Meeting the Mandate: Compliance, Input Substitution, and Heterogeneous Responses to Nursing Home Minimum Staffing Requirements

Introduction

Nursing homes provide vital post-acute and long-term care to over a million people in the US annually. While quality is highly correlated with staffing, we know little about the optimal number of staff hours or the skill mix that would achieve the best outcomes for nursing home residents. Even though 70% of nursing home days in 2024 were paid by the Medicare and Medicaid programs(Zahida Siddiqi, 2025), the federal regulations with regard to staffing remain vague: nursing homes must have sufficient staff to ensure that each resident attains and maintains their highest practicable physical, mental, and psycho-social well-being. This lack of specificity, as well as variation in patient case-mix, likely contributes to the widely varying hours of care and skill mix observed in nursing homes today.

Some states have adopted minimum staffing standards to provide clearer guidance and regulation around nursing home staffing, usually structured in terms of hours of care per resident day. Research that examined state regulations introduced before 2002 found that while state minimum staffing standards increased staffing hours per resident day (HPRD), they also led to decreases in skill mix as the hour increases were more likely comprised of lower-skilled nursing staff (Bowblis & Ghattas, 2017; Chen & Grabowski, 2015; Park & Stearns, 2009).

The landscape of the nursing home industry has shifted dramatically since 2002, when the effectiveness of state-level staffing mandates was last examined, and the use of these regulations is on the rise again. Since 2018, 8 states have introduced new staffing mandates or increased their existing minimum staffing mandates, both are at higher levels than previously examined. But these minimums are set at higher levels than the earlier regulations, and staffing has long-standing issues of recruitment and retention, exacerbated by the COVID-19 pandemic. A survey in March 2024 (AHCA, 2024)found that almost all of the 441 responding nursing homes were actively hiring, including 89% with registered nurses (RN) vacancies and 95% with certified nursing assistant (CNA) vacancies. Relatedly, turnover rates are extremely high; the median annual turnover rate for nursing assistants in U.S. nursing homes is estimated at 99 percent per year(Gandhi et al., 2021). Local labor market conditions combined with regulated reimbursement rates could make it difficult for some nursing homes to meet these regulations, potentially increasing financial pressures instead of increasing quality.

As such, we revisit the question of the effectiveness of recent state minimum staffing regulations. Specifically, using detailed staffing data available in the Payroll Based Journal (PBJ), we examine the effects of changes to state minimum staffing laws from 2018-2024. We first describe the stringency of the standards, by examining the proportion of nursing homes impacted by the new regulations. Then we estimate difference-in-difference models that account for staggered treatment timing to isolate the effectiveness of these staffing regulations, with effectiveness defined in terms of total HPRD increase and skill-specific HPRD changes. We include several time-varying controls to try to capture the local labor market and the severity of the COVID-19 pandemic to see whether these factors contribute to the effectiveness of the regulations. Finally, we gathered information about regulation enforcement to try to further our understanding of the patterns of compliance.

Data and Methods

From the CMS provider of services (POS) file, we identify the universe of CMS-certified nursing homes that were operating during our study period (January 2017-December 2024). To that, we add information on nursing home staffing mandates (MacPAC, n.d.), and supplemented and updated those data with hand-collected data and internet searches. We restrict the sample to the 8 states with changes in their staffing mandates during the study period, and the 10 states without any mandate during the study period (see Figure 1).

The main outcomes of interest are the staffing ratios which we conceptualize as HPRD. We constructed HPRD for total direct care staff and broken into its components: RN, LPN, and CNA, We use daily census from the Minimum Data Set and reported in the PBJ data as the denominator.

Additional control variables come from the Johns Hopkins University coronavirus resource center, in order to control for county-level COVID-19 death rates (per 1000 population). We also collected data from tTe COVID-19 Schooling Data Hub (COVID-19 School Data Hub, n.d.)to capture state-level variation in school policies as an additional constraint on hiring. We use this information to create an indicator variable for the dominant school learning setting is in-person. To account for local economic conditions, we incorporated the annual county-level unemployment rate from the Area Health Resources Files (AHRF).

We use the Callaway and Sant'Anna (2021) estimator within a difference-in-difference framework to estimate the effectiveness of the state staffing mandates (Callaway & Sant'Anna, 2021) Since the policy is at the state level, we clustered the standard errors at the state level. To estimate the effects, we use a doubly robust estimator and construct the control group using both never-treated and not-yet-treated states. Since three states (CT, NY, and RI) enacted the

reform at the same time, the Callaway and Santa'Anna estimator cannot disentangle the state-effect from the time-effect. Thus, we run separate models to isolate the effects of these three states by dropping the other two treated states in a sub-analysis.

Findings

Figure 2 illustrates the variation in the timing of staffing regulation implementation and in the level of the standards relative to previous standards. The dotted line is 3.48 total HPRD, the proposed and subsequently repealed federal level. Most of the state mandates we analyze hover around this threshold, with CT (3.06) and PA (2.93) being notably lower.

Figure 3 illustrates the stringency of the regulations. Despite the similarity in the HPRD mandate levels, the percentage of nursing homes meeting the minimum in each state varies dramatically, both before and after the mandates were passed. In California, 69% of nursing homes met the increased minimum staffing ratio in the year before enactment. Similar, or even higher, rates are observed in Arkansas, Connecticut, and Pennsylvania. Indeed, Pennsylvania's minimum staffing regulation was only binding in 4 percent of their nursing homes. In contrast, only half of Massachusetts nursing homes were at the minimum staffing level prior to the minimum increase, and even fewer in New York and in Rhode Island, where new regulations were introduced.

Figure 3 also provides the longitudinal patterns of staffing, providing descriptive evidence of the potential effectiveness of these minimum staffing regulations. In California, the percentage of nursing homes meeting the minimum staffing requirements increased to 90% upon the enactment of the law, and staffing HPRD remained high, with 97% of nursing homes meeting the requirement in 2024. States that enacted their mandate through the pandemic had less favorable trends in staffing, with the percent of nursing homes in Massachusetts meeting their mandate decreasing after enactment.

Table 1 provides the descriptive statistics of our sample.

Difference in Difference Estimates

Table 2 provides the difference-in-difference results, as we add covariates to control for labor market and covid-19 effects, to see how sensitive the results are to these additional factors. Our preferred specification is in Panel 3, with labor market and covid-19 controls included. However, it is interesting to note how the addition of labor market and COVID-controls influences the measured effectiveness of these mandates. There are notable changes in the coefficients for CT, NY, and RI, who all adopted these mandates in Quarter 1 of 2022; AR and MA, who enacted their mandates earlier in the pandemic, however, see less variation due to the addition of these

controls. The addition of labor market controls (the unemployment rate) generally increases the magnitude of the effect of the mandate, and the inclusion of the covid-related controls further increases the measured effectiveness, suggesting both factors matter in the ability to comply with these mandates.

Figure 4 provides the adjusted difference-in-difference results for total HPRD overall, and by state. Following the results from Table 2, we find that there are sizable and significant increases in staffing total HPRD after the introduction of a minimum staffing mandate. Connecticut and California saw the largest increase in total HPRD. However, Arkansas and Massachusetts remain outliers, with no statistical change in Arkansas but significant decreases in Massachusetts.

Figure 5 provides the adjusted difference-in-difference results by staff type, RN, LPN, and CNAs. Much like the earlier mandates, we see that most of the movement is met through increases in CNA hours and to a lesser extent LPN hours. Only Arkansas and Connecticut had increases in RN hours. Arkansas's RN hour increase offsets the LPN decreases. Massachusetts's results are completely driven by decreases in RN hours.

Discussion and Conclusion

State minimum staffing mandates at 3.0 HPRD and higher are effective at increasing staffing in nursing homes in 6 out of the 8 states who have introduced or increased their regulations since 2018. Arkansas, which did not see an increase in total staffing, did achieve a higher skill mix in shifting away from LPN and towards RN hours. Massachusetts remains the only state that did not increase total hours or increase its skill mix; but they did start enacting this mandate during the height of the covid-19 pandemic.

Both the unemployment rate and factors related to the pandemic help explain low staffing ratios in nursing homes and impacted the effectiveness of these mandates. Future work will include understanding the role that penalties and enforcement policies impact the effectiveness of this legislation. There is a long delay between the enactment and the penalties for some states, which could contribute to the lack of a timely response to these regulations.

Figure 1: Map of State-Level Minimum Nursing Home Staffing Mandates: 2017-2024

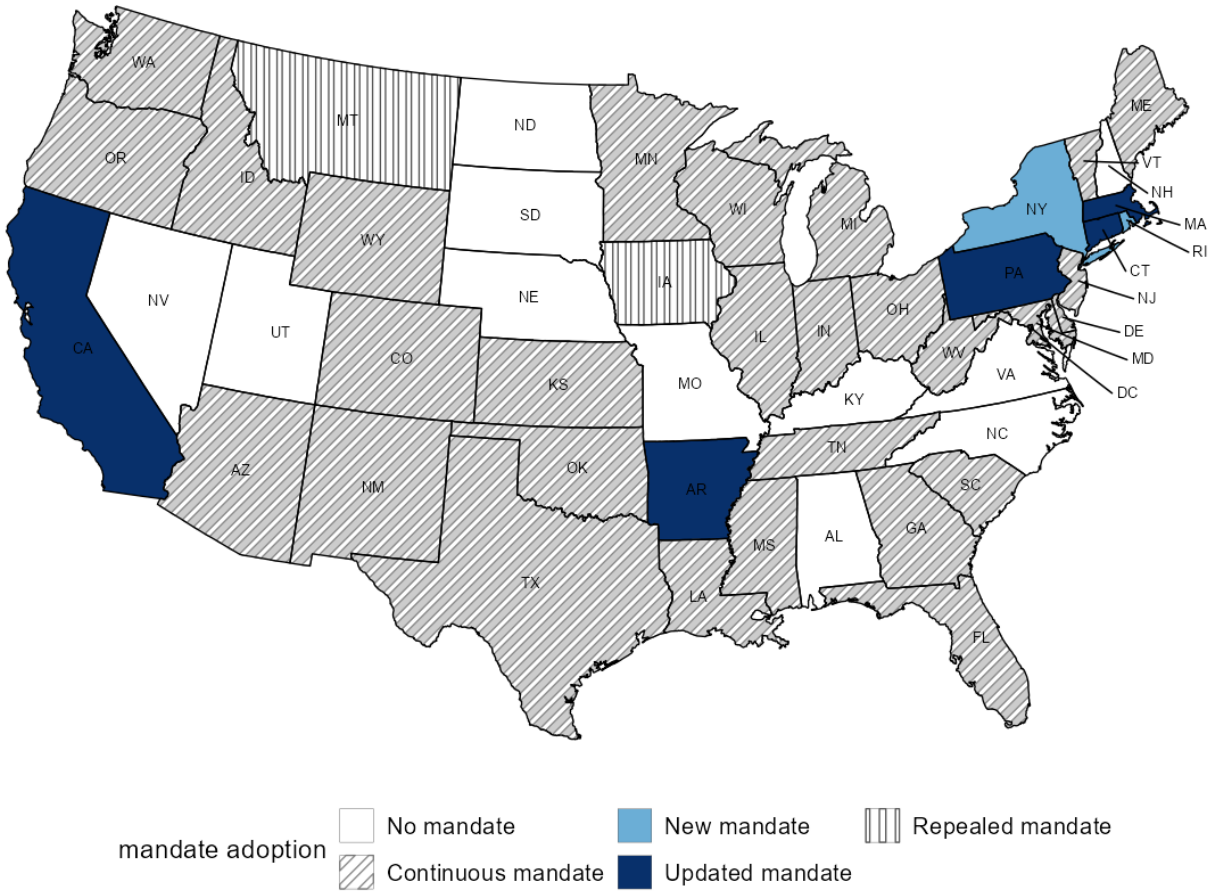


Figure 2: Levels of State Minimum Staffing Regulations

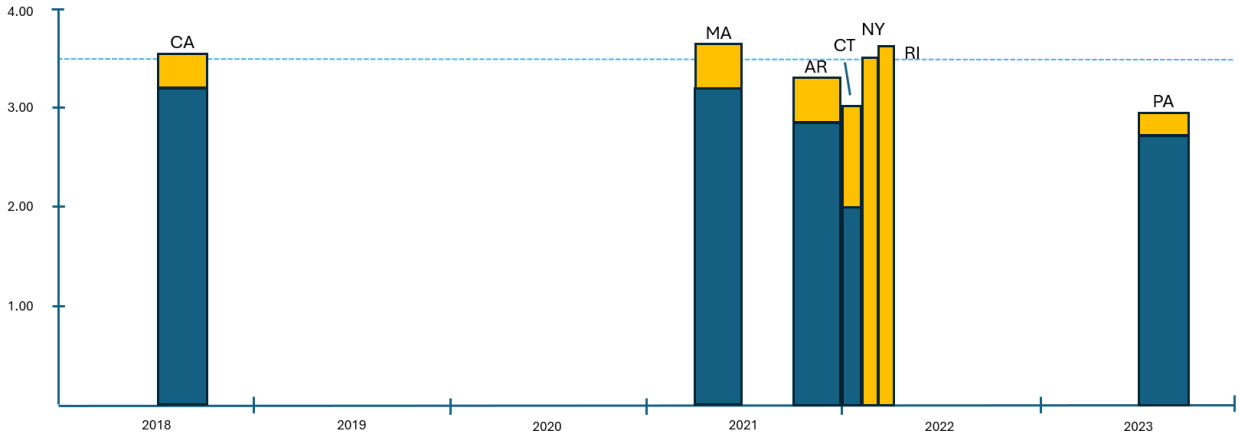


Figure 3: The Stringency of the Regulation, by state

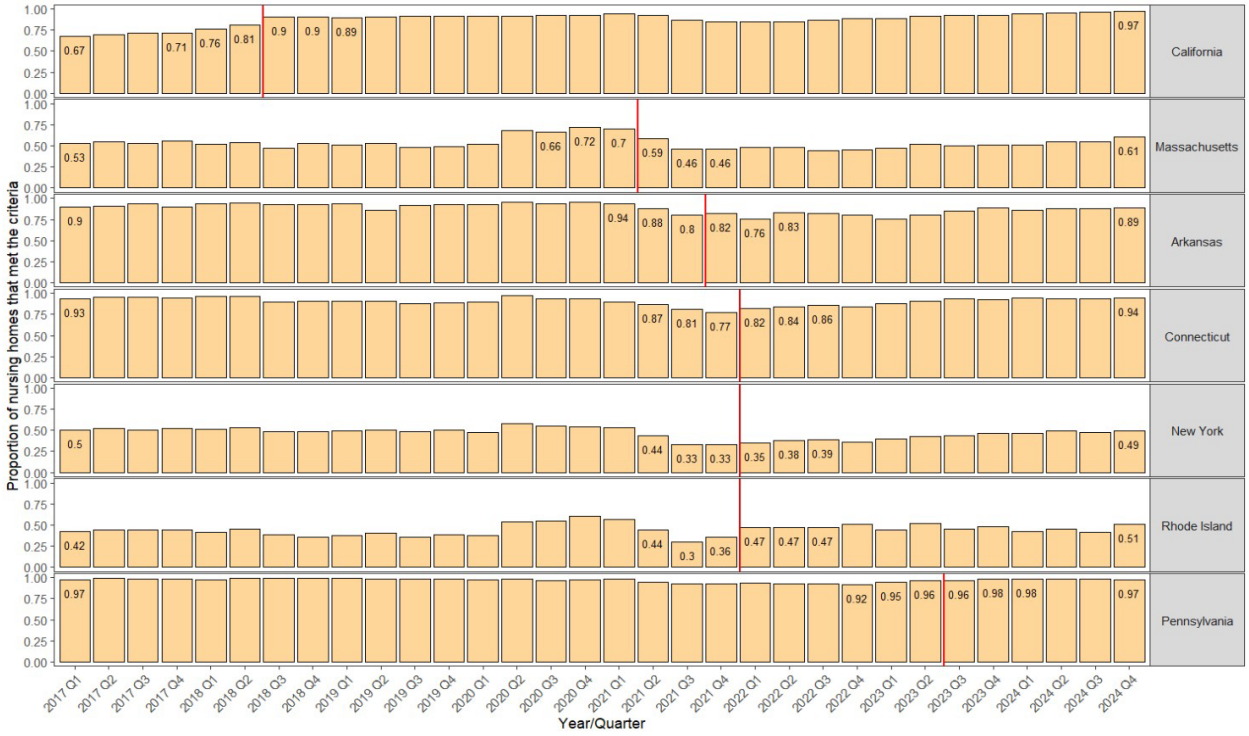
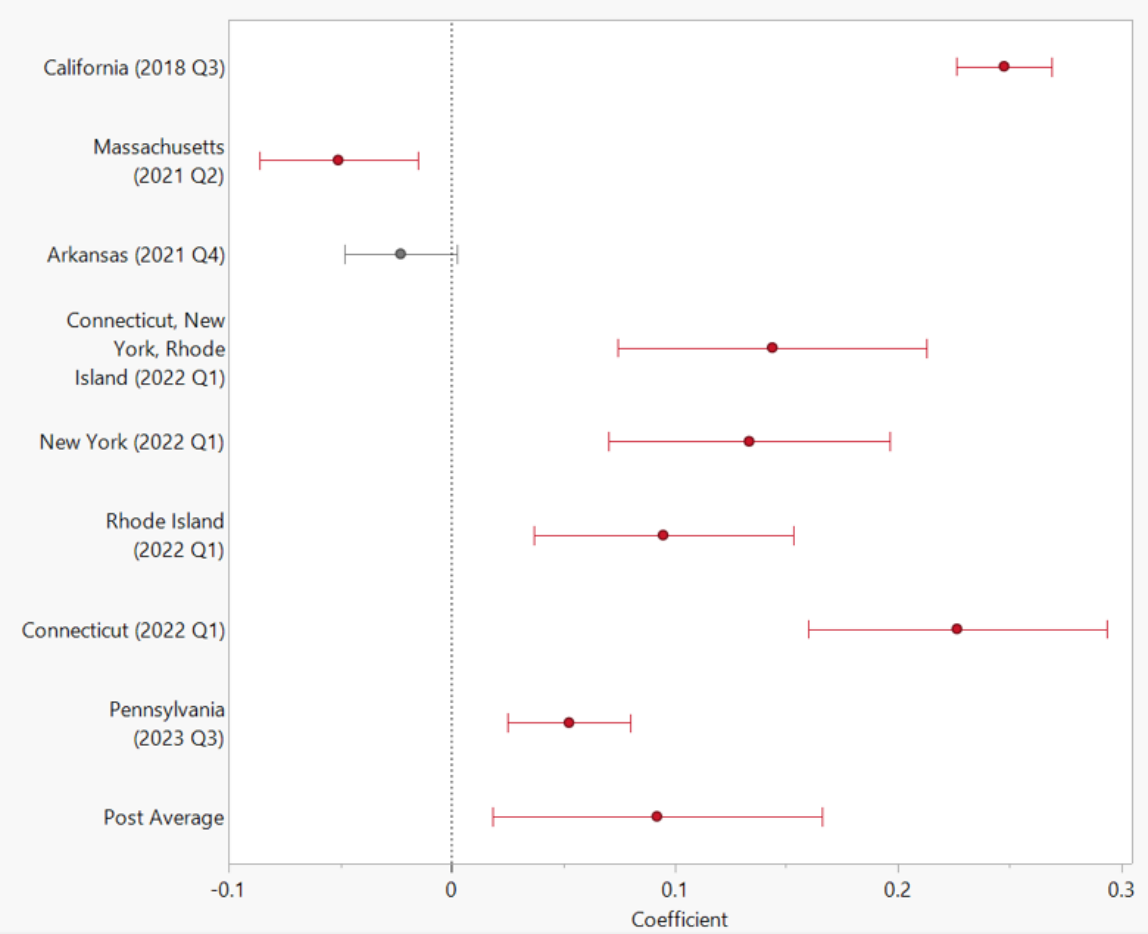
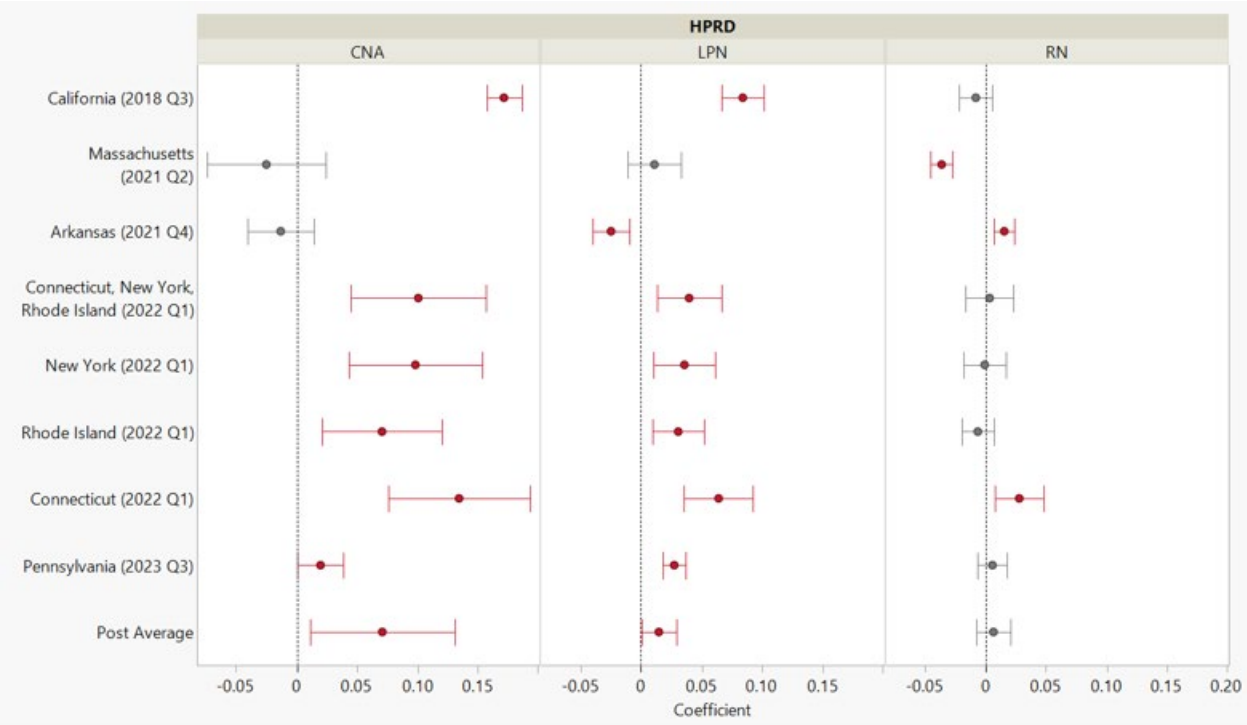


Figure 4: The effect of minimum staffing regulations on total HPRD, overall and by state



Note: All models are adjusted (unemployment rate, covid death rates, school modality)

Figure 5: Effect of Staffing Regulations on Staffing Mix, by state



Note: All models are adjusted (unemployment rate, covid death rates, school modality)

Table 1: Staffing Regulations and Penalties

State	Staffing Requirements	Penalty Structure	Compliance Check	Mitigating Factors / Exceptions	Enforcement Status
California	Total 3.56 hprd minimum (DON .06; Direct Care 3.5 including LN .24, CNA 2.4)	Administrative penalties for noncompliance; enforcement through state inspections and audits (amount varies depending on deficiency)	Payroll records, inspections, staffing audits	Waivers may be available during emergencies or extraordinary workforce shortages	Enforcement ongoing through California Department of Public Health
Massachusetts	Total 3.64 hprd, including DON 0.06 hprd DC 3.58 hprd (DC includes RN 0.508 hprd)	Medicaid payment reductions and enforcement actions for facilities failing to meet staffing requirements rather than a fixed daily fine	Payroll-Based Journal (PBJ) data submitted to CMS	Limited hardship and implementation provisions	State monitors compliance through PBJ reporting
Arkansas	Total DC 3.36 hprd (no separate DON or RN requirements) https://www.kff.org/report-section/state-actions-to-address-nursing-home-staffing-during-covid-19-appendix/ A.C.A. § 20-10-1402. Staffing standards.	Civil penalties may be imposed under state nursing facility licensing laws; no single statewide per-day staffing penalty identified	State inspections and staffing documentation	Licensing agency discretion; hardship provisions may apply	Enforcement through state survey agency
Connecticut	Total DC 3.06 hprd 3.0 hprd direct care staff plus DON	Department of Public Health may impose licensing sanctions and civil penalties for noncompliance	Facility staffing reports and inspections	Waivers or temporary exceptions during emergencies	Enforcement through Connecticut Department of Public Health
New York	Effective 1/1/22: Total 3.56 hprd including: DON 0.06 hprd DC 3.5 hprd (including 2.2 hours or more from CNA or NA) Effective 1/1/2023: Total 3.56 hprd, including: DON 0.06 hprd DC 3.5 hprd (including 2.2+ hours from a CAN or NA and 1.1+ hours from LPN)	**Up to $2,000 per day** for noncompliance	Quarterly CMS Payroll-Based Journal (PBJ) data	Natural disasters, declared emergencies, acute labor shortages, union disputes, and other mitigating factors may reduce penalties	First civil penalties issued in 2026 for 2022–2023 noncompliance totaling approximately **$4.26 million**
Rhode Island	Total DC 3.64 DC 3.58 hprd (DC includes 2.8 CNA hprd) plus DON .06	Payment reductions and administrative enforcement; civil penalties available under licensing authority	PBJ data and state reporting	Emergency waivers and workforce shortage provisions	Enforcement framework implemented beginning in 2026

Pennsylvania	2023: 2.87 hprd including 1 RN per 250 residents during all shifts, DAY: 1 NA per 12 residents+ 1 LPN per 25 res EVENING: 1 NA per 12 residents+ 1 LPN per 30 res NIGHT: 1 NA per 20 residents+ 1 LPN per 40 res 2024: 3.2 hprd DAY: 1 NA per 10 residents EVENING: 1 NA per 11 residents NIGHT: 1 NA per 15 residents	Enforcement primarily through licensing deficiencies and potential civil monetary penalties; no fixed staffing-specific daily penalty identified	State inspections and staffing documentation	Department discretion for extenuating circumstances	Enforcement through Pennsylvania Department of Health

Table 2: Results: The effectiveness of minimum staffing regulations on total HPRD, by state

	Model 1				Model 2				Model 3			
	Total HPRD	**RN HPRD**	**LPN HPRD**	**CNA HPRD**	**Total HPRD**	**RN HPRD**	**LPN HPRD**	**CNA HPRD**	**Total HPRD**	**RN HPRD**	**LPN HPRD**	**CNA HPRD**
Overall	0.15 (0.02, 0.28)	-0.01 (-0.02, 0.01)	0.06 (0.02, 0.09)	0.1 (0.01, 0.19)	0.16 (0.04, 0.28)	-0.01 (-0.02, 0.01)	0.06 (0.02, 0.1)	0.11 (0.03, 0.19)	0.16 (0.05, 0.27)	-0.01 (-0.02, 0.01)	0.06 (0.02, 0.09)	0.11 (0.04, 0.19)
CA	0.26 (0.24, 0.28)	-0.001 (-0.01, 0.01)	0.08 (0.07, 0.1)	0.18 (0.16, 0.19)	0.25 (0.23, 0.27)	-0.01 (-0.02, 0.01)	0.09 (0.07, 0.1)	0.17 (0.16, 0.19)	0.25 (0.23, 0.27)	-0.01 (-0.02, 0.01)	0.08 (0.07, 0.1)	0.17 (0.16, 0.19)
MA	-0.07 (-0.09, -0.05)	-0.05 (-0.06, -0.04)	0.01 (-0.01, 0.03)	-0.03 (-0.06, 0.002)	-0.07 (-0.08, -0.05)	-0.05 (-0.05, -0.04)	0.02 (-0.001, 0.03)	-0.04 (-0.06, -0.02)	-0.05 (-0.09, -0.02)	-0.04 (-0.05, -0.03)	0.01 (-0.01, 0.03)	-0.03 (-0.07, 0.02)
AR	-0.02 (-0.05, 0.01)	0.02 (0.01, 0.03)	-0.04 (-0.05, -0.03)	- 0.001 (-0.03, 0.03)	-0.02 (-0.05, 0.01)	0.02 (0.01, 0.03)	-0.04 (-0.05, -0.03)	-0.00001 (-0.03, 0.03)	-0.02 (-0.05, 0.002)	0.02 (0.01, 0.02)	-0.02 (-0.04, -0.01)	-0.01 (-0.04, 0.01)
CT, NY, RI	0.07 (0.01, 0.12)	-0.005 (-0.02, 0.01)	0.04 (0.02, 0.07)	0.03 (-0.004, 0.06)	0.11 (0.07, 0.16)	-0.004 (-0.02, 0.01)	0.05 (0.03, 0.07)	0.07 (0.03, 0.11)	0.14 (0.07, 0.21)	0.003 (-0.02, 0.02)	0.04 (0.01, 0.07)	0.1 (0.04, 0.16)
CT	0.14 (0.12, 0.17)	-0.002 (-0.01, 0.01)	0.09 (0.08, 0.1)	0.06 (0.03, 0.08)	0.18 (0.14, 0.22)	0.01 (0.001, 0.03)	0.07 (0.06, 0.09)	0.09 (0.06, 0.13)	0.23 (0.16, 0.29)	0.03 (0.01, 0.05)	0.06 (0.04, 0.09)	0.13 (0.08, 0.19)
NY	0.05 (0.02, 0.07)	-0.004 (-0.02, 0.01)	0.03 (0.02, 0.04)	0.02 (-0.01, 0.04)	0.11 (0.07, 0.15)	-0.01 (-0.02, 0.01)	0.05 (0.03, 0.06)	0.07 (0.03, 0.11)	0.13 (0.07, 0.2)	-0.001 (-0.02, 0.02)	0.04 (0.01, 0.06)	0.1 (0.04, 0.15)
RI	0.03 (0.004, 0.06)	-0.01 (-0.03, -0.002)	0.03 (0.02, 0.04)	0.01 (-0.01, 0.04)	0.06 (0.02, 0.09)	-0.02 (-0.03, -0.004)	0.04 (0.02, 0.05)	0.04 (0.002, 0.07)	0.09 (0.04, 0.15)	-0.01 (-0.02, 0.01)	0.03 (0.01, 0.05)	0.07 (0.02, 0.12)
PA	0.05 (0.03, 0.08)	0.01 (-0.01, 0.02)	0.03 (0.02, 0.04)	0.02 (0.0001, 0.04)	0.05 (0.02, 0.08)	0.01 (-0.01, 0.02)	0.03 (0.02, 0.04)	0.02 (0.0005, 0.04)	0.05 (0.02, 0.08)	0.01 (-0.01, 0.02)	0.03 (0.02, 0.04)	0.02 (0.0005, 0.04)
N Unique NH	5973	5973	5973	5973	5927	5927	5927	5927	5927	5927	5927	5927
Labor Market Controls					**X**	**X**	**X**	**X**	**X**	**X**	**X**	**X**
COVID Controls										**X**	**X**	**X**

Notes: Labor market controls include the county-level unemployment rate and the state-level predominate schooling in-person indicator. Covid-19 controls include the monthly county-level COVID-19 death rates.

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