

INTRODUCTION

- Alternative nurse staffing models were used to ameliorate registered nurse (RN) shortages during the COVID-19 pandemic^{1,2}
- One model, “team-based nursing,” maximizes the use of licensed practical nurses (LPNs) and nursing assistive personnel (NAP) to work alongside RNs and take on tasks that do not require an RN’s expertise^{1,2}
- Little national data exist showing if trends in hospital nurse staffing were disrupted after the pandemic

AIM

We sought to understand whether, after controlling for hospital and geographic characteristics, nurse staffing models changed after the pandemic began in 2020 compared to the pre-pandemic period from 2017 to 2019 and if differences existed between states.

METHODS

- Data Source.** American Hospital Association’s (AHA) Annual Survey from 2017 to 2022
- Sample.** 16,453 observations nested within 3,577 (66.5%) general acute care hospitals
- Analysis.** Descriptive and bivariate analyses to examine trends in general acute care hospitals regarding:
- Average Full-time Equivalents (FTEs) of RNs, LPNs and NAPs between 2017 and 2022; and
 - RN staffing intensity, measured by average RN FTEs per 1,000 adjusted inpatient days between 2017 and 2022
- Hierarchical linear modeling (HLM) was used to investigate changes in RN staffing intensity in general acute care hospitals between 2017 and 2022
 - Dependent variable: RN adjusted staffing intensity, measured as RN FTEs per 1,000 adjusted inpatient days
 - Controls: hospital characteristics (teaching hospital status [yes/no], ownership [public, non-profit, private], total staffed beds, and occupancy rate [Inpatient days / (total staffed beds * 365], county’s metropolitan status [yes/no], and HPSA status [whole county, part county, non-HPSA]
 - Model included time and state fixed effects (2017 and New York were reference categories)



Exploring the Effect of COVID-19 on Nurse Staffing in Hospitals

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RESULTS

- Average RN FTE per hospital increased 9% from 373.1 in 2017 to 407.1 in 2020 before decreasing to 396 FTE in 2021 and 2022 (**Figure 1**)
- Average LPN FTE held relatively steady between 2017 and 2020, before declining to an average of 16.7 in 2021 and then increasing to an average 17.8 in 2022 (**Figure 3**)
- Average NAP FTEs per hospital (including certified nursing assistants and equivalent unlicensed staff) increased 12% between 2017 and 2022 (**Figure 2**)
- The HLM (**Table 1**) revealed that relative to 2017, RN adjusted staffing intensity increased by 0.12 RNs per 1,000 patient days in 2020 (p < .01) but then decreased by 0.11 RNs in 2021 (p < .01) and further decreased by 0.27 RNs per 1,000 patient days in 2022 (p < .01)
- After 2020, the RN adjusted staffing intensity decreased at a faster rate in metropolitan counties than nonmetropolitan counties, decreasing by 0.13 RNs per 1,000 adjusted inpatient days in 2021 (p < .01) and by 0.18 RNs in 2022 (p < .001)
- Relative to New York, 14 states had statistically significantly different RN adjusted staffing intensity, ranging from Utah having 2.2 more RNs per 1,000 adjusted inpatient days to West Virginia having .79 fewer RNs (p < .05) per 1,000 adjusted inpatient days

Figures 1-3. Average Registered Full-time Equivalents (FTE) per Hospital, 2017-2022

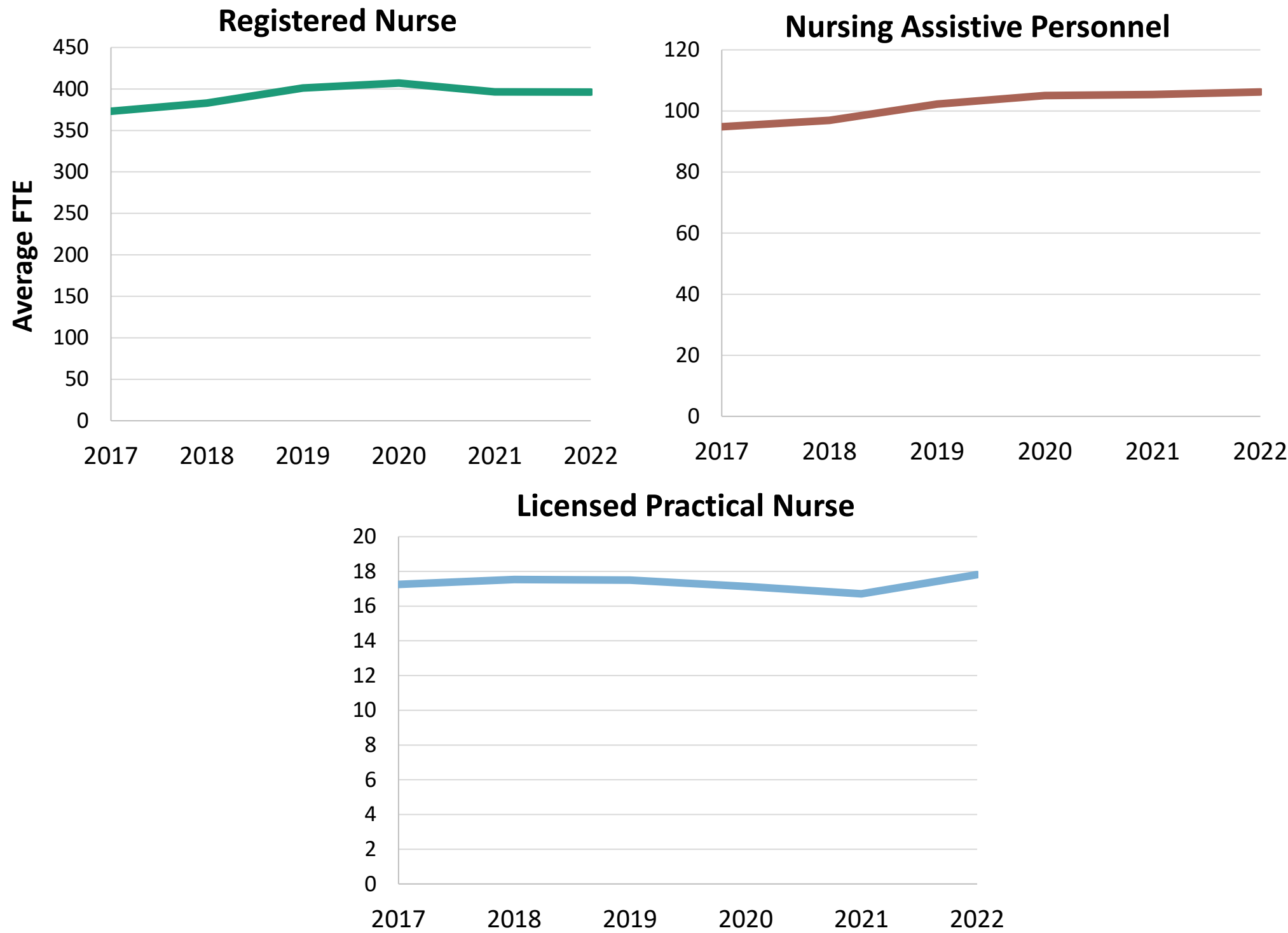


Table 1. Hierarchical Linear Model of RN Adjusted Staffing Intensity, 2017-2022

Variable	Coefficient	SE	95% CI	
Intercept	3.17***	0.17	2.84	3.49
Year (ref: 2017)				
2018	0.03	0.03	-0.04	0.09
2019	-0.01	0.03	-0.07	0.06
2020	0.12***	0.03	0.05	0.18
2021	-0.11**	0.03	-0.18	-0.04
2022	-0.27***	0.03	-0.34	-0.2
Teaching Hospital (ref: no)				
Yes	0.81***	0.08	0.65	0.97
Hospital Ownership (ref: public)				
Non-Profit	0.33***	0.06	0.22	0.44
Private	0.66***	0.08	0.5	0.82
Beds and Occupancy				
Total Beds	0.0008***	0.0001	0.0006	0.001
Occupancy Rate	-1.33***	0.05	-1.43	-1.22
CBSA Status (ref: nonmetro)				
Metropolitan	0.66***	0.06	0.55	0.78
HPSA Status (ref: non-HPSA)				
Full County HPSA	-0.83***	0.12	-1.06	-0.59
Part County HPSA	-0.19*	0.09	-0.37	-0.003
Year by Metropolitan Interaction				
2018*Metro	-0.03	0.04	-0.12	0.05
2019*Metro	-0.04	0.04	-0.12	0.05
2020*Metro	0.03	0.04	-0.05	0.12
2021*Metro	-0.13**	0.04	-0.21	-0.04
2022*Metro	-0.18***	0.04	-0.27	-0.10
Random Effects				
	<u>Variance</u>	<u>SD</u>		
Hospital	2	1.41		
Residual	0.57	0.76		

Note. RN staffing intensity is measured as RN FTEs per 1,000 adjusted inpatient days; * p < .05, ** p < .01, *** p < .001; HLM model also includes state fixed effects.

CONCLUSIONS & POLICY IMPLICATIONS

- Findings support concerns voiced about whether RNs will return to hospital employment at current pay scales, working conditions, and rates of workplace violence
- If hospitals continue to increasingly rely on LPNs, it may decrease the ability of long-term care facilities to staff beds and hospitals may find it increasingly difficult to discharge patients in need of long-term care. State and federal policymakers may want to increase investments in LPN education and career laddering opportunities that increase the ability of NAPs to become LPNs. Nursing regulatory bodies may want to collaborate with LPN employers to provide education on LPN scope of practice so that employers have the knowledge to utilize LPNs to their full scope of practice according to state-specific regulations
- Even after controlling for time and state fixed effects, as well as hospital and geographic characteristics, considerable variation in RN staffing intensity exists between states which warrants further investigation. California is the only state with mandated staffing ratios and yet Utah, which has a staffing plan that enables nurses and hospitals to determine how to allocate resources, had higher RN staffing intensity than California. By contrast, West Virginia also has a staffing plan approach, but they had the lowest statistically significant staffing intensity in the sample

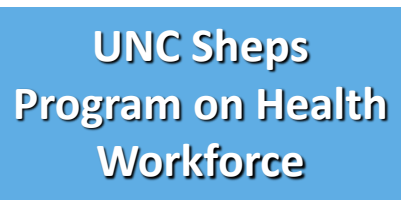
LIMITATIONS

Findings on increased LPN utilization in hospitals are preliminary and may not reflect future trends. Although changes in nursing skill mix were observed, we cannot discern whether the data reflect a shift to team-based nursing models that include delegation of care and coordinated care planning. Data on contract RNs were not collected until after 2022 and, thus, nurses not employed by the hospital are not included in the data which may mean that our analyses underestimate RN FTEs.

REFERENCES & FUNDING

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Read the paper in Nursing Outlook

