



# Assessing the Impact of California's Nurse Staffing Ratios on Hospitals and Patient Care

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## Introduction

In 2004, California became the first state to establish minimum nurse-to-patient staffing requirements in acute-care hospitals. Little is known about how these regulations affected California's hospitals, the market for nursing labor, or the quality of hospital care. While research and news reports do indicate that hospital staffing of licensed nurses increased between 2002 and 2004 and employment of unlicensed nursing assistants dropped,<sup>1-3</sup> some hospitals did not meet the ratios in the first year of their implementation<sup>4-6</sup> and no significant impact on the quality of patient care has been measured.<sup>7-9</sup>

Prior studies have focused on average changes in staffing and patient outcomes across all California hospitals. This study, in contrast, examines how the minimum staffing regulations affected different types of hospitals, categorizing them according to ownership, financial position before the ratios were enacted, and mix of patients. The research then probes three issues:

- What strategies did hospitals use to meet the staffing requirements?
- Are the ratios associated with changes in hospital financial status?
- Did the ratios improve the quality of hospital care?

The results show that the nurse staffing legislation resulted in higher use of registered nurses in most California hospitals. Implementation of the staffing regulations could not be tied to changes in hospital finances; rather, changes in Medicare and Medi-Cal payment rates and demands to

address seismic building requirements had far greater effects on finances. Hospital administrators found that it was challenge to meet the staffing requirements, particularly in ensuring that staff were available at all times, including during breaks and meals. Finally, many of the health care leaders interviewed for the study expressed an expectation that the minimum staffing ratios would increase the quality of care due to increased interaction with patients; however, there was no evident change in patient length of stay or adverse patient safety events. None of these findings were affected by hospital ownership, financial position, or patient mix.

## Background

In 1999, the California State Assembly passed AB 394, mandating that the state establish minimum nurse-to-patient staffing in acute-care hospitals. Between 1999 and 2002, the California Department of Health Services developed registered and licensed vocational nurse-to-patient ratios.<sup>10,11</sup> The law went into effect in January 2004 with specific ratios for different types of hospital units; for example, the minimum ratio in medical-surgical units was one nurse per six patients. The ratios were to be adjusted in January 2005 to require fewer patients per nurse in selected units; for example, the ratio in medical-surgical units would have dropped to one to five. This change was suspended in November 2004 by the Schwarzenegger administration, but the suspension was invalidated by the Sacramento County Superior Court in March 2005. Court challenges by the California Hospital Association proved unsuccessful, and the additional ratio regulations went into full effect on April 7, 2005.<sup>12</sup>

Licensed vocational nurses (LVNs) may make up half of the licensed nurses in this ratio, but whether they can be employed to this extent in practice depends on the needs of patients in the hospital. The legal scope of practice for LVNs, who must work under the direction of physicians or registered nurses (RNs), does not include administration of intravenous medications or the assessment of patients; thus, in most hospitals LVNs can have full responsibility for only a small share of patients. In addition, hospitals have tended to underuse LVNs by limiting their role to an even greater degree than the legal scope of practice requires.<sup>13</sup>

Little is known about how the minimum staffing regulations affected hospitals, nursing labor markets, or the quality of hospital care in California. In fact few studies had been conducted from which the state could develop the ratio requirements. A literature review conducted for the California Department of Health Services noted that only a handful of recent studies and reviews had demonstrated consistent relationships between staffing levels for licensed nurses and the quality of patient care, and none identified an ideal staffing ratio for hospitals.<sup>14,15</sup> The few publications that examined the effect of California's ratios reported that many hospitals did not appear to be meeting the standard in 2004—the first year of the regulation.<sup>16–18</sup> Recent research also found that licensed nursing staff increased notably between 2002 and 2004, while employment of unlicensed nursing assistants dropped; however, no significant improvement in the quality of patient care could be detected.<sup>19–21</sup>

Because the papers published to date have focused on average changes in staffing, patient outcomes, and hospital finances across all California hospitals, they may not capture the full impact of the ratios, since minimum staffing regulations may have had different effects on different types of hospitals. Previous studies have found that some hospitals—such as those with a high share of publicly insured patients—are more likely to report a shortage of nurses; these hospitals may have found it

particularly difficult to recruit and retain nurses to meet the staffing regulations. Hospitals that were in weak financial positions prior to the enactment of the ratio legislation may not have had the financial resources to pay for more nurses. Differences in hospitals' ability to respond to the regulations may in turn result in variation in the benefit to patients.

For the research reported in this issue brief, the methods used by hospitals to meet the staffing requirements were explored: Did permanent employment increase? Did hiring and retention change? Were more temporary agency nurses used? Changes in hospital financial positions were also examined. Finally, patient safety measures were compared to learn whether the implementation of the staffing regulations was associated with improvements in patient safety. For each of these three topics, hospitals were categorized by their ownership, financial position before the ratios were enacted, and mix of patients to learn whether the impact of minimum staffing ratios varied across hospitals.

## Methodology

This study combined quantitative analysis of several data sets with qualitative analysis of interviews conducted at 12 hospitals. Quantitative analysis of the impact of the regulations on staffing, fiscal, and health care outcomes was conducted for 410 general acute-care hospitals from 1999 through 2007. The main sources of data were three datasets collected by the California Office of Statewide Health Planning (OSHPD). With these data, changes in the hours worked by registered nurses, licensed vocational nurses, aides and orderlies, and agency-employed nurses were examined using the annual hospital disclosure reports. The fiscal health of each hospital was determined by comparing operating margins before and after ratios, using the quarterly hospital financial data. A set of nursing-sensitive metrics devised by the Agency for Healthcare Research and Quality (AHRQ) was calculated for hospitals reporting thirty or more patients at risk for

an incident during one time period, using the patient discharge data.

Changes in employment also were studied using the base wage file of the California Employment Development Department (EDD) from 1998 through 2007. These data compile wage and employment information that are primarily collected for unemployment insurance and disability insurance programs. The base wage file does not include occupation data, so it was not possible to identify registered nurses. Thus, all analyses of turnover were conducted for all hospital employees. Since RNs account for about one-third of hospital employees, it is expected that hospital-wide turnover rates will reflect proportional changes in nurse staffing. The final database included 244 employers. Due to the confidentiality of wage and employer information, all analyses of these data were performed by the EDD.

All quantitative data were first analyzed for all hospitals combined. The analyses were then repeated for three categorizations of hospitals: profit status (public, for-profit, and nonprofit), fiscal strength (fiscally strongest, fiscally weakest, and average fiscal position), and patient demographics (i.e., those serving higher-income populations with few recent immigrants; those whose patient mix includes a disproportionate share of lower-income, non-resident, or homeless patients; and average patient mix). Table 1 presents the number of each category of hospital included in this study.

**Table 1: Number of Hospitals in the Study, by Type**

Nonprofit	223
For-profit	125
District	41
Public	30
Fiscally Strong (average operating margin: 10.9 percent)	42
Fiscally Weak (average operating margin: -15.8 percent)	31
Lower-income Patients (average share of patients in public programs: 64.7 percent)	71
Higher-income Patients (average share of patients in public programs: 51.7 percent)	39
<b>TOTAL</b>	<b>410</b>

Interviews were conducted with 23 chief nursing officers, chief nurse executives, vice presidents of nursing, chief executive officers, emergency department directors, and other managers and directors. Hospitals selected for the case studies were chosen to represent a range of financial and recruiting positions from good to weak. Twenty hospitals were contacted for the study, with 12 agreeing to participate. Seven of the 12 hospitals are nonprofits, four are public hospitals, and one is for-profit. The researchers also interviewed several people currently or recently employed in the insurance industry to learn how the ratio regulations were addressed in contract negotiations between hospitals and payers.

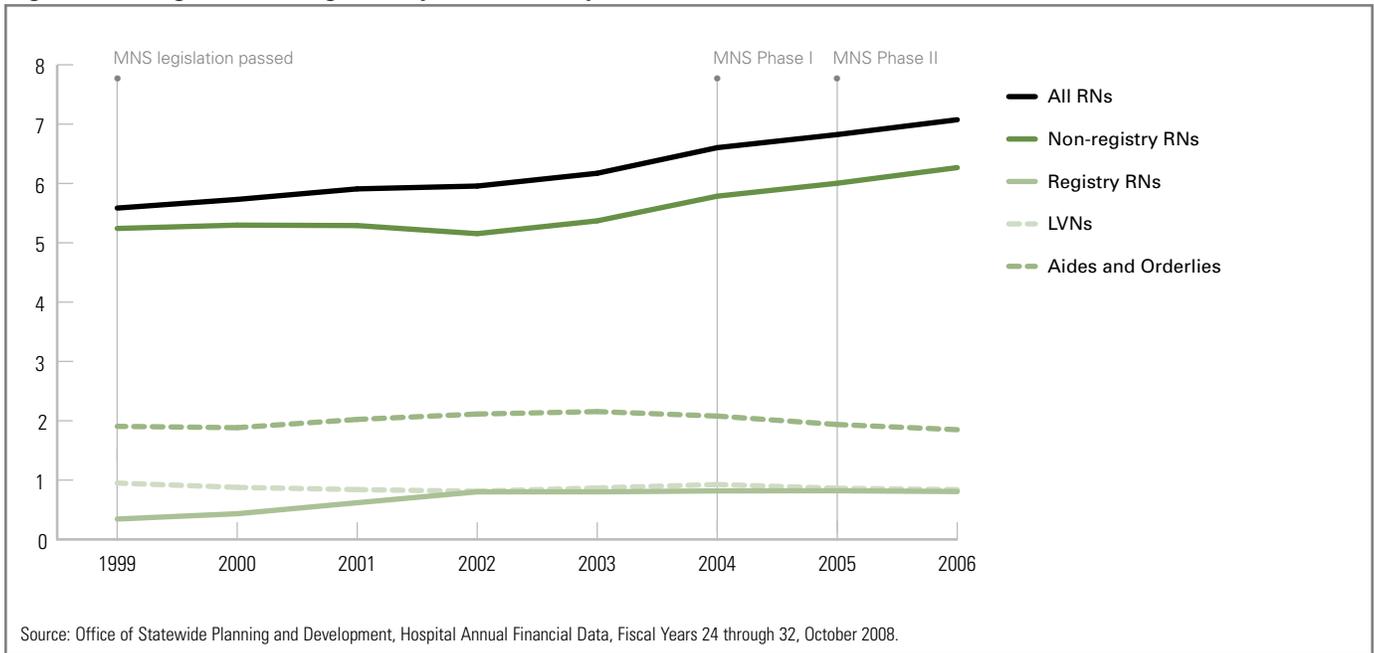
**Findings**

**Staffing Changes and Challenges**

The nurse staffing legislation resulted in higher employment of licensed nurses in most California hospitals. Figure 1 presents changes in hours worked by RNs, LVNs, and aides/orderlies between 1999 and 2006. The hours worked by regular RN employees and agency RNs also are indicated. RN hours per patient day increased throughout this period, with more rapid growth after 2002. Agency RN hours rose notably between 2000 and 2002. After 2002, RN hours per patient day for non-agency RNs increased. The levels of LVN and aide hours were fairly stable throughout the entire period.

Figure 2 compares RN hours per patient day before and after 2004, for all hospitals and by type of hospital. Prior to the enactment of the ratios, nonprofit hospitals had the highest number of RN hours per patient day, while district, for-profit, and fiscally weak hospitals had fewer RN hours per patient day. After the ratios were implemented, average RN hours per patient day increased for hospitals overall, as well as for each type of hospital. This growth varied by type of hospital. One might expect that staffing would have increased more among hospitals that had lower initial staffing; however, this is not the case for the groups presented in Figure 2. Less growth in RN

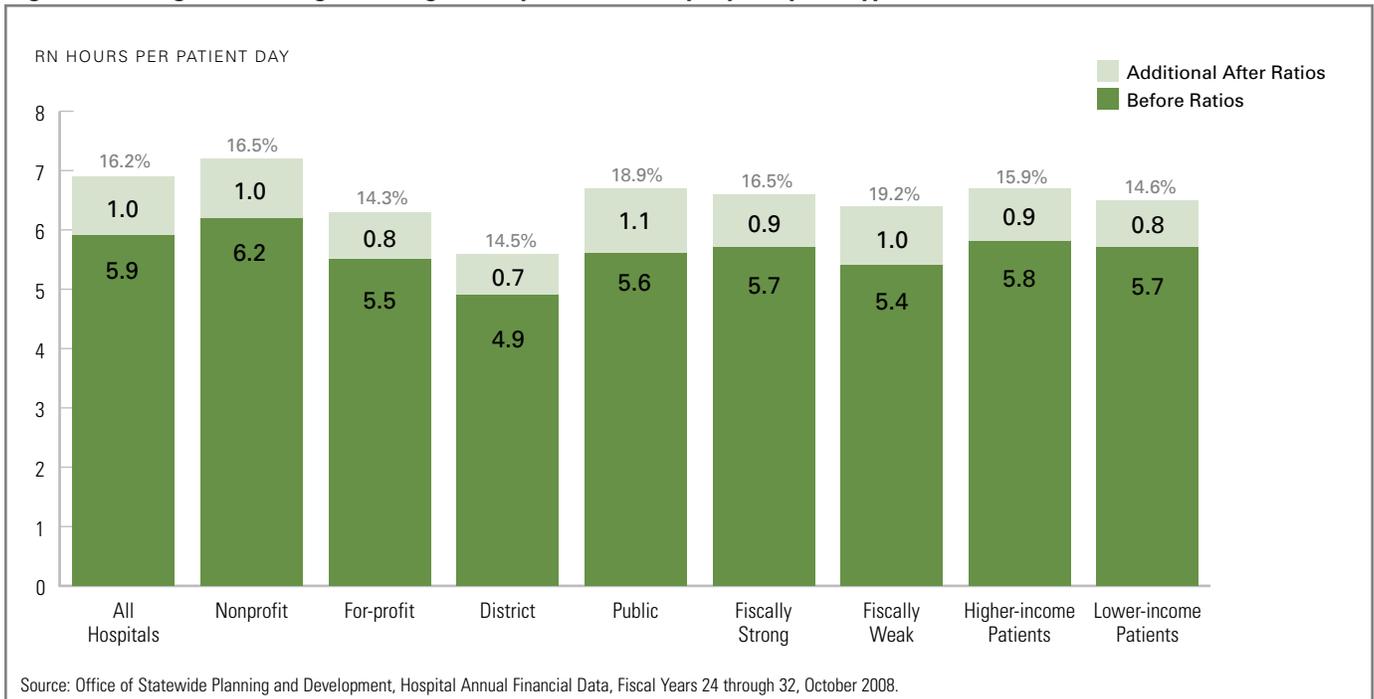
**Figure 1: Changes in Nursing Hours per Patient Day, 1999–2006**



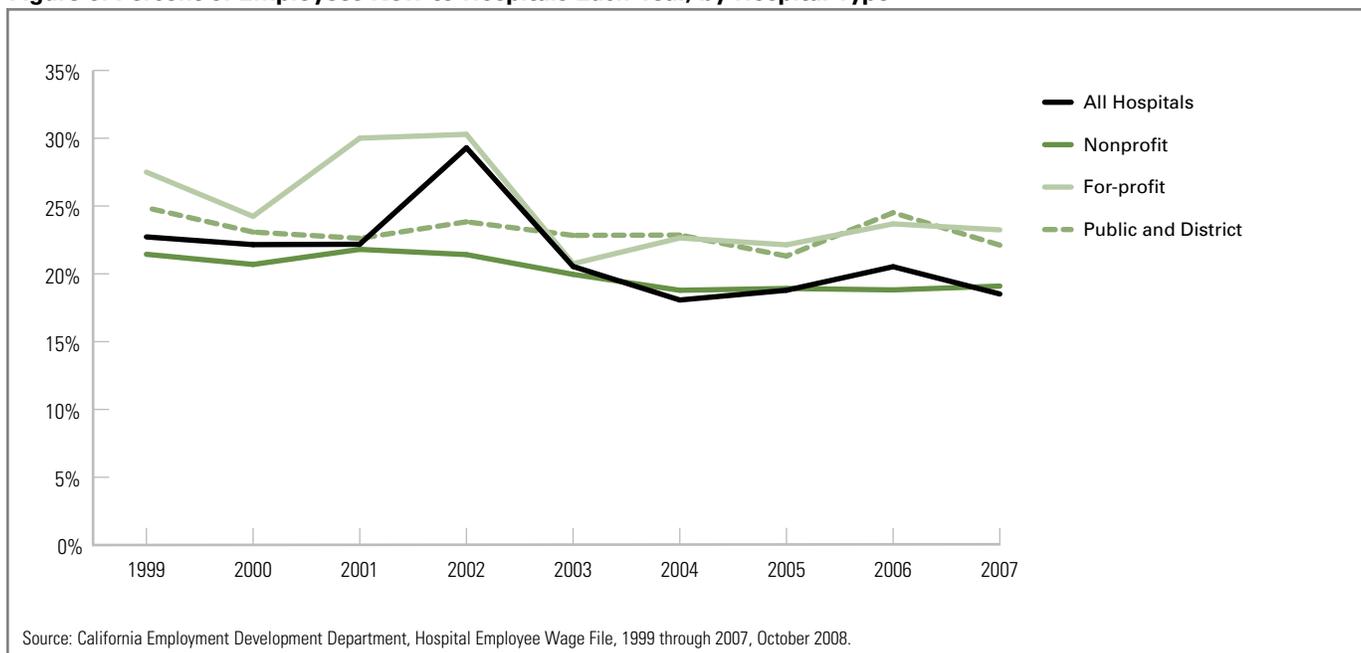
hours per patient day was observed for district hospitals, for-profit hospitals, and hospitals with lower-income patients—all of which had initial staffing below the statewide average.

Figure 3 examines hospital hiring of new employees from 1999 through 2007, as calculated from the EDD’s base wage file. Hiring peaked in 2002 for all hospitals, with an average of 29 percent of employees being new to their

**Figure 2: Changes in Average Nursing Hours per Patient Day, by Hospital Type, Before and After 2004**



**Figure 3: Percent of Employees New to Hospitals Each Year, by Hospital Type**



hospitals that year. For-profit hospitals increased their hiring earlier, in 2001. This is not surprising because staffing levels at for-profit hospitals were below the statewide average before the ratios were implemented, which meant they had a greater need to hire to meet the regulations. Hiring by nonprofit hospitals was comparatively stable over time, though it decreased somewhat after 2001. Hiring by public hospitals, which in Figure 3 includes district hospitals, also was fairly stable between 1999 and 2007. Hospitals that served a greater proportion of higher-income patients engaged in more hiring throughout this time period, with hiring rising notably in 2003, dropping in 2004, and then rising again through 2007. Hospitals that served more lower-income/non-resident patients increased hiring somewhat in 2001 and 2002, but decreased hiring after 2004. Fiscally strong hospitals did more hiring than fiscally weak hospitals, but the difference was not large. (In the interest of clarity, the data tracking patient demographics and financial strength were not included in Figure 3.)

The hospital leaders interviewed for this study reported that they faced many challenges as the staffing regulations were put in place. Prior to the implementation of the

ratios in 2004, most hospitals had completed financial and staffing assessments. A few interviewees reported that staffing ratios at their hospitals or units were already at or above the mandated levels, but most reported that they needed to hire more RNs to meet the requirements, particularly to cover meals and breaks. California's labor code regulates how many meal breaks employees must receive based upon shift length, and the interaction of this regulation with the minimum staffing requirement posed a particular challenge.

The majority of the individuals interviewed for this study, both at high-performing and under-performing hospitals, discussed the problems associated with meeting the "at all times" requirement of the ratios law in conjunction with meal breaks for staff. This challenge was addressed with a wide variety of solutions. Many created "float pools" to have a supply of staff to cover meal breaks. Charge nurses and nurses from registries are also used to cover meal breaks. One hospital created a position whereby a nurse works a truncated shift for the sole purpose of providing meal breaks. Several interviewees noted that the need to cross-train staff increased, particularly in specialty areas, in order to increase float coverage. Some interviewees

thought the implementation of the ratios increased tension between management and staff, and associated this with rules regarding meal breaks. The combination of meal break and staffing regulations was perceived as reducing the ability of staff nurses to use their professional judgment in determining the best time to take a break, and interviewees believed that nurses found this loss of autonomy frustrating.

Nine of the 12 hospitals that participated in the interviews reported that 90 percent or more of their nursing staff were RNs, and six hospitals said they employ traveling or agency nurses to meet staffing requirements. Many hospital leaders reported difficulty finding specialty nurses or experienced nurses holding bachelor's or master's degrees, noting that new graduates are not appropriate for some positions. Interviewees also noted that they could not readily use LVNs to meet the staffing regulations due to their limited scope of practice. Because only RNs can assess patients and administer intravenous medications those few hospitals that used LVNs had to partner them with RNs; some of the nursing managers reported that their RN staff thought this arrangement increased their workload, since they had to provide care to both their own and the LVN's patients while supervising the LVN. A reduction of ancillary staff support was reported at several of the hospitals. These reductions resulted in additional primary care duties for the RNs, such as giving baths to patients. Managers reported hearing from their RN staff that they were unhappy with these additional job tasks and the shift in their role in patient care. These issues were of equal importance among both high-performing and under-performing hospitals.

Overwhelmingly, interviewees said they want some flexibility in applying the ratios. particularly the removal of the "at all times" language. The lack of flexibility was singled out as the reason hospitals have trouble remaining in compliance, since it is expensive and challenging to maintain the mandated ratios at all times and in all contingencies, such as days when too many nurses call

in sick. Another recommendation focused on using acuity-based ratios, so as to avoid situations where the minimum staffing regulations dictate a lower ratio than was generally thought of as necessary, or vice versa. The night shift and patients waiting to be discharged were both cited as examples of situations requiring fewer nurses than the ratios prescribe. On the other hand, caring for patients with complex conditions, such as multiple and chronic illnesses, was cited as an example of an area where the staffing ratios fell short of meeting the patient's needs.

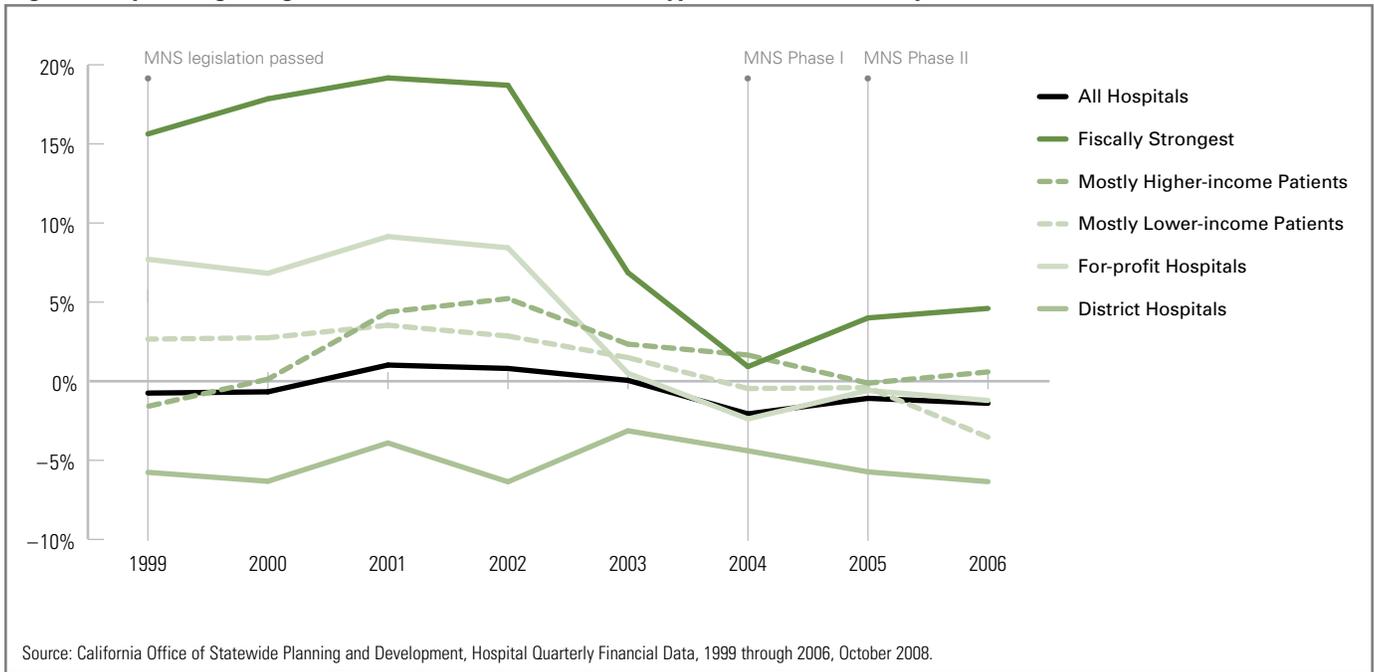
### Fiscal Stability and Change

Over the eight years examined in this study, California's hospitals experienced decreasing operating margins; however, these changes could not be tied directly to the nurse staffing legislation. A variety of financial policies had a substantial effect on hospitals from 1999 to 2007.

Medicare margins severely declined as the Balanced Budget Act of 1997 constricted government payment rates and Medicare significantly changed its billing procedures and payment streams.<sup>22,23</sup> After a series of emergency state funding bills, California had fewer hospitals reporting operating deficits in 2005 than in 1999. However, in late 2005, the state began enacting a series of changes in Medicaid funding that, along with new changes in Medicare funding, sought to decrease government transfers to safety-net hospitals.

As a result of these policies and trends, by 1999, the first year examined in this study, California hospitals had experienced significant declines in operating margins. Hospitals started to recover from these fiscal woes in 2001, but by 2004 margins had declined again. These declines occurred primarily in district hospitals, for-profit hospitals, hospitals serving higher-income or lower-income patients, and hospitals that prior to 2002 were fiscally strongest (Figure 4). Public, nonprofit, and the fiscally weakest hospitals experienced increases in operating margins over the same period, while public hospital margins declined after 2004. Due to

**Figure 4: Operating Margins Prior to Ratios for Selected Types of California Hospitals**



these pre-ratio trends, most hospital types experienced statistically significant variation in operating margin after ratios. (The two exceptions were district hospitals and those serving mostly higher-income patients.) While the ratio regulations may have influenced the amount of change experienced by each hospital type, this analysis cannot isolate any such effect. In fact, it is likely that the staffing requirements had at most a marginal impact on hospital financial stability.

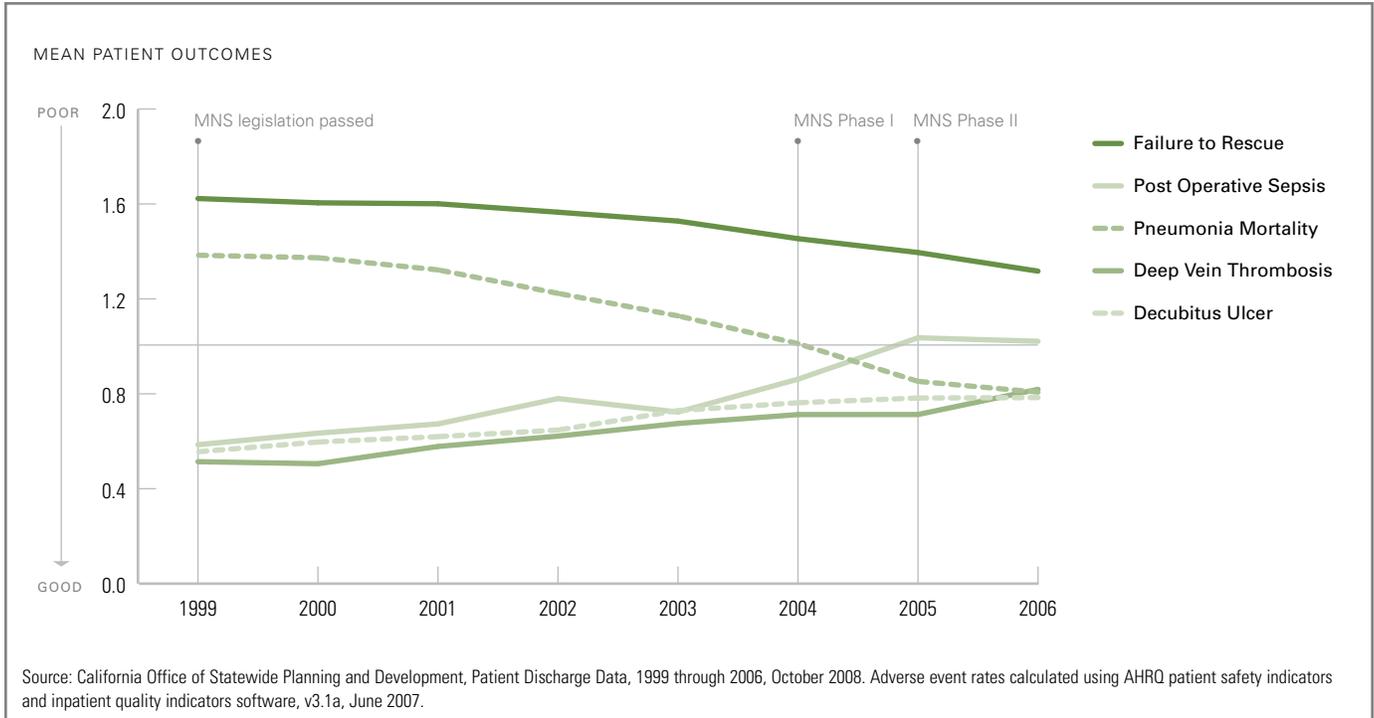
Several of the nursing executives and managers reported that the staffing legislation made it easier to secure additional funding or avoid budget cuts within their own hospitals, particularly for hiring nursing staff. However, CEOs at both high- and under-performing hospitals said that it was difficult to absorb costs related to the ratios. They noted that they needed to find funds from other budget areas, which in some cases involved the reduction of some services. A small number reported that their hospitals successfully obtained higher insurance reimbursement rates from insurers to defray some of the increased costs. The insurers interviewed for this study indicated that hospitals have cited the minimum ratios as

one reason for rising costs, and that these costs are likely passed on to the consumer.

### Quality of Care

The desired outcome of minimum nurse staffing legislation was the improvement of patient outcomes; however, most of the quality measures analyzed for this study do not appear to have been directly affected by the increase in RN staffing. For example, one of the metrics sensitive to nursing care, average length of patient stay, showed very low rates of change during the study period. Average length of stay did not change for nonprofit hospitals, increased significantly in public hospitals, and decreased significantly among for-profit hospitals. As a result, the overall level of average length of stay in California has stayed the same since the ratios were imposed. Other nursing-sensitive measures such as decubitus (pressure) ulcers, failure to rescue after a post-surgical complication, deep vein thrombosis/pulmonary embolism (DVT), pneumonia mortality, and postoperative sepsis show similar results. Figure 5 shows the average ratio of observed patient incidents over expected patient incidents for all California hospitals.

**Figure 5: Trends in Patient Safety Measures for California Hospitals, 1998–2006**



Ratios greater than one indicate poorer quality, whereas rates less than one indicate better quality. California performed better than expected through the entire period for rates of DVT and decubitus ulcer. All California hospitals performed worse than expected for rates of pneumonia mortality and failure to rescue, but these rates improved throughout the study period and were improving well before the minimum staffing requirements were implemented.

Many of the healthcare leaders we interviewed expressed an expectation that the minimum staffing ratios would raise the quality of care due to increased interaction with patients. However, only a few interviewees felt that the ratios had resulted in such an improvement. Some expressed concern about the break in the continuity of care resulting from maintaining compliance between both the ratios and the meal break rules. Some interviewees reported that the ratios affected patients in their emergency departments. In those hospitals, emergency department waiting times increased, patients occasionally had to be held in the emergency department due to lack

staffing, or, in rare cases, the emergency departments were put on diversion so patients had to be transported to other hospitals. Very few hospitals had conducted any analysis of data related to the ratios. While many hospitals conduct regular patient satisfaction surveys, most of the leaders we interviewed said they did not believe there had been a significant change in patient satisfaction as a result of the nurse staffing regulations.

### Conclusion

Staffing changes have created challenges and adjustments for some hospitals, particularly with regard to the logistics of meal break compliance and the roles of RNs. The leaders we interviewed did not notice significant changes to the quality of patient care, though emergency departments became bottlenecks at some hospitals. Leaders reported difficulties in absorbing the costs of the ratios, and many had to reduce budgets, reduce services, or employ other cost-saving measures. The interviews did not reveal any important differences in the effects of the ratios upon high-performing and under-performing hospitals.

The minimum nurse staffing regulations did achieve one goal of the legislation: skill mix increased in California hospitals. The hours worked per patient by RNs and registry RNs significantly increased. These improvements in skill mix did not have a clear impact on hospital finances. While overall margins declined between 1999 and 2007, there was no clear relationship between those declines and the start of staffing ratios. This is likely due to other fiscal challenges facing California hospitals. Ratios did not appear to affect most nursing-sensitive outcomes. While the average length of stay changed after 2004, trends in rates of decubitus ulcer, failure to rescue, and deep vein thrombosis, were not changed. More detailed analysis of this and other nursing-sensitive outcomes is needed to fully explore the effect of nurse staffing ratios on the quality of patient care.

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## ABOUT THE FOUNDATION

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## ENDNOTES

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