

# Agency Staffing and Hospital Financial Performance: Insights and Implications

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**Introduction:** Staffing is critical to hospital performance. However, in recent years, hospitals have struggled with severe staffing shortages, forcing them to rely on expensive agency staff to meet urgent patient care needs. This substitution of agency staff for permanent employees has raised concerns over its potential impact on financial stability. This study investigated the association of agency labor with hospital financial performance.

**Methods:** Utilizing tenets from agency theory and transaction cost theory, data for the calendar year 2022 for active short-term acute care hospitals (n=2771) in the United States were analyzed using multivariable linear regression analysis. Hospital financial performance was assessed using three variables: net patient revenue, operating revenue per bed, and operating expense per bed. The independent variable was agency labor cost, representing the total expenditure on agency labor. Additionally, organizational and market-level control variables that may independently affect hospital financial performance were included.

**Results:** Our regression findings indicated that agency labor cost was significantly associated with all three dependent variables: net patient revenue ( $\beta = 0.224$ ,  $p < 0.001$ ), operating revenue per bed ( $\beta = 0.042$ ,  $p < 0.001$ ), and operating expense per bed ( $\beta = 0.032$ ,  $p < 0.001$ ).

**Discussion:** The results indicated that increased agency labor was associated with higher revenues, but it also corresponded with increased expenses. Therefore, hospitals should strategically use agency staffing to meet immediate operational needs while remaining cognizant of its financial implications. The judicious use of agency labor can help hospitals balance the benefits of increased revenue against higher costs, while ensuring that they still meet immediate patient needs.

**Keywords:** agency staff, contract labor, hospital financial performance, healthcare staffing

## Introduction

### Background

Healthcare professionals are essential to the functioning of hospitals.<sup>1</sup> However, ensuring adequate staffing has always been a challenge for hospitals. To mitigate staffing shortages, hospitals rely on contract or agency staff—temporary workers hired through third-party agencies to fill staffing gaps across various facilities.<sup>2</sup> Recent industry reports have indicated that the use of agency staff in United States (US) hospitals has surged with the proportion of total hours worked by agency staff increasing by 133% between 2019 and 2022.<sup>3,4</sup>

Several factors have contributed to the increased utilization of agency labor, including high staff turnover rates, a limited labor pool, non-competitive pay, and inadequate workplace support.<sup>5,6</sup> Moreover, hospitals compete for hourly employees with non-healthcare organizations that can often offer higher wages and pass on the increased costs to customers.<sup>7</sup> Hospitals continue to feel the lingering effects of the COVID-19 pandemic.<sup>4</sup> While the staffing deficit is particularly acute for nurses,<sup>8,9</sup> other healthcare professions are affected as well.<sup>5</sup>

In this environment, hospitals may perceive hiring agency staff as a strategic approach to cost containment. Agency staff can offer certain benefits: flexible scheduling, reduced overtime for regular staff, and a decreased need to create more permanent positions.<sup>9</sup> Agency staff can also shield hospitals from sudden staffing shortages due to high turnover or absenteeism or an unanticipated surge in patient census. However, an overt reliance on contractual personnel can negatively impact hospital financial stability. The healthcare workforce is expensive, with employee wages and benefits constituting the largest expense for acute care hospitals.<sup>10</sup> Hospital labor costs increased by over one-third between 2019 and 2022, resulting in an additional financial burden of \$24 billion.<sup>4</sup> As a result, hospital labor expense per adjusted discharge increased by 24.8%.<sup>3,4</sup>

The increased utilization of agency staff may be an important reason for the sharp escalation in staffing costs.<sup>11</sup> Agency labor is significantly more expensive than the regular full-time equivalent (FTE) staff—typically adding 50% or more to an employee's hourly rate.<sup>12</sup> For nurses, the difference may be even starker with the median wage of agency nurses three times higher than that of staff nurses.<sup>4</sup> As a result, hospital industry groups have estimated that agency labor expense as a share of total labor expenses have increased by approximately 178% from 2019 to 2022 while the total agency labor expense surged by nearly 260%.<sup>3</sup>

The financial strain of using agency labor may stretch hospital budgets and compromise their ability to invest in patient care.<sup>12</sup> Hospitals are still struggling with the financial repercussions of the COVID-19 pandemic including the exhaustion of federal relief funds.<sup>13</sup> However, given the intractable staffing shortages, hospitals will continue to depend on agency labor in the foreseeable future. For instance, some of the largest hospital systems in US increasingly mirror the gig economy model with staffing apps,<sup>14</sup> and in-house staffing agencies.<sup>15</sup>

Despite the sharp escalation in the use of agency nurses in the US hospital industry, limited research has examined its impact on performance. Beauvais and colleagues have shown that the agency labor may negatively influence hospital quality.<sup>16</sup> In another study, Beauvais et al have examined the organizational and market factors associated with agency labor use in US hospitals.<sup>17</sup> Nursing home research has indicated that the use of agency nurses may be associated with poorer financial outcomes.<sup>18</sup> However, the financial implications of using agency labor have not been previously explored in US hospital settings.

## Purpose of the Study

Examining a national sample of US hospitals, and utilizing recent data for the year 2022, the primary purpose of this study was to investigate the association of agency labor utilization with hospital financial performance. The study findings will contribute to a better understanding of the economic impacts of adopting flexible staffing models in the healthcare industry.

## Conceptual Framework

This study used an integrated perspective based upon tenets from the Resource Dependency Theory (RDT) and Transaction Cost Economics (TCE). RDT asserts that organizational survival is dependent upon their ability to acquire, sustain, and utilize “critical resources”<sup>19</sup> Organizations need these resources to produce goods and deliver services. On the other hand, TCE examines the costs involved in economic exchanges and how they may influence an organization's structure and behavior.<sup>20</sup>

For hospitals, labor is a critical resource required to deliver care. When hospitals rely on external sources such as staffing agencies to meet their labor needs, there can be a misalignment between the interests of the external (agency) staff and the hospital's operational goals. This misalignment can affect hospitals' ability to deliver a consistent quality of care and maintain efficiency. For instance, due to their temporary nature, agency labor may have lower levels of organizational commitment leading to undesirable behaviors like opportunism that could compromise hospital performance.<sup>21</sup> TCE helps explain the transaction costs associated with the use of agency staffing, such as contracting, monitoring, and enforcement expenses. For instance, staffing agencies administrative fee can be as high as 60% significantly increasing the wage rate hospitals pay for agency labor.<sup>3</sup>

Therefore, the combination of these factors—the increased dependency on the external environment for critical resources (labor) and higher transaction costs—may negatively affect hospital financial performance by increasing both

direct and indirect costs. Direct costs may rise due to higher fees and wages paid to agencies and temporary staff.<sup>4,12</sup> Indirect costs may increase as potential decreases in care quality associated with agency labor can lead to longer patient stays, increased complication rates, and subsequent revenue losses from penalties and reduced patient inflows.<sup>16</sup> For instance, the average length of stay (ALOS) increased by 19.2% between 2019 and 2022.<sup>22</sup> These additional inpatient days may not only require additional hospital staff but they may not be reimbursed by healthcare payers, further impacting hospital financial performance.<sup>12</sup>

Based on the preceding discussion, it was hypothesized that,

**Hypothesis:** The utilization of agency labor would be associated with lower financial performance in hospitals.

## Materials and Methods

### Data

Data were obtained from Definitive Healthcare which consolidates information from numerous public access databases pertaining to hospitals in the US, such as the American Hospital Association Annual Survey (hospital profile), Medicare Cost Reports (financial data), the Hospital Value-Based Purchasing Program (quality data), and Hospital Compare (quality data).<sup>23</sup> The original data set consisted of 3876 short-term acute care hospitals. All Federal hospitals, including 172 Veterans Affairs, 26 Indian Health Service, and 31 Military Health System facilities, were excluded from our study sample due to a lack of relevant data elements. An additional 876 facilities were excluded because of significant data missingness. The final data set included 2771 hospital observations (2022) and comprised over 70% of the total active short-term acute care facility population in the US. The year 2022 was specifically chosen as it was the most recent complete year of data.

### Dependent Variables

To evaluate the potential financial impact of agency labor in the short-term acute care hospital setting, attention was focused on three dependent variables related to operating revenues and expenses for the year 2022. Hospital operating revenues/costs are a portion of operating revenues/expenses specifically related to patient care.

The first dependent variable was *net patient revenue* which is the total revenue generated by a healthcare facility from patient services after subtracting any allowances, discounts, and contractual adjustments. It represents the amount of money collected from payors, including private insurance, self-payments, Medicare, and Medicaid.<sup>24</sup>

The second dependent variable is *operating revenue per bed* which represents the cash receipts generated by a hospital through the provision of healthcare services and the subsequent third-party insurance billing process in addition to any receipts from patient co-payments. Conversely, non-operating revenue is anything that comes from outside patient visit revenue. This variable was included to ascertain the relative overall operating revenue for each hospital on an equitable basis as costs are distributed on a per-bed basis. In our opinion, this variable provides a perspective of the relative scale of revenues received via the provision of healthcare services and is automatically scaled for size – making relative analysis and inferences across different size organizations logical and meaningful.

The third dependent variable is *operating expense per bed* which is calculated by dividing hospital operating costs (eg, labor, supplies, etc.) by the number of staffed (vs licensed) beds in the facility. This variable was included to ascertain the relative overall operational costs for each hospital on an equitable basis as costs are distributed on a per-bed basis. This variable provides a perspective of the relative scale of expenses involved with health care delivery and is automatically scaled for size – making relative analysis and inferences across different size organizations logical and meaningful.

### Independent Variable

To address the methodological challenges noted in previous studies regarding the definition and measurement of agency labor,<sup>25</sup> this study employed agency labor cost as a proxy for agency staff. This approach not only enhances precision but also recognizes that while nurses are pivotal to hospital quality, healthcare delivery is a collaborative process where staff members across domains contribute synergistically to the overall performance. Agency labor cost represents the total expenditure on agency labor within the hospital and was extracted from the Definitive dataset.

## Control Variables

Numerous independent variables were included in the study to account for the variation in hospital revenue and costs associated with various individual hospital and hospital market characteristics, including urban or rural location, the average length of stay, academic medical center designation, market concentration (as measured via the Herfindahl–Hirschman Index (HHI), government-operated or not, for-profit hospital or not, Medicaid days of service, Medicare days of service, overall case mix index, the complication/comorbid and major complication/comorbid (CC/MCC) rate, the labor compensation ratio, the level of uncompensated care provided (in millions of dollars), the number of full-time equivalent employees, the Hospital Value Based Purchasing (HVBP) Total Performance Score (2021), and geographic region of the country as defined by the American Hospital Association (AHA) (Regions 1–9).<sup>26</sup> Region 1 (ME, VT, NH, MA, RI, CT) was used as the control group.<sup>27</sup>

## Analysis

Shapiro–Wilke normality tests were performed on the dependent variables and non-normality was observed ( $p < 0.001$ ). In response, the dependent variables were adjusted via min-max scaling and natural log transformation. To aid with ease of interpretation, the independent variables of interest were also natural log transformed to create a log-log model, where  $\log Y_i = \alpha + \beta \log X_i + \varepsilon_i$ . In instances where both the dependent variable and independent variable(s) are log-transformed variables, results may be interpreted as an expected percentage change in  $Y$  when  $X$  increases by some percentage. Such relationships, where both  $Y$  and  $X$  are log-transformed, are commonly referred to as an elasticity in econometrics.<sup>28</sup>

Descriptive statistics and three multivariable linear regressions with listwise deletion were conducted using IBM (International Business Machines) SPSS (Statistical Package for Social Sciences) Statistics package 28. In each of the analyses performed, the association between the studied independent variables and the dependent variable was rejected at an  $\alpha = 0.05$ . Model fit was assessed using adjusted  $R^2$ . The potential for reverse causality prompted us to use older agency labor cost data (2021) to ensure that our two datasets did not fully overlap. This allows for the impact of agency staffing expenses to be realized in the hospital's financial reporting systems. The practice of replacing an explanatory variable with its lagged value to counteract endogeneity is prevalent across a wide variety of disciplines in economics and finance.<sup>29–31</sup> Multicollinearity was evaluated, and all variables maintained a variance inflation factor (VIF) under 5 in all analyses.

## Results

A descriptive analysis of all variables is available in [Table 1](#). Our sample was comprised of 6.2% academic medical centers (SD = 0.24), 25.2% rural hospitals (SD = 0.43), 13.9% government-operated (SD = 0.35), and 22.2% for-profit (SD = 0.42). The hospitals included in the sample compete in markets with a market concentration index of 0.34 (SD = 0.32). The highest percentage of facilities are in the AHA Region 4, which includes the states of Alabama, Florida, Georgia, Mississippi, South Carolina, Tennessee, and Puerto Rico (15.8%; SD = 0.37). On average, our sample hospitals employ 1445 full-time equivalent staff (SD = 2166.44), maintain a 46.36% labor compensation ratio (SD = 17.91%), spend \$25.62 million on uncompensated care (SD = \$53.73), maintain a case mix index of 1.76 (SD = 0.40), experience a CC/MCC rate of 65.6% (SD = 0.12), manage an average length of stay of 4.8 days (SD = 3.10). These hospitals perform with an average HVBP Total Performance Score of 22.12 (SD = 9.12). On average, these facilities' patients are comprised of 8.5% Medicaid (SD = 8.93%) and 27.8% Medicare (SD = 11.26%).

In general, statistically significant relationships were observed in all three of the tested dependent variables but with varied directional consistency related to the agency labor cost independent variable of interest. [Table 2](#) presents the multivariable regression results for analyses.

Our regression findings indicated that agency labor cost was associated with higher levels of net patient revenue ( $R^2 = 78.5\%$ ,  $\beta$ : 0.224, standard error (S.E.): 0.008,  $p < 0.001$ ). Similar findings were observed in the analysis of operating revenue per Bed ( $R^2 = 34.9\%$ ,  $\beta$ : 0.042, S.E.: 0.008,  $p < 0.001$ ) and operating expense per Bed ( $R^2 = 41.1\%$ ,  $\beta$ : 0.032, S.E.: 0.008,  $p < 0.001$ ).

**Table 1** Descriptive Statistics

	Min	Max	Mean	Std Dev
<b>Dependent Variables</b>				
Net Patient Revenue (in millions)	2.819	7691.623	380.715	566.890
Operating Revenue per Bed (in millions)	0.119	109.917	7.439	5.581
Operating Expense per Bed (in millions)	0.165	10.771	1.839	1.126
<b>Independent Variable of Interest</b>				
Agency Labor Cost (in millions)	0.001	498.188	15.048	27.225
<b>Control Variables</b>				
Market Concentration Index (HHI)	0.020	1.000	0.335	0.315
Government Owned	0	1	0.139	0.346
For Profit	0	1	0.222	0.416
Academic Medical Center	0	1	0.062	0.241
Rural Geographic Location	0	1	0.252	0.434
Uncompensated Care (in millions)	0.00	1010.711	25.622	53.734
Average Length of Stay	0.500	148.300	4.822	3.098
Payor Mix: Medicare Days	0.000%	88.700%	27.750%	11.256%
Payor Mix: Medicaid Days	0.000%	87.000%	8.570%	8.928%
Case Mix Index	0.840	5.150	1.763	0.400
CC/MCC Rate	0.000	0.880	0.656	0.117
Labor Compensation Ratio	7.600%	473.100%	46.363%	17.905%
# of Employees	1	32,398	1445.091	2166.439
HVBP Total Performance Score	0.000	81.330	22.117	9.116
Region 1 (CT, ME, MA, NH, RI, VT)	0	1	0.057	0.318
Region 2 (NJ, NY, PA)	0	1	0.120	0.325
Region 3 (DE, KY, MD, NC, VA, WV, DC)	0	1	0.082	0.274
Region 4 (AL, FL, GA, MS, SC, TN, PR)	0	1	0.158	0.365
Region 5 (IL, MI, IN, OH, WI)	0	1	0.151	0.358
Region 6 (IA, KS, MN, MO, NE, ND, SD)	0	1	0.081	0.273
Region 7 (AR, LA, OK, TX)	0	1	0.156	0.363
Region 8 (AZ, CO, ID, MT, NM, UT, WY)	0	1	0.075	0.263
Region 9 (AK, CA, HI, NV, OR, WA)	0	1	0.120	0.325

**Notes:** HHI: Herfindahl-Hirschman Index, HVBP: hospital value-based purchasing, CC/MCC: complication/comorbid and major complication/comorbid.

**Table 2** Multivariable Regression Results Between Agency Labor Cost and Hospital Financial Performance N=2,71)

	Net Patient Revenue (Natural Log)			Operating Revenue per Bed (Natural Log)			Operating Expense per Bed (Natural Log)		
	Adj R <sup>2</sup> = 78.5%			Adj R <sup>2</sup> = 34.9%			Adj R <sup>2</sup> = 41.1%		
	β	S.E.	Sig	β	S.E.	Sig	β	S.E.	Sig
<b>INDEPENDENT VARIABLE</b>									
Agency Labor Cost (in millions) - Natural Log	0.224	0.008	***	0.042	0.008	***	0.032	0.008	***
<b>FACILITY ATTRIBUTES</b>									
Labor Compensation Ratio	-0.012	0.001	***	-0.008	0.001	***	-0.002	0.001	***
Number of Employees	0.001	0.000	***	0.001	0.000	***	0.001	0.000	***
Market Concentration Index (HHI)	0.139	0.040	***	0.055	0.041	-	0.162	0.032	***
Government Operated	-0.076	0.034	*	-0.099	0.035	**	0.032	0.027	-
For Profit Hospital	-0.241	0.030	***	0.122	0.031	***	-0.347	0.024	***
Academic Medical Center	-0.043	0.053	-	-0.042	0.054	-	0.053	0.042	-

(Continued)

Table 2 (Continued).

	Net Patient Revenue (Natural Log)			Operating Revenue per Bed (Natural Log)			Operating Expense per Bed (Natural Log)		
	Adj R <sup>2</sup> = 78.5%			Adj R <sup>2</sup> = 34.9%			Adj R <sup>2</sup> = 41.1%		
	β	S.E.	Sig	β	S.E.	Sig	β	S.E.	Sig
Rural Geographic Classification	-0.435	0.032	***	-0.087	0.033	**	0.027	0.026	-
Uncompensated Care (in millions)	0.002	0.000	***	0.001	0.000	***	0.001	0.000	***
Average Length of Stay	0.006	0.003		-0.027	0.004	***	-0.021	0.003	***
Payor Mix: Percent Medicare Days	-0.005	0.001	***	0.001	0.001	-	0.000	0.001	-
Payor Mix: Percent Medicaid Days	-0.001	0.001	-	-0.014	0.001	***	-0.007	0.001	***
Case Mix Index	0.539	0.034	***	0.319	0.034	***	0.353	0.027	***
CC/MCC Rate	1.575	0.103	***	0.815	0.106	***	-0.266	0.083	***
HVBP Total Performance Score	-0.001	0.001	-	0.005	0.001	***	0.008	0.001	***
Region 2 (NJ, NY, PA)	-0.141	0.055	*	0.029	0.056	-	-0.438	0.044	***
Region 3 (DE, KY, MD, NC, VA, WV, DC)	-0.184	0.060	**	0.095	0.061	-	-0.438	0.048	***
Region 4 (AL, FL, GA, MS, SC, TN, PR)	-0.236	0.055	***	0.256	0.056	***	-0.573	0.044	***
Region 5 (IL, MI, IN, OH, WI)	-0.186	0.054	***	0.135	0.055	*	-0.318	0.043	***
Region 6 (IA, KS, MN, MO, NE, ND, SD)	-0.209	0.059	***	0.106	0.060		-0.340	0.047	***
Region 7 (AR, LA, OK, TX)	-0.437	0.055	***	0.189	0.056	***	-0.464	0.044	***
Region 8 (AZ, CO, ID, MT, NM, UT, WY)	-0.245	0.062	***	0.432	0.063	***	-0.185	0.049	***
Region 9 (AK, CA, HI, NV, OR, WA)	-0.126	0.056	*	0.360	0.057	***	-0.167	0.045	***

Notes: \*p < 0.05; \*\*p < 0.01; \*\*\*p < 0.001, HHI: Herfindahl-Hirschman Index, HVBP: hospital value-based purchasing, CC/MCC: complication/comorbid and major complication/comorbid. Region 1 is the referent region.

## Discussion

The primary purpose of this study was to investigate the association between agency staff utilization and hospital financial performance. It was hypothesized that agency labor would be associated with poorer financial performance. Our results suggest a nuanced influence of agency staff utilization on hospital financial performance.

Agency labor was associated with increased net patient revenue and increased operating revenue per bed. Agency labor may allow hospitals to address immediate staffing gaps without compromising patient care. By maintaining adequate staffing levels, hospitals can continue to admit and treat patients resulting in increased patient revenue. Additionally, the use of temporary staff can allow hospitals to respond to vagaries of patient census without long-term commitment involved in hiring permanent staff. Moreover, they can ensure that critical care areas are adequately staffed, preventing revenue leakages.

On the other hand, agency labor was also associated with higher operating expenses. This is not surprising as agency staff wages are typically higher compared to permanent employees.<sup>12</sup> Staffing agencies also include additional fees for their services, such as administrative fees further increasing hospital agency labor expenses.<sup>32</sup> Furthermore, hospitals incur increased onboarding, training, and monitoring costs on temporary staff. However, these higher costs may be justifiable in the short term as they may allow hospitals to provide uninterrupted patient care.

A comment on the effect size of the study findings would be appropriate here. A one percentage increase in agency labor cost resulted in a 0.224% increase in net patient revenue. While these values may appear small, from a practical standpoint, this means that for every one percentage increase in agency labor cost (~\$150,000 on average based on the mean agency labor cost of \$15.04 million), hospital net patient revenue increased by \$852.8K (mean net patient revenue of \$380.72 million). Similarly, it was observed that for every one percentage increase in agency labor cost, there was a 0.042% increase in operating revenue per bed. Practically, this translates to an increase of \$3124 in operating revenue per bed for every ~\$150,000 in agency labor spending (mean operating revenue per bed of \$7.44 million), while operating expenses increase at a lower rate of \$588. In summary, with every one percentage increase in agency labor cost,

the net operating revenue per bed (operating revenue less operating expense) increased by \$3119. Given the financial struggles hospitals face,<sup>32</sup> these seemingly small effects can have a significant positive impact on their financial stability.

## Operational/Practice Implications

Workforce-related challenges are perhaps the most significant obstacle currently faced by US hospitals.<sup>12</sup> Agency staff will continue to play a significant role in the hospital labor landscape. For instance, the US faces long-term nursing shortages with no immediate remedies on the horizon.<sup>33,34</sup> Hospitals located in remote or other underserved areas may struggle to attract talent. Hence, for the hospital leadership, the elimination of agency staff may be unrealistic, and the goal should be to optimize their utilization by mitigating potential drawbacks.

The positive association between agency labor and patient revenue measures suggests that the strategic use of agency staff can be beneficial. Hospital administrators should use agency labor as a flexible resource to handle varying patient volumes and urgent staff shortages. Furthermore, hospitals can also utilize agency labor to keep critical areas staffed, ensuring that patient care is not affected by staffing exigencies.

However, given the higher costs associated with agency labor, hospital administrators should carefully budget for these expenses. Administrator should consider developing onboarding programs specifically tailored for agency labor and implementing ongoing competency assessment tools and training programs.<sup>35,36</sup> Integrating temporary staff with their lower level of organizational commitment will always remain a challenge but can be mitigated with appropriate strategies and tools.

Prior studies have associated agency staffing with poorer quality outcomes including higher rates of adverse events (hospital-borne infections),<sup>37</sup> bedsores, falls,<sup>38</sup> and higher mortality.<sup>39</sup> Therefore, hospital leaders should be concerned about the potential impact agency staffing might have on downstream profitability as quality decrements are recognized in the marketplace by payers, providers, and patients. Policymakers are emphasizing initiatives such as Value-Based Purchasing (VBP) program to provide a financial incentive for hospitals to deliver high-quality care.<sup>40</sup> Consequently, while the sustained use of agency staff especially at high levels may have adverse financial implications as reimbursement is increasingly linked directly to the quality. In particular, previous research has identified a positive association between the high quality of care in hospitals and their financial performance.<sup>29,41</sup>

The inflated cost of agency labor may inhibit hospitals from investing in their regular employees as it may contribute to burnout and turnover.<sup>42</sup> Administrators should be wary of fueling a vicious cycle where hospitals are forced to rely more on costly agency staff due to staff dissatisfaction. To break this cycle, hospitals should consider and expand measures such as mentoring new hires, providing retention incentives for regular employees, flexible scheduling, and tuition reimbursement programs. Additional supportive measures could include childcare, quiet break rooms, meal tickets for overtime workers, and creating an organizational culture receptive to employee feedback. Providing temporary lodging close to the hospital could incentivize FTE employees to fill urgent and unanticipated hospital staffing gaps.<sup>43</sup> To reiterate, agency labor should not become a convenient substitute for poor staffing practices resulting in an inability to attract and retain talent.

## Limitations and Future Research

This study had several limitations. First, this study analyzed data from a single calendar data year (2022), with lagged independent and control variables (2021) to address endogeneity and reverse causality. Future research using longitudinal data with fixed effects models may provide deeper insights into the relationship between hospital agency staffing and financial performance. It would help control for unobserved heterogeneity, allowing for a more precise estimation of the impact of agency staffing on financial outcomes.

Second, future studies should consider incorporating additional variables such as service mix, patient demographics, and clinical staff composition. Third, researchers should consider conducting qualitative studies to better understand the experiences of both agency and regular staff as well as hospital administrators. Finally, a cross-sectional study cannot establish causality. Nevertheless, as one of the first studies that have examined the relationship between agency staffing hospital financial performance, it provide relevant insights into this important relationship.

## Conclusions

The COVID-19 pandemic has exacerbated existing staffing shortages in US hospitals, leading them to rely on agency labor to meet patient needs. However, agency labor is expensive, and their use raises significant concerns over the potential impact on hospital financial performance. A national sample of hospitals was analyzed to understand the association between agency labor and financial performance. The findings suggested a nuanced influence: while agency labor was associated with increased patient revenues, it also resulted in higher operating costs. It is possible that agency labor may allow hospitals to meet immediate patient needs, with the higher revenues offsetting the additional costs. However, given the potential negative influence on quality, hospital leaders should carefully and strategically use agency labor to balance immediate patient needs with hospital quality and financial performance. Finally, addressing the long-term staffing shortages in the US healthcare industry would require a collaborative approach, and it is hoped that the findings of this study would stimulate these important conversations among policymakers, regulators, and healthcare leaders.

## Institutional Review Board Statement

Prior research of this type has been reviewed by the Texas State University Research Integrity and Compliance (RIC). According to the provisions in 45 CFR § 46.102 pertaining to “human subject” research, the RIC has previously determined studies of this type exclusively involve the examination of data originally collected and created by Definitive Healthcare, which provides data that are anonymous and publicly available. Therefore, the RIC has concluded this type of research does not use human subjects and is not regulated by the provisions in 45 CFR § 46.102, and therefore an IRB review of the study has not been required.

## Data Sharing Statement

Datasets used in this study are available upon reasonable requests from the corresponding author.

## Funding

This research received no external funding.

## Disclosure

The authors declare no conflicts of interest in this work.

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