The Regional Divergence of Contract Staffing in U.S. Nursing Homes: A Longitudinal County-Level Analysis (2022–2024)

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February 3, 2026

Abstract

The COVID-19 pandemic precipitated a significant increase in the use of contract labor in U.S. nursing homes, but the long-term trajectory of this reliance remains poorly understood. This study analyzes Centers for Medicare & Medicaid Services (CMS) Payroll-Based Journal (PBJ) data from 2022 through 2024 to examine county-level trends in contract staffing ratios. Our findings reveal a dramatic regional divergence in staffing recovery. While states like Florida and Georgia demonstrated a "crisis-recovery" model, with contract labor ratios dropping by over 70%, other states like Vermont and North Dakota exhibited "structural dependency," with ratios exceeding 20% and showing little signs of decline. County-level analysis identifies hotspots of persistent reliance that may be particularly vulnerable to proposed federal staffing mandates. These results suggest that the national "agency surge" has bifurcated into a temporary crisis response in some regions and a permanent structural fixture in others, necessitating geographically tailored policy interventions to ensure the stability of the long-term care workforce.

1 Introduction

The nursing home industry has faced an unprecedented workforce crisis in the wake of the COVID-19 pandemic. A critical component of this crisis has been the dramatic increase in the utilization of contract staffing agencies to fill vacancies in direct care nursing positions. While the use of agency labor was historically a temporary solution for short-term staffing gaps, recent literature has characterized it as a widespread and potentially permanent shift in the nursing home labor market [1].

Contract staffing, while providing necessary labor to meet minimum regulatory requirements, presents significant challenges for both facility stability and resident care quality. Agency labor is associated with substantially higher costs, which can strain facility finances and divert resources from permanent staff retention [2]. Furthermore, the lack of continuity associated with transient agency staff has been linked to potential declines in the quality of care and resident outcomes [3].

As the federal Public Health Emergency (PHE) concluded in early 2023, there were expectations that the reliance on agency labor might normalize. However, recent evidence suggests that the trajectory of recovery is not uniform across the United States. While some regions appear to be returning to pre-pandemic staffing models, others seem to be hardening their dependency on contract labor [4].

This study aims to clarify these trends by performing a high-resolution, county-level analysis of contract staffing ratios from 2022 through 2024. By moving beyond national and state-level averages, we identify the specific geographic areas where contract labor has transitioned from a crisis response to a structural dependency. Our analysis provides critical context for current policy debates regarding federal staffing mandates and the financial sustainability of the long-term care sector.

2 Methods

2.1 Data Source

We utilized daily, facility-level staffing records from the CMS Payroll-Based Journal (PBJ) system for the period between January 1, 2022, and December 31, 2024. The PBJ system captures auditable data on the hours worked by various categories of nursing staff, including Registered Nurses (RNs), Licensed Practical Nurses (LPNs), and Certified Nursing Assistants (CNAs), distinguishing between facility-employed and contract staff.

2.2 Variables and Human-Readable Labels

In accordance with reporting standards for Payroll-Based Journal research, we mapped raw PBJ variables to human-readable labels for all analyses and presentation. The primary outcome variable is the **Contract Labor Ratio**, defined as the proportion of total direct care nursing hours (RN, LPN, and CNA) provided by contract personnel. Specifically:

- **Registered Nurse Hours**: Sum of RN hours per resident day.

- **Licensed Practical Nurse Hours**: Sum of LPN hours per resident day.
- **Certified Nursing Assistant Hours**: Sum of CNA hours per resident day.
- **Daily Resident Census**: The reported count of residents in the facility on a given day.

2.3 Data Cleaning and Aggregation

The aggregation from daily facility records to annual county-level means followed a rigorous three-step process:

1. **Quarterly Cleaning**: Daily records were aggregated to calendar quarters. Facilities were flagged for exclusion if they met CMS "aberrant staffing" criteria, such as reporting zero total nursing hours or exceeding 12 total nursing hours per resident day.
2. **Annual Facility Level**: Quarterly averages were calculated for each facility. To ensure representativeness and reduce seasonal bias, facilities were required to have at least three valid quarters of data to be included in the annual facility average.
3. **County Aggregation**: Annual facility-level metrics were aggregated to the county level using arithmetic means.

2.4 Outlier Screening

To ensure the robustness of the trend analysis, we applied a strict outlier removal protocol. Facility-year observations were excluded if their Contract Labor Ratio or Total Nursing Hours per Resident Day yielded a Z-score absolute value greater than 4 ($|z| > 4$). This threshold was selected to remove extreme data anomalies (e.g., reporting errors or extreme idiosyncratic events) while preserving the natural variance inherent in the national nursing home market. As summarized in the results, this led to the removal of 399 facility-year observations.

2.5 Statistical Analysis

We employed descriptive statistics to characterize the distribution of contract ratios by year and region. Longitudinal trends were assessed by calculating the absolute and percentage changes in contract ratios between the 2022 baseline and the 2024 end-of-period. We categorized states and counties into "recovery" or "dependency" models based on the direction and magnitude of these changes.

2.6 STROBE Flow Diagram

The study population flow and exclusion steps are documented in Figure 1, following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

3 Results

3.1 Sample Characteristics and Data Flow

Our initial dataset comprised over 16 million daily staffing observations from across the United States. Following the application of inclusion criteria and outlier screening, the final analytic sample consisted of 11,299 county-year observations. The exclusion process is detailed in the STROBE flow diagram (Figure 1).

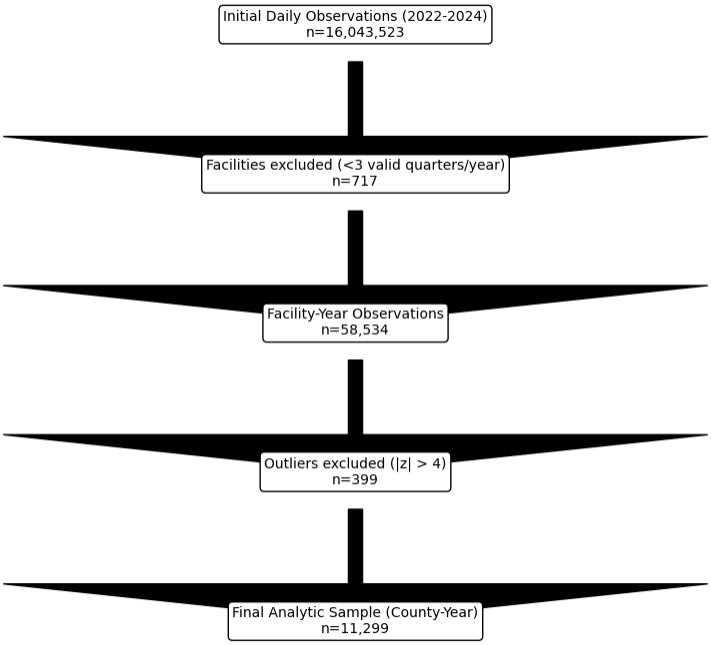

Figure 1: STROBE Flow Diagram illustrating the exclusion criteria and final analytic sample of nursing home facilities and counties.

3.2 National and Regional Trends

The national landscape of contract staffing reliance is characterized by extreme geographic heterogeneity. Figure 2 shows the mean contract ratio by state in 2024. Table 1 provides the annual breakdown for all 50 states and the District of Columbia.

Analysis of regional trends (Figure 3) reveals that the South and parts of the Midwest have seen the most consistent declines in contract labor reliance since 2022. In contrast, the Northeast and West regions exhibit more varied trajectories, with certain states maintaining high levels of dependency.

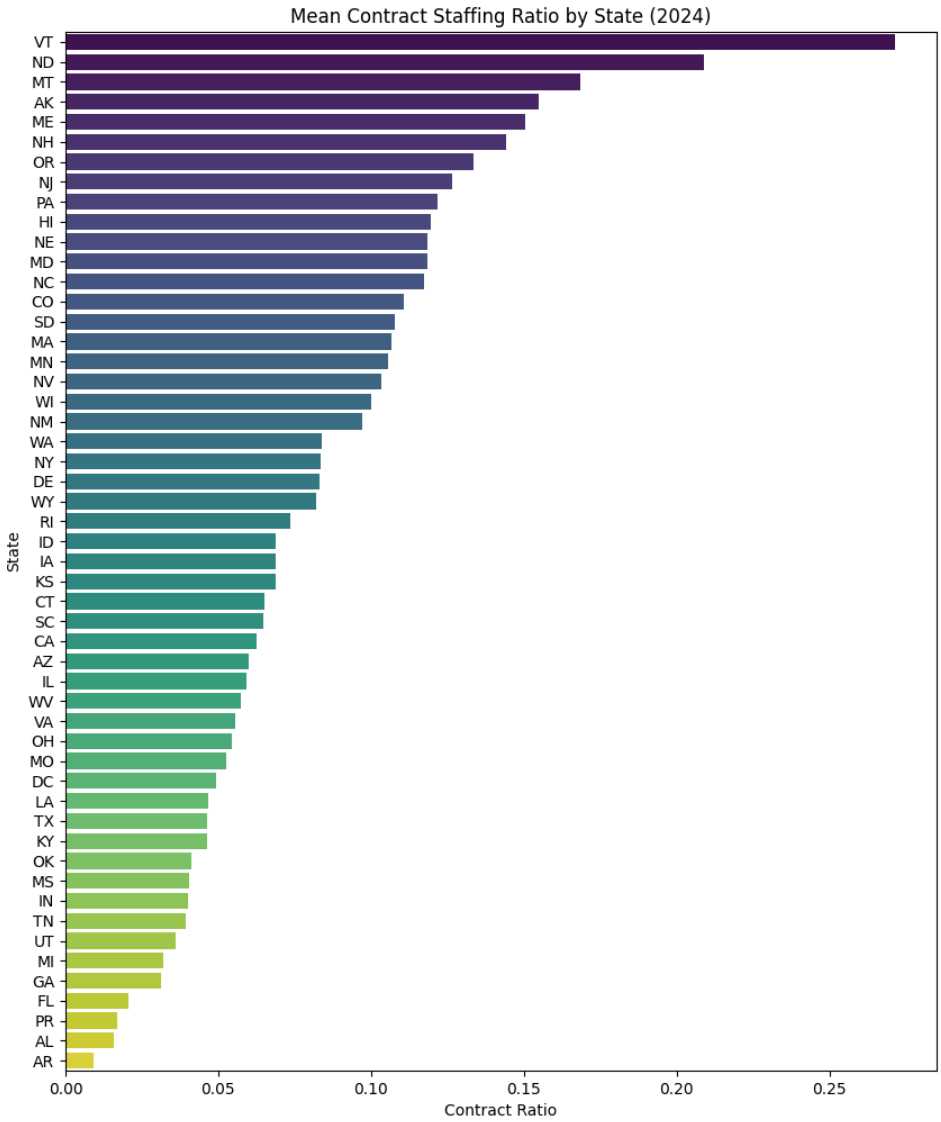

Figure 2: Mean Contract Labor Ratio by State in 2024. Darker regions indicate higher reliance on agency staffing.

Table 1: Mean Contract Ratio by State and Year

Year State	2022	2023	2024
AK	0.179873	0.143215	0.154851
AL	0.031494	0.019464	0.015877
AR	0.019804	0.010995	0.009241
AZ	0.079698	0.078522	0.060027
CA	0.068960	0.068974	0.062578
CO	0.133040	0.125614	0.110732
CT	0.072960	0.080966	0.064989
DC	0.048295	0.073875	0.049419
DE	0.116047	0.129839	0.083184
FL	0.094027	0.053713	0.020684
GA	0.095814	0.076951	0.031396
HI	0.042400	0.079273	0.119418
IA	0.129053	0.092690	0.068786
ID	0.058441	0.051409	0.068824
IL	0.079634	0.061630	0.059052
IN	0.082570	0.062912	0.040243
KS	0.109936	0.086647	0.068638
KY	0.080754	0.063302	0.046248
LA	0.068280	0.060734	0.046712
MA	0.125809	0.177981	0.106586
MD	0.182540	0.177459	0.118523
ME	0.160658	0.186842	0.150510
MI	0.050230	0.043826	0.032187
MN	0.076622	0.100689	0.105627
MO	0.076044	0.067449	0.052726
MS	0.096112	0.067019	0.040599
MT	0.204725	0.174796	0.168461
NC	0.165448	0.150696	0.117305
ND	0.207162	0.211858	0.209080
NE	0.133792	0.123880	0.118564
NH	0.126762	0.165170	0.144274
NJ	0.133773	0.147918	0.126459
NM	0.146047	0.096042	0.097300
NV	0.094251	0.108794	0.103266
NY	0.131125	0.130465	0.083577
OH	0.083995	0.071478	0.054616
OK	0.050860	0.041805	0.041136
OR	0.159210	0.137276	0.133676
PA	0.142811	0.152470	0.121737
PR	0.005421	0.010337	0.016849
RI	0.088640	0.095602	0.073584
SC	0.097885	0.071412	0.064760
SD	0.093378	0.091275	0.107881
TN	0.072243	0.055291	0.039450
TX	0.076925	0.057001	0.046335
UT	0.091004	0.060594	0.035992

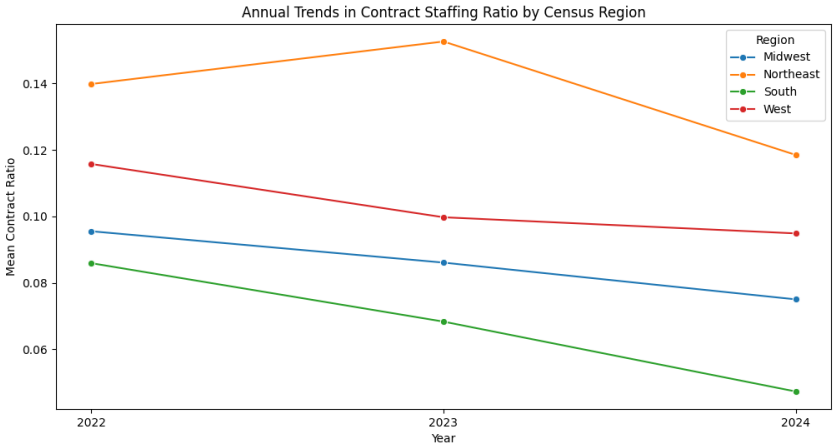

Figure 3: Annual trends in mean contract labor ratios by U.S. Census Region (2022–2024).

3.3 Divergence: Crisis-Recovery vs. Structural Dependency

A primary finding of this study is the significant divergence between states that have successfully reduced their reliance on agency labor and those where it has become structural.

States such as Florida and Georgia exemplify the "crisis-recovery" model. As shown in Figure 5, Florida's mean contract ratio dropped from 9.4% in 2022 to 2.1% in 2024. Georgia saw a similar reduction from 9.6% to 3.1%. These dramatic shifts suggest that in these labor markets, the spike in agency use during the pandemic was a temporary phenomenon that has since been largely corrected.

Conversely, states like Vermont and North Dakota exhibit "structural dependency." Vermont's contract ratio rose from 24.2% in 2022 to 27.1% in 2024, the highest in the nation. North Dakota maintained a high and stable ratio above 20% throughout the study period.

3.4 County-Level Hotspots

County-level analysis further highlights the hyper-local nature of these trends. Figure 6 demonstrates the relationship between 2022 and 2024 contract ratios at the county level, illustrating both the general downward trend and the significant number of "outlier" counties with persistent or increasing dependency.

Tables 2 and 3 list the top 20 counties with the greatest improvements and declines (increases in dependency), respectively. The counties with the greatest increases are predominantly located in rural regions of the Northeast and Midwest, reinforcing the findings of previous studies regarding rural labor market vulnerabilities [5, 6].

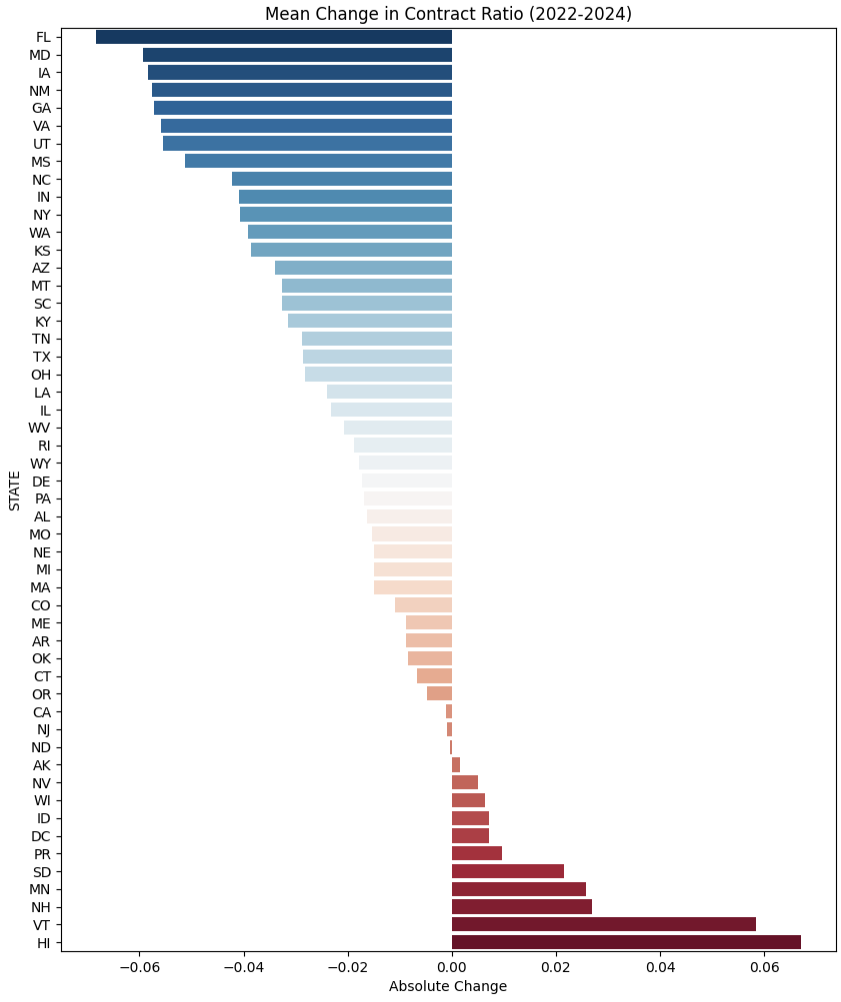

Figure 4: Percentage change in contract labor ratios by state from 2022 to 2024.

Figure 5: States with the greatest absolute reductions in contract staffing ratios (2022–2024).

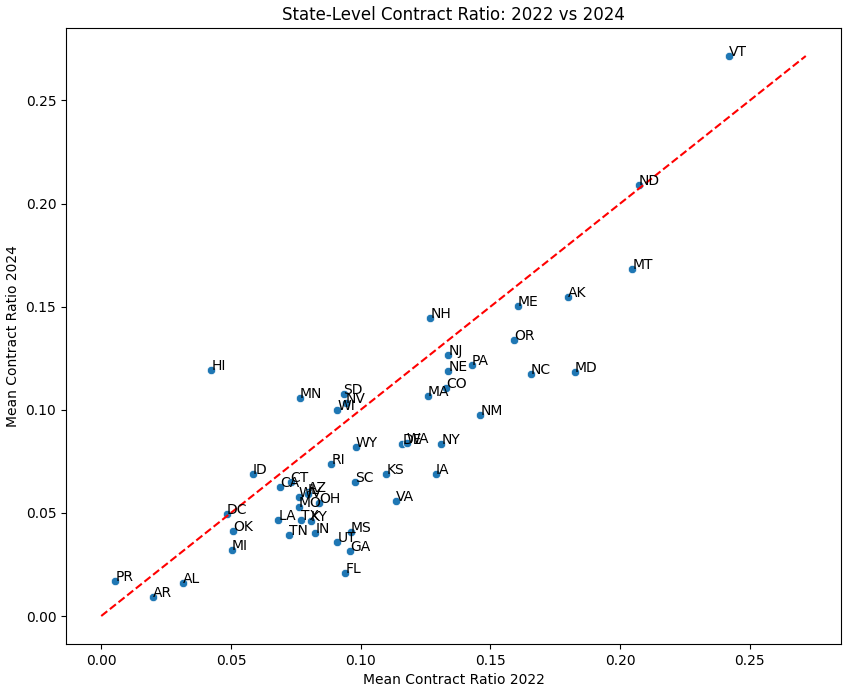

Figure 6: County-level scatter plot comparing 2022 contract ratios with 2024 ratios. The diagonal line represents no change.

Table 2: Top 20 Counties with Greatest Reduction in Contract Ratio

State	Year County FIPS	2022	2023	2024	Absolute Change	Percentage Change
MD	11	0.542161	0.320862	0.000000	-0.542161	-100.000000
NM	28	0.540002	0.141053	0.000000	-0.540002	-100.000000
NC	117	0.541939	0.162851	0.013862	-0.528077	-97.442179
UT	51	0.537642	0.380250	0.068034	-0.469608	-87.345903
KY	75	0.440198	0.120480	0.000000	-0.440198	-100.000000
GA	81	0.452376	0.292792	0.047752	-0.404625	-89.444252
NE	69	0.453072	0.263643	0.053457	-0.399615	-88.201157
ND	49	0.575264	0.384079	0.179605	-0.395659	-68.778702
NC	73	0.517638	0.172952	0.134215	-0.383423	-74.071600
NM	41	0.376448	0.059608	0.000000	-0.376448	-100.000000
	51	0.374304	0.058657	0.000906	-0.373398	-99.758066
NC	79	0.364768	0.208255	0.000000	-0.364768	-100.000000
VA	37	0.345949	0.013429	0.000000	-0.345949	-100.000000
MS	93	0.504182	0.238750	0.171404	-0.332777	-66.003432
TX	51	0.360878	0.187670	0.028468	-0.332410	-92.111353
NE	61	0.330741	0.097829	0.000000	-0.330741	-100.000000
MS	107	0.354377	0.110787	0.024540	-0.329838	-93.075232
KS	165	0.327905	0.111963	0.000000	-0.327905	-100.000000
KY	163	0.325340	0.000000	0.000000	-0.325340	-100.000000
GA	157	0.353547	0.116703	0.030634	-0.322913	-91.335241

Table 3: Top 20 Counties with Greatest Increase in Contract Ratio

State	Year County FIPS	2022	2023	2024	Absolute Change	Percentage Change
SD	105	0.054002	0.375076	0.508961	0.454958	842.476852
NC	9	0.180834	0.252381	0.554898	0.374064	206.855315
NE	181	0.095215	0.139189	0.466591	0.371376	390.041022
ND	81	0.060873	0.240382	0.430245	0.369372	606.790247
VT	15	0.043091	0.259295	0.400062	0.356971	828.409202
ND	47	0.107035	0.246254	0.453876	0.346841	324.043219
NE	99	0.000000	0.250746	0.328476	0.328476	NaN
CO	14	0.094709	0.401505	0.417878	0.323168	341.220359
MO	181	0.000000	0.164850	0.321252	0.321252	NaN
MT	1	0.173222	0.143385	0.493043	0.319821	184.630806
CO	115	0.000000	0.205741	0.303598	0.303598	NaN
SD	47	0.000000	0.118218	0.300784	0.300784	NaN
MT	57	0.032873	0.200553	0.331236	0.298363	907.610277
NC	55	0.019359	0.215294	0.315074	0.295716	1527.561543
GA	227	0.000000	0.000000	0.287936	0.287936	NaN
KS	109	0.191230	0.363608	0.475418	0.284188	148.610549
ME	7	0.030486	0.308789	0.304620	0.274134	899.226318
TX	263	0.023974	0.142851	0.296786	0.272812	1137.968845
	389	0.122449	0.130874	0.389745	0.267295	218.290701
KY	17	0.239687	0.584088	0.505671	0.265985	110.971765

4 Discussion

4.1 Synthesis of Findings

The results of this longitudinal analysis challenge the notion of a universal post-pandemic "recovery" in nursing home staffing. While national averages might suggest a moderate decline in agency reliance, this masks a fundamental bifurcation in the industry. We identified two distinct models: a "crisis-recovery" model prevalent in the South and parts of the Midwest, and a "structural dependency" model concentrated in the Northeast and rural Mountain states.

The dramatic recovery observed in states like Florida and Georgia (dropping from 9.5% to $<$3.5%) provides the first large-scale empirical evidence that the "agency surge" is reversible. This recovery likely reflects a combination of improved local labor market conditions, facility-level management initiatives, and potentially, state-specific policy interventions or regulatory changes that disincentivized high-cost agency labor. Future research should investigate the specific drivers of success in these "recovery" states.

In contrast, the persistence of ratios above 20% in Vermont and North Dakota confirms the hypothesis that contract labor has become a structural fixture for a significant segment of the industry [4]. Facilities in these high-dependency regions are often rural and face unique recruitment and retention hurdles that may force a permanent reliance on expensive agency staff to meet even baseline safety requirements [5].

4.2 Policy Implications

These geographic disparities have profound implications for national nursing home policy, particularly regarding the implementation of federal staffing mandates. A "one-size-fits-all" mandate may be achievable and even beneficial in states like Florida and Georgia, where the workforce has stabilized. However, the same mandate could prove financially catastrophic for facilities in Vermont or North Dakota, where nearly one-third of nursing hours are sourced through high-premium agencies.

The financial burden of persistent agency reliance creates a "quality trap." Facilities in high-dependency regions must dedicate a disproportionate share of their budget to temporary labor, leaving fewer resources for permanent staff wages, benefits, and capital improvements [2]. This cycle of instability poses a long-term risk to resident care continuity and facility viability.

4.3 Limitations

While this study utilizes the most current and comprehensive staffing data available, several limitations should be noted. First, PBJ data records the quantity of contract labor but does not provide the specific costs or premiums paid to agencies. Second, our analysis is descriptive and does not definitively establish the causal factors driving the observed regional differences. Third, the county-level aggregation, while more granular than state-level data, may still mask facility-level variation within counties.

4.4 Conclusions

The U.S. nursing home staffing market is undergoing a period of significant regional divergence. The transition from crisis to recovery is well underway in many parts of the country, yet a hardening dependency on contract labor persists in others. Policy makers must account for these geographic realities when designing staffing regulations and financial support programs. Ensuring a stable and sustainable long-term care workforce will require move than broad mandates; it will require targeted efforts to address the structural labor market failures that continue to plague high-dependency regions.

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