios and ban mandatory overtime.⁶

Adequate nurse staffing is key to patient care and nurse retention, while inadequate staffing endangers patients and drives nurses from their profession. From 54% of nurse respondents in Pennsylvania to 34% in Scotland, nurses reported burnout scores above published norms for medical personnel.⁷ A study published in 2006 found that 49% of U.S. registered nurses under age 30 and 40% of registered nurses over age 30 experienced high levels of burnout.⁸

According to a 2002 study in the *Journal of the American Medical Association*, each additional patient per nurse carries a 23% risk of increased burnout and a 15% decrease in job satisfaction.⁹ Some hospitals succeeded in retaining nurses by raising nurse-to-patient ratios, involving nurses in decision-making, and providing nurses with opportunities to further their education. Turnover dropped from 15.3% in 2000 to 10.3% in 2002 at New York Presbyterian Hospital, a hospital which now has a safe staffing clause in its contract.¹⁰ Not coincidentally, a November 2003

study by the Institute of Medicine of the National Academy of Sciences (IOM) calls for better nurse-to-patient ratios, limits on mandatory overtime, and nurse involvement at every level to protect patients.¹¹

Understaffing Endangers Patients' Lives: The Evidence Is Overwhelming

- The IOM study concluded that **the environment in which nurses work is a breeding ground for medical errors which will continue to threaten patient safety until substantially reformed.** The study finds increased infections, bleeding, and cardiac and respiratory failure associated with inadequate nurse staffing.¹²
- A report by the Joint Commission on Accreditation of Healthcare Organizations stated that the lack of nurses contributed to nearly a quarter of the unanticipated problems that result in death or injury to hospital patients.¹³
- A 2006 study by Heather K. Spence Laschinger, Ph.D., R.N., and Michael P. Leiter, Ph.D., found that patient safety outcomes are related to the quality of the nursing practice work environment. Strong correlations exist between low staffing levels and increased emotional exhaustion, which leads to more patient complaints, nosocomial infections (infections received from hospital care such as urinary tract or staph infections) and medication errors.¹⁴
- Another study found that patients at hospitals with staffing ratios of four patients to one nurse or higher suffered from cardiac arrest or shock 9.4% more often than patients at hospitals with ratios of 2.5 or fewer patients to one nurse. They also had 9% more urinary tract infections, 5% more gastrointestinal episodes, and 6.5% more cases of pneumonia acquired in the hospital. Surgery patients in short-staffed hospitals were 6% more likely to die from complications like shock or sepsis.¹⁵
- In 2005, more than 50% of hospital RNs and MDs who participated in a national survey reported that the quality of patient care, time for patients, and effectiveness has decreased because of shortages.¹⁶
- Another 2005 study found that more time with nurses per day also benefited patients in long term care. Specifically, patients at risk for pressure ulcers who spent more time per day with nurses had fewer pressure ulcers, fewer urinary tract infections, and less weight loss.¹⁷
- Higher rates of staffing led to lower incidence of bloodstream infections in infants, according to a 2006 study.¹⁸
- A 2005 study showed that low nurse staffing increased the incidence of methicillin resistant staphylococcus aureus (MRSA), the so-called 'superbug.'¹⁹
- A survey of Massachusetts doctors in 2005 revealed that over 75% think nurse staffing levels are too low and over 50% believe that this inadequate staffing has led to injuries or deaths.²⁰
- A 2006 study in the UK indicated that hospitals with the most favorable nurse staffing ratios had consistently better outcomes than those with lower nurse staffing ratios. The study found that patients in hospitals with the lowest nurse-to-patient staffing ratios had 26% higher mortality rates and patients were 29% more likely to die following complicated hospital stays than those patients in hospitals with higher nurse-to-patient ratios.²¹
- A study by the Centers for Medicare and Medicaid Services (CMS) suggests that short-stay patients in skilled nursing care facilities with staffing levels in the bottom 30% were more likely to be among the worst 10% of facilities for transfers for hospitalizations due to acute

heart failure, electrolyte imbalances, sepsis, respiratory infection, and urinary tract infections. Facilities with less than 2.78 hours of aide time and 0.75 hours of RN time per patient, per day, had a greater probability of poor outcomes for long-stay patients. Patients in these facilities were more likely to suffer from pressure ulcers, skin trauma, and weight loss.²²

- In a study of long-term care facilities, patients in facilities with more direct RN time (30 to 40 minutes per patient, per day) had fewer pressure ulcers, acute care hospitalizations, urinary tract infections, urinary catheters, and less deterioration in their ability to perform the tasks of daily living.²³
- A 2003 study in *Nursing Research* found a correlation between nurse staffing levels and adverse events. Patients experienced an 8.9% decrease in contracting pneumonia when given one hour more RN care per day. Also, increasing the nurse-to-patient ratio by 10% is associated with a 9.5% decrease in the likelihood of contracting pneumonia. The study also found a correlation between adverse events and increased medical costs. Pneumonia was associated with an increase of 5.1 to 5.4 days in a patient's length of stay, an increase of 4.7-5.6% in the probability of death, and an additional \$22,390–\$28,505 in costs.²⁴

While the most important results related to inadequate nurse staffing are unanticipated patient complications and deaths, other costs include longer hospital stays, higher rates of occupational injury and stress among nurses, more turnover among nurses, and more liability for hospitals. In 1999, the IOM estimated that preventable medical errors cost the economy from \$17 to \$29 billion annually, of which half are health care costs.²⁵ A 2008 study by Health Grades estimates that patient safety incidents alone amounted to \$8.8 billion in additional costs from 2004–2006.²⁶

Understaffing Endangers Nurses

- **Working long hours and with inadequate staffing affects nurses' health, increasing their risk of musculoskeletal injuries (MSDs—back, neck, and shoulder injuries), as well as causing hypertension, cardiovascular disease, and depression.** MSDs are common among health care workers due to the cumulative effects of frequent lifting and repositioning patients. Nurses' aides and orderlies sustain more MSDs than any occupation and registered nurses rank eighth among all workers.²⁷ MSDs in nurses can affect nurse retention: a 2003 study found 6% of RNs reported changing jobs because of neck problems, 8% because of shoulder problems, and 11% because of back problems.²⁸
- Nurses working 12 or more hours per day and 40 or more hours per week are 50% more likely to get a back, neck, or shoulder injury. Nurses working nights or weekends also significantly increased their risk, while nurses working rotating shifts had twice the number of reported accidents as those working day or night shifts only.²⁹
- Nurses' cardiovascular health also suffers from working long shifts. There is a greater risk of hypertension and cardiovascular disease from long working hours, including higher blood pressure among workers completing over 60 hours of overtime per month and increased risk of acute myocardial infarction among those working more than 11 hours per day.³⁰
- Conversely, as the nursing staff is increased, the number of injuries sustained by nurses and nursing aides decreases. A 2005 study found this held true across the three states studied.³¹
- Other work-related injuries, like needle sticks, can occur. A 2002 study in the *American Journal of Public Health* found that nurses working with less adequate resources, lower

staffing levels, less leadership, and higher levels of emotional stress, were twice as likely to report risks of needle stick injuries.³²

- Nursing can also be mentally strenuous. A 2005 study at a Swedish hospital found that more than 50% of RNs intended to change jobs. One-third of those intending to quit said they found their job psychologically strenuous and stressful and also found their work tempo increased stress and decreased the quality of patient care.³³

Adverse Outcomes Associated With Low Nurse Staffing Lengthen Patients' Hospital Stays, Increase Costs of Care

- **Low staffing levels are associated with higher rates of adverse outcomes.** Adverse outcomes sensitive to nurse staffing, like urinary tract infections, pneumonia, pressure ulcers, and falls, can all lead to longer hospital stays and increased costs for hospitals.³⁴
- For example, an Agency for Healthcare Research and Quality study found that the cost of care for patients who developed pneumonia while in the hospital rose 84%, raised total treatment costs by \$22,390–\$28,505, and increased the length of stay by 5.1–5.4 days.³⁵ Pressure ulcers and other adverse events associated with low staffing ratios are estimated to cost \$8.5 billion per year.³⁶
- In 2007, 70% of hospital executives were concerned about financial challenges and 36% were concerned about personnel shortages.³⁷
- A 2007 study in *Medical Care* found that an increase of one RN per patient day was associated with a 24% reduction in length of stay in the Intensive Care Unit and a 31% reduction in length of stay for surgery patients.³⁸
- The Institute for Health and Socio-Economic Policy projects annual savings of about \$2 billion a year for California hospitals just from the shorter patient stays that result from better RN staffing. The findings are based on an examination of 21.7 million patient discharges in California from 1993–1998 and hospital charges per patient day.³⁹

High Nurse Turnover Is Expensive

Nursefinders, Inc., which conducts a quarterly nurse staffing survey, estimated the average cost per RN turnover at \$65,000 in 2005. Given their finding that many healthcare facilities may lose 25% to 60% of their nurses in 2005 alone, the financial impact of this turnover on affected facilities could range from \$1.6 million to nearly \$4 million a year.⁴⁰

- Organizations with high annual RN turnover rates (22–44%) had 36% higher costs per discharge than hospitals with turnover rates of 12% or less. Hospitals with low turnover had lowered risk-adjusted scores as well as lower severity-adjusted length of stay compared to hospitals with 22%, or higher, turnover rates.⁴¹
- Hospitals with low RN turnover (4–12%) averaged a 23% return on assets compared to a 17% return for those with high turnover rates.⁴²
- Over 40% of hospitals offer bonuses to new hires, according to the American Hospital Association. Most offer packages of between \$1,000 and \$5,000, but some offer even more compensation.⁴³ This policy does nothing to reward and retain experienced nurses and can create resentment.

- Hospitals also recruit nurses from other countries, which removes badly needed health care providers from poor countries, while depressing nurses' wages here. Currently, one-third of new RNs are foreign born.⁴⁴

These solutions do nothing to address the underlying reasons why so many qualified nurses leave the profession. Better nurse-to-patient ratios would, however. The *Nursefinders* survey finds 57% and 56% of nurses, respectively, citing work-related stress and patient care loads/staffing as having a major impact on turnover, above the impact of compensation.⁴⁵

Temporary or Supplemental Nurses

Supplemental nurses are nurses brought into hospitals to temporarily fill gaps in nurse staffing. Temporary nurses are more likely to be concentrated in hospitals with poor staffing ratios and inadequate resources.⁴⁶

- Supplemental staff nurses are similar to permanent staff with respect to age but are more likely to be male (13% vs. 6%) and less likely to be married (53% vs. 72%). Supplemental nurses are slightly more likely than permanent nurses to hold baccalaureate or higher degrees (46% vs. 40%) and more likely to have received their education in the last 10 years (57% vs. 48%). Supplemental nurses are more likely to work in intensive care units (35%) whereas only 20% of permanent nurses work in the ICU.⁴⁷
- Supplemental nursing staff is expensive for nurse managers and executives, especially when they are brought in from outside agencies. Nationally, hospitals spent \$7.2 billion on temps and travelers in 2000.⁴⁸
- In 2002, temps and traveling nurses earned as much as \$100 an hour, while staff nurses typically earned less than \$25 per hour.⁴⁹ Such differences can create resentment among permanent nursing staff who earn less despite being more efficient and needing less staff support.⁵⁰
- The American Hospital Association reported that 56% of hospitals used agency per diem or traveling nurses in 2001. More recently, the Community Tracking Study found that 75% of participating hospitals used supplemental nurses. Two-thirds of the U.S.'s \$6 billion annual market for externally contracted nurse services is spent on per diem or local agency accounts, while the remaining third is spent on traveling nurse services.⁵¹
- A study in the *Journal of Nursing Administration* found that the proportion of nurse turnover costs represented by vacancy costs had increased from 35% to 75% between 1988 and 2002 due in large part to greater reliance on the use of temporary nurses to fill nurse vacancies created by nurse turnover.⁵²
- In hospitals where less than 5% of nurses were temporary, staff reported fewer nosocomial infections. Patient falls and verbal abuse were less commonly reported in hospitals with between 5% and 15% staff of temporary nurses. Also, the percentage of nurses reporting work-related injuries was significantly higher in hospitals which employed more than 15% supplemental nurses.⁵³
- Nurses in hospitals with 15% or more temporary RNs were more likely to be dissatisfied with their jobs. They were also more likely to have plans to leave their current positions within a year and to show signs of burnout above the norm for healthcare workers.⁵⁴

What Will Safe Staffing Ratios Cost Hospitals?

- A 2003 study in the *Journal of Health Care Finance* found that while increased nurse staffing raised operational costs for hospitals, it did not decrease the hospital's profits. Improving nurse staffing ratios is cost-effective, in part because high turnover rates and high levels of non-nurse staffing increase operating costs, average costs per discharge, and cause a decreased return on assets.⁵⁵
- A University of California, Davis study estimates it will cost California hospitals \$1.1 billion annually to implement a ratio of four patients to one nurse in medical/surgical units, the standard approved by the SEIU Nursing Alliance, United Nurses' Associations of California, and Kaiser Permanente.
- Berliner, *et. al.*, criticized the UC Davis study on several methodological grounds, pointing to assumptions which inflate the estimate by 35% to 40%, as well as data collection issues, placing the estimate below \$500 million.⁵⁶ The assumptions include failing to distinguish between for-profit and non-profit hospitals, although for-profit hospitals have the leanest staffing ratios and can best afford to implement improved staffing ratios; assuming that nurses cannot be transferred from a unit where there is a surplus of staff to a unit which is short; assuming that only full-time nurses would be hired, when 35% of nurses in California work part-time; and defining the cost of hiring a new nurse at the average nurse salary, when it is plausible that many will be entry-level or part-time.⁵⁷
- Although the validity of the UC Davis study is questionable, even if the estimate of \$1.1 billion is accurate, the cost is only a 2.3% increase for California's \$40 billion industry divided among 500 hospitals.⁵⁸ Moreover, inadequate nurse staffing is costly; safe staffing ratios allow hospitals to save on costs associated with patient complications and liability, nurse turnover, temp agency fees, and recruiting.
- A 2002 report by the Blue Cross Blue Shield Association found that California hospitals could save over \$331 million if all hospitals performed at the level of the best hospitals in the state in terms of these quality indicators: adverse events, wound infection, pneumonia after surgery, and urinary tract infections.⁵⁹ These indicators are well-established measures of nurse staffing quality.
- If Berliner and colleagues' estimate of \$500 million as the cost of safe staffing levels is accurate, the direct costs of complying with the California safe staffing law would be almost completely offset by the benefits of improved nurse staffing quality.
- A 2006 study in *Health Affairs* examined costs and benefits of increasing nurse staffing. The study examined three policy options. Option 1: raise the proportion of RNs to LPNs, without changing the total number of hours of care, to the same level as the top 25% of hospitals; option 2: increase the number of licensed nursing hours per day without changing the proportion of RNs to LPNs; option 3: raise the proportion of RNs and licensed nursing hours per day to that of the top 25% of hospitals.⁶⁰
 - Option 1 would require hospitals not in the top 25% to replace 37,000 LPNs with RNs at the cost of \$811 million. This approach would provide a net savings of \$242 million over the short-term and \$1.8 billion over time through shorter hospital stays, fewer deaths, and decreased complications. Most of the reduction in costs would come from shorter hospital stays, which under this model would be decreased by 1.5 million days.⁶¹

- The second option would require hospitals not in the top 25% to hire an additional 114,456 RNs and 13,000 LPNs at the cost of \$7.5 billion. In this approach, short-term costs would increase by \$5.8 billion. While this is a large amount of money, it would only account for about 1.5% of annual hospital expenditures. Over time these expenses would be further reduced by the decrease in days of care, which under this approach would decrease by 2.6 million days. Due to the decrease in days of care, the cost of this policy option would only account for 0.8% of annual hospital expenditures.⁶²
- The third option would require hospitals not in the top 25% to hire 158,000 more RNs and decrease the number of LVNs at the cost \$8.5 billion. The short-term costs would be \$5.7 billion, accounting for approximately 1.5% of annual hospital expenditures. Like option 2, the policy option's costs can be reduced by the decrease in days of care, which under this option is estimated to be 4.1 million less days of care. The reduction in days of care would reduce the option's costs to only 0.4% of annual hospital expenditures.⁶³
- The study estimates that 90% of decreases in the hospitals' fixed costs over the long term would be the result of shorter hospital stays.⁶⁴
- All of the options would result in a decrease in patient mortality. The study estimates that 6,700 patient deaths can be avoided by increasing nurse staffing. Under the first option, 4,997 of these deaths can be prevented. Under options 2 and 3 more deaths can be prevented but at a higher cost. Under option 2 and option 3 the short-term cost of each death avoided would be \$3.23 million and \$846,000, respectively. In the long-term, cost per death avoided for options 2 and 3 would be \$1.8 million and \$231,000, respectively.⁶⁵
- A 2005 national study in the journal *Medical Care* found that reducing nurse-to-patient ratios was cost-effective in improving patient outcomes. The authors found that the cost of a life saved by improving nurse-to-patient ratios is considerably less than by using other basic safety measures, such as routine cervical cancer screening or thrombolytic therapy for heart attack patients. The authors found that limiting the nurse-to-patient ratio to 4:1 never cost more than \$449,000 per life saved. These cost estimates don't include the additional savings from reduced length of hospital stays which are associated with lower staffing ratios; the study estimates these savings may offset fully half of the added labor costs.⁶⁶

More States are Pursuing Safe Staffing Legislation

In January 2004, California became the first state to implement mandatory nurse-to-patient ratios. State labor and nurses' organizations fought successfully to keep the legislation in its original form (requiring one nurse per six patients starting in January 2004, increasing to one nurse per five patients by January 2005), despite an attempt by California Governor Arnold Schwarzenegger to block the second increase.⁶⁷ Preliminary studies on the effect of this legislation indicate that staffing levels have increased significantly in California hospitals, and that contrary to concerns, hospitals did not seek to meet the new requirements by increasing their use of licensed vocational nurses (LVNs). More studies will be needed to determine the effect on patient outcomes.⁶⁸

- A study by the *Journal of Hospital Medicine* studied the effects of California's nurse staffing legislation on nurse-to-patient staffing ratios. The study indicates that between 1993 and 1999 nurse staffing ratios were essentially flat; but in 1999 the median nurse-to-patient ratios began to increase. From 2003 to 2004, the median hospital staffing ratio increased from less

than one nurse per four patients to a ratio of more than one nurse per five patients. By 2003, fewer than 25% of hospitals were below the minimum of at least one nurse per five patients.⁶⁹

- One of the concerns about the nurse staffing legislation in California was that it would lead to an increase in LVNs. The California law allows up to 50% of nurse staffing ratios to be met by LVN hours. However, according to the study in the *Journal of Hospital Medicine*, the proportion of LVN staffing relative to nurse staffing hours has decreased. In 1993 LVNs accounted for 27% of nurse staffing hours but by 2004 they made up 13% of nurse staffing hours.⁷⁰
- The *Journal of Hospital Medicine* study found that hospitals with a high proportion of Medicaid and uninsured patients were significantly more likely than hospitals with low proportions of Medicaid patients to be below minimum nurse staffing ratios. The hospital types with the highest percentage of hospitals below the 1:5 ratio were those with a high proportion of Medicaid/uninsured (21.7%), government owned (21.1%), nonteaching (12.0%), urban (11.9%), and more competitive markets (11.7%).⁷¹

Meanwhile, several other states have enacted or put into motion legislation addressing safe staffing levels. For instance:

- In 2004, New Jersey passed legislation requiring hospitals to disclose staffing information. An as-yet unsuccessful bill requiring staffing ratios is expected to be reintroduced in early 2006.
- In 2005, Rhode Island enacted legislation requiring hospitals to annually submit a staffing plan.⁷²
- In 2005, Oregon updated and strengthened its 2001 legislation requiring hospitals to appoint a staffing plan committee and take other measures to ensure timely filling of vacancies.⁷³ In 2002, Texas put in place similar regulations to the original Oregon staffing plan legislation.⁷⁴
- Fourteen states (California, Connecticut, Illinois, Maryland, Minnesota, Missouri, New Hampshire, New Jersey, New York, Oregon, Rhode Island, Texas, Washington, West Virginia) have enacted laws or regulations on mandatory overtime for nurses, most prohibiting hospitals from requiring overtime except in the event of a public health emergency. Mandatory overtime legislation or regulation has been considered in another eight (Arizona, Florida, Maine, Nebraska, Ohio, Vermont, Washington (to extend existing protections to the public sector), Wisconsin).⁷⁵
- On the federal level, the “Nurse Staffing Standards for Patient Safety and Quality Care Act of 2007” (H.R. 2123) introduced by Representative Jan Schakowsky (D-IL) would restrict mandatory RN overtime to times of emergency and establish minimum nurse:patient ratios.⁷⁶
- Other initiatives in Illinois and Tennessee attempt to counter shortages and bolster the workforce. In Illinois, the Illinois Center for Nursing was created to assess the current statewide nursing economy and develop a plan to educate, recruit, and retain nurses. In 2007, Governor Philip Bredesen (TN) launched the Graduate Nursing Loan Forgiveness Program to raise \$1.4 million in scholarship money to help nurses earn degrees.

Nurses Return to Nursing When Safe Staffing Ratios Are Implemented

- The California Board of Nursing reports being inundated with RN applicants from other states because of the nurse-to-patient ratio regulations that went into effect in January 2004. With a more than 60% increase in applications for licenses it now takes six or more weeks to get a temporary license and as much as three or four months to get a permanent one.⁷⁷

California has experienced more interest in nursing since the nurse ratio legislation was passed in 1999:

- The number of actively licensed RNs in California increased by more than 60,000, from 246,068 on June 30, 1999 to 306,140 on December 30, 2005.⁷⁸
- Kaiser Permanente voluntarily enacted ratios before the California law went into effect in July 2001. As a result, the Northern California branch of Kaiser hired 71% more new nurses and the number of nurses quitting declined by 47% from January to October 2002, a net increase in RNs of 570% over the previous year.⁷⁹
- Testimony from California RNs confirms the benefits of staffing ratios. A study by UC San Francisco's Center for Health Professions found that nurses from California express concern about staffing more than any other topic, regardless of whether they work for for-profit or non-profit healthcare organizations or whether they belong to a union. Staffing ratios have been required in critical care units in California hospitals and nurses consistently cite ratios as a draw to work in these units because they know they will be able to provide high quality care to their patients.⁸⁰
- A UC San Francisco study estimated that in 2004, 11,000 "travelers"—U.S.-trained nurses who bounce from hospital to hospital on short contracts—moved to California in the wake of the staffing-ratio legislation, along with 3,700 foreign-trained nurses.⁸¹
- Vacancies for registered nurses at Sacramento hospitals have plummeted 69% since early 2004, according to the January 11, 2008 *Sacramento Business Journal*.⁸²
- The nurse crisis is a global phenomenon. In 2000, the Australian state of Victoria implemented staffing ratios as part of a strategy to recruit and retain nurses in their state and met with remarkable success. Six months after the ratios were fully implemented, 3,300 nurses returned to work full-time.⁸³

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⁶ "Fact Sheet on the Patient Safety Act", *The Coalition to Protect Massachusetts Patients*. http://www.massnurses.org/safe_care/PDFs/safe-staffing-fact-sheet.pdf

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