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Assessing Medicaid Payment Rates and Costs of Caring for the Medicaid Population Residing in Nursing Homes

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by
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Office of the Assistant Secretary for Planning and Evaluation

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ASSESSING MEDICAID PAYMENT RATES AND COSTS OF CARING FOR THE MEDICAID POPULATION RESIDING IN NURSING HOMES: FINAL REPORT

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EXECUTIVE SUMMARY

The purpose of this research was to understand the relationship between state Medicaid payment rates to nursing homes and those facilities' costs of providing care to Medicaid residents. Using Medicaid payment data collected from individual states and Medicare Cost Reports for freestanding nursing homes in 44 states, we calculated the national average and median per diem Medicaid payment rates, per diem costs of caring for the Medicaid population, and the Medicaid payment-to-cost ratios. We also analyzed data for the nation as a whole, by nursing home characteristics, and by state Medicaid payment policies, to gain insight into factors that affect the differences between payments and costs.

Using data for the latest pre-pandemic period (2019), we found that Medicaid payment rates for the average or median nursing home covered about 82 cents per every dollar of costs that nursing homes reported incurring in caring for Medicaid residents. For approximately 40% of nursing homes, Medicaid per diem payments covered 80% or less of their estimated per diem Medicaid costs. The majority, or 52% of nursing homes, had 80-100% of their Medicaid per diem costs covered; and the remaining 8% of nursing homes had Medicaid payments exceeding their Medicaid per diem costs. Not-for-profit nursing homes had the lowest Medicaid payment-to-cost ratio compared to for-profits and government-owned nursing homes. Nursing homes with total nursing staff levels below 3.00 hours per resident day (HPRD) had the highest average Medicaid payment-to-cost ratio of 0.85, whereas nursing homes with nursing staff levels above 4.0 HPRD had the lowest average Medicaid payment-to-cost ratio at 0.77. For comparison, we also found that the mean and median *all-payer* payment-to-cost ratios were nearly 1, suggesting that per diem payments from *all-payer* sources (including Medicare, Medicaid, and other payers) were approximately equal to reported per diem *all-payer* total reimbursable costs.

This study did not address the adequacy of the Medicaid payment, the accuracy and completeness of the data in the Medicare Cost Reports, or whether nursing homes were operating efficiently or were adequately staffed based on the acuity of their residents. Nonetheless, this study does provide additional data on state Medicaid payment rates and costs that can be useful in current discussions assessing potential Medicaid payment policy reforms. Findings from this study can also be used to examine the impact of potential changes in Medicaid payment policy on the financial performance of nursing homes at the state and facility-level.

BACKGROUND

Prior to the COVID-19 pandemic, an estimated 1.37 million Americans were using one of the nation's 15,000+ nursing homes.[1] Nursing homes provide a broad range of services to mostly older Americans who need personal, custodial, and medical care. Nursing homes are regulated at the state and federal levels as either "nursing facilities" or "skilled nursing facilities." Historically, "nursing facilities" provided long-term services and supports to residents that need around the clock care, while "skilled nursing facilities" provided short-term post-acute and rehabilitative services generally after an acute stay at the hospital. Today, the vast majority of nursing homes provide care for both long-term care residents and short-term post-acute and rehabilitative patients.

Medicaid is a public insurance program financed with a combination of federal and state funding that is designed to provide health care to eligible individuals who have limited financial resources. Medicaid is the primary and largest single payer for care provided in nursing homes, covering the cost of care for approximately two-thirds of nursing home residents.[1] Many of the residents whose nursing home care is paid for by Medicaid are long-stay residents who often require custodial-type care due to cognitive or physical impairments that must be provided on a long-term basis. All state Medicaid programs must cover such residents, but Medicaid rules give significant flexibility to states. Many Medicaid policies, including how much nursing homes are paid by the program, are determined at the state level. Medicaid coverage of nursing home care is a significant expenditure for states. Overall, Medicaid spending is the second largest state expenditure (27.6% in fiscal year 2022), second only to elementary and secondary school education (National Association of State Budget Officers, 2022), and more than one-third of Medicaid spending is allocated to long-term care provided in nursing homes and in home and community-based settings.[2]

Medicaid payment rates vary widely across states. The Medicaid and CHIP Payment and Access Commission (MACPAC) has documented in detail each state's Medicaid fee-for-service (FFS) nursing home payment policies, summarizing how each state sets their payment rates and adjustments.[3] Medicaid payment systems are regulated at the federal level (federal regulations at 42 CFR 447.204, implementing §1902(a)(30)(A) of the Social Security Act), and require payments to be "consistent with efficiency, economy, and quality of care and sufficient to enlist enough providers so that the services are available to beneficiaries at least to the extent that those services are available to the general population."[4] There is also a requirement (42 CFR 447.272) which limits Medicaid payments to either the cost or a reasonable estimate of the amount that Medicare would pay for the same services. States have flexibility in how they design Medicaid payment systems and states design nursing home Medicaid payment systems to achieve desired policy objectives related to nursing home costs and quality, access to care, payment equity, service capacity, and budgetary control.[5] Setting Medicaid payment rates too high can lead to excess profits at the expense of taxpayers, and potentially create financial incentives that divert funds away from resident care. At the same time, nursing homes need financial resources to pay nursing staff and invest in other quality improvement efforts to assure proper care. The resulting Medicaid payment methodologies are enormously complex, which makes it challenging to determine the extent to which they achieve the objectives, but there is some evidence that suggests that the incentives built into state Medicaid payment systems, such as wage pass-throughs and pay-for-performance initiatives, can further desired outcomes.[6-9]

The nursing home industry and consumer advocacy groups pay close attention to these Medicaid payment systems and their resulting payment rates. The industry claims that nursing home costs are not fully covered by their Medicaid payments[10,11] and that this affects the amount of financial resources available to invest in staffing and in quality improvement efforts. In contrast, consumer advocacy groups argue that nursing homes are already adequately paid,[12] but profit incentives can potentially divert funds away from resident care instead of paying for nursing staff and other direct care services.[13] Regardless, Medicaid payment rates are important determinants of nursing home quality, as past work has found that nursing homes that saw cuts in

their Medicaid payment rates reduced staffing levels.[14] However, it is unclear whether this result is due to nursing homes attempting to maintain the same level of profitability or due to the lack of financial resources to pay for nursing staff.

Nursing homes incur operating expenses from labor, rent, food, supplies, drugs, equipment, insurance, administration, and other overhead. Until recently, there has been limited research examining the relationship between Medicaid payment rates and the costs of caring for Medicaid nursing home residents. Such information is essential to support discussion of policy reforms that aim to improve the safety and quality of nursing home care in the wake of the pandemic. A recent study by MACPAC found that the median Medicaid payment rate was 86% of reported nursing home costs in 2019.[15] For this study, we used different and more granular data sources and methods. The work we present in this report supplements this knowledge.

The purpose of this research was to have a more comprehensive understanding of state Medicaid payment rates and nursing homes' costs of caring for their Medicaid residents by addressing the following research questions:

1. What is the average per diem cost of caring for the Medicaid population residing in nursing homes, by state and provider characteristics?
2. What is the average per diem Medicaid reimbursement rate to nursing homes, by state and provider characteristics?
3. What are the key determinants of average cost and payment variation across each state?
4. How do Medicaid payments compare to the reported costs and to what extent?

We report the results of our analyses of freestanding nursing homes in the United States, including the national average and median per diem Medicaid payment rates, per diem cost of caring for the Medicaid population, and the Medicaid payment-to-cost ratios. We also report on the distribution of these outcomes for the nation as a whole, by nursing home characteristics, and by state Medicaid payment policies, and discuss the implications of these findings.

METHODS

Sample

Our study population targeted freestanding nursing homes in the 50 states in 2019. The study period was chosen by identifying the most recent Medicare Cost Report for all nursing homes with a fiscal year end date between July 2018 and June 2019. The selection of this time period provides the most recent data that represent the typical operating environment, avoiding the distortions in payment and costs caused by the COVID-19 pandemic, which was associated with many nursing homes reporting staffing shortages,[16,17] and additional state payments (through stimulus or public health emergency funds), which temporarily increased Medicaid payment rates. Based on Nursing Home Compare Archive data for June of 2019, there were 14,258 freestanding nursing homes in the 50 states (excluding the District of Columbia) that were certified for Medicaid (see ***Table 1***).

We sought to obtain Medicaid payment information from all 50 states. Not all states responded to repeated requests, and some did not provide information that could be used to calculate a Medicaid payment rate that would be comparable to other states. After excluding Alaska as an outlier for having high costs and few freestanding nursing homes, we were able to obtain usable Medicaid payment data for 44 states. Based on Nursing Home Compare Archive data, our potential sample of nursing homes for which we had both payment and cost information was 13,285 nursing homes, representing 93% of all freestanding nursing homes in 2019.

Table 1: Sample Development and Final Study Population

Population Characteristics	Number	%
Estimated national number of freestanding nursing homes	14,258	N/A
Estimated number of freestanding nursing homes from states from which we have collected Medicaid payment rates	13,285	100%
Number of nursing homes with full-year Medicare Cost Reports	12,098	91.1%
Number of nursing homes with matched Medicare Cost Report and Medicaid payment rates	11,126	83.7%
Excluding nursing homes with non-nursing home beds	10,081	75.9%
Sample after eliminating outliers	9,543	71.8%

Using Medicare Cost Reports for these 44 states, we created an analytic sample that reflected Medicaid payment and reported costs under normal nursing home operations. First, similar to other work examining nursing home costs,[18] we restricted the sample to nursing homes with full-year cost reports that could also be merged with other data sources. This restricted the sample to nursing homes that were in continuous operation with the same owner. Second, some states provided alternative identification numbers or only facility names, which limited our ability to link cost reports with payment data. Third, cost reports allow nursing homes to include information on home health agencies, hospice, and other long-term care settings. To assure Medicaid costs were not inflated by these non-nursing home expenditures, we limited our sample to nursing homes that only reported having nursing home beds.[a] Sensitivity analyses presented in ***Appendix 2*** found that including nursing homes with other services had little impact on the findings. Finally, the financial information in the Medicare Cost Reports contain obvious outliers, such as having Medicaid costs of over $5,000 per day. To account for outliers, we excluded nursing homes in the 2.5% tails of Medicaid costs. These exclusions resulted in a final analytic sample for the main analysis of 9,543 nursing homes (***Table 1***). That

[a] Nursing homes with other components were identified using Worksheet S-3, Part I, rows 3-7 on the CMS-2540-10.

sample represents 67% of all freestanding nursing homes in the United States and 79% of freestanding nursing homes with full-year Medicare Cost Reports in the 44 states analyzed.

Data Sources

Medicaid Payment Data

There is no central repository of Medicaid nursing home payment rates for all states and nursing homes. We sought to access facility-level Medicaid payment rate data from all 50 states. To standardize rates across states, we focused on obtaining the statutory Medicaid payment rates. The statutory Medicaid payment rate is the amount the nursing home is entitled to receive as payment either from the Medicaid beneficiary's income/assets or the state for routine nursing home services. It does not include any additional payments to the nursing home from Medicaid or the beneficiary for additional Medicaid-covered services.

The source of Medicaid payment rates varied by state. For some states, we were able to obtain data from public websites. For other states, we received the necessary data by requesting it from the relevant state agency. We obtained usable data from 44 of the 50 states.

Medicaid Cost Data

We calculated Medicaid per diem operating costs using data from the Medicare Cost Reports. The financial information necessary to calculate Medicaid costs are available from either Medicaid Cost Reports or Medicare Cost Reports. We used the Medicare Cost Reports because the data are uniform across the states and are more consistent, accurate, and complete for cross-state comparisons. The information in Medicare Cost Reports includes financial data (e.g., operating expenses, expenses by cost center) and other information on nursing home structural characteristics, census, and staffing levels. The Medicare Cost Reports enable direct comparison of financial information across individual nursing homes across all states.

A limitation of the Medicare Cost Reports is that they only collect data on freestanding nursing homes that are certified by Medicare; they lack information on nursing homes that are certified by Medicaid but not Medicare. Most nursing homes are dually certified to participate in the Medicare and Medicaid programs; only about 2% of nursing homes that are certified for Medicaid are not certified for Medicare.[19] Therefore, Medicare Cost Reports provide financial information for the vast majority (98%) of Medicaid-certified freestanding nursing homes and offer the best resource available to calculate Medicaid per diem costs on a national basis.

Nursing Home Characteristics and State Payment Methods

In addition to information about nursing home costs, the Medicare Cost Reports provided information about facility-level characteristics, including ownership status (i.e., for-profit, not-for-profit, government-owned),[b] chain affiliation, number of beds, occupancy rate, Medicaid payer mix (i.e., proportion of Medicaid to all resident days), and whether the nursing home was located in a rural or urban area.

Other nursing home characteristics, including whether the nursing home was part of a continuing care retirement community (CCRC) or had a dedicated memory care or other special care unit (SCU), were obtained from the Certification and Survey Provider Enhanced Reports (CASPER) dataset. Total nursing staff levels were calculated from the Payroll-Based Journal (PBJ) data and were used to calculate the average total nursing staff

[b] Medicare Cost Reports require nursing homes to report "the type of ownership or auspices which the SNF [i.e., nursing home] is conducted." This includes thirteen different types of not-for-profit, for-profit, and government ownership structures. Following the academic literature, we categorized nursing homes into the broad ownership structures of for-profit, not-for-profit, and government ownership.[16]

hours per resident per day. Total nursing staff includes registered nurses, licensed practical nurses, and nursing assistants. Nursing home quality was measured using the overall five-star rating from CMS's Five-Star Quality Rating System,[20] obtained from the Nursing Home Compare Archive data. Because overall five-star ratings change over time, we used the star rating reported for the last month in the cost reporting period.

Finally, data on state payment methodologies were drawn from MACPAC's characterization of each state's FFS nursing home payment policies.[3] Particular payment system characteristics we examined included the basis of payment (i.e., cost-based, price-based, or a combination thereof); rebasing frequency (i.e., how often states update their payment rates) to reflect prevailing costs of care; and states' use of adjustments and supplemental payments to nursing homes.[c]

Data Variable Construction

We followed a set of guiding principles when constructing the analytic variables of per diem Medicaid payment rates and costs. First, all information had to be consistently collected, and we used only information that was found to be reliable. Second, payment and cost information had to be able to be matched to each nursing home and be comparable across nursing homes and states. Third, payment and cost information had to be able to be linked to facility-specific information on nursing home characteristics, staffing levels, and quality.

Per Diem Medicaid Payment Rates

Medicaid payment rates contain a base payment and two potential additional payments: (1) add-on payments that adjust the per diem payment rate; and (2) lump sum payments, sometimes referred to as supplemental payments. Add-on adjustments include the additional amounts applied to the per diem Medicaid payment rate for provider taxes, pay-for-performance incentives, and to select government nursing homes, when provided. Supplemental payments typically include those paid to government providers (the largest source of supplemental payments). We made best efforts to capture the statutory Medicaid payment rate that includes the base payment and add-on payments for residents who do not have special needs.[d] We conducted sensitivity analyses to assess the potential effects of excluding supplemental payments for government nursing homes on the findings and found little impact (see ***Appendix 2***).

We constructed per diem Medicaid rates in three ways, depending on the data available and state payment methods. Most states set a single payment rate that is applied to all residents within each nursing home for a period of time. For these states, we utilized the relevant Medicaid payment rate effective at the time. Nebraska and Texas used resident-specific rates, meaning there was more than one rate that could be utilized per nursing home. For Nebraska and Texas, we obtained the number of residents for each nursing home that were associated with each resident-specific rate and calculated a weighted average of resident-specific rates for those nursing homes. For any state in which neither of the first two approaches could be used, we obtained information on total Medicaid revenues and Medicaid paid resident days to calculate the average Medicaid

[c] In determining the basis of payment, base rates may be cost-based, price-based, or some combination thereof. Cost-based systems draw from nursing home cost reports to pay nursing homes for *their* actual costs per day up to a specified ceiling. Price-based systems use cost reports to establish prospective payment rates, often called prices, that are calculated from the distribution of the cost of care *for a group* of nursing homes in the state. For example, a state may set payment rates in a price-based system equal to the median cost of care for nursing homes in a particular geographic area. The Medicaid payment rate established under both cost-based and price-based systems need to be updated to reflect prevailing cost of care. This process of updating costs is called rebasing, and states differ regarding the frequency in which cost reports are used to update base rates (e.g., annually, 2-4 years). These costs are generally obtained from state-specific Medicaid Costs Reports, for which states may perform audits and reviews.

[d] Some states have add-on payments to the statutory Medicaid payment rate for residents on ventilators, mental health conditions, or have other high need conditions such as AIDS. These add-on payments were not included unless the state used a resident-specific payment model based (e.g., Texas) or we used total Medicaid revenues to calculate the Medicaid payment rate.

payment per diem. ***Table 2*** shows the number of states that used each of these approaches and the number of states from which usable information was not obtainable.

Using these data, the Medicaid payment rates were available either on an annual, semi-annual, quarterly, or other point-in-time basis. Because states have different reporting periods and fiscal years, we collected payment rate information from 2017 through 2019 and calculated the average Medicaid payment rate that was specific to each nursing home's **reporting period** in the Medicare Cost Reports.[e] If there was not a Medicaid payment rate or series of payment rates that matched the entire 12-month reporting period for the cost report, we excluded the observation from the analysis.

Table 2: Distribution of States by Method of Acquiring Medicaid Payment Rate Information

Approach to Acquiring Medicaid Payment Rates	Number of States
Single rate applied to all residents within nursing home (AL, AR, CA, CO, CT, FL, GA, HI, IA, ID, IL, IN, KS, KY, LA, MD, ME, MO, MS, MT, NC, NH, NJ, NV, NY, OH, OK, PA, SC, UT, VA, VT, WA, WI, WV, WY)	36
Resident-specific rate and distribution of number of residents in each rate category to obtain weighted average (NE, TX)	2
Medicaid revenues divided by Medicaid resident days (DE, MA, MN, ND, OR, RI)	6
States from which we could not obtain usable information (AZ, MI, NM, SD, TN)	5
Data collected but not used (AK)	1

Per Diem Medicaid Cost

Some nursing home residents require intense medical and rehabilitative post-acute care, whereas others require mostly long-term custodial care. The costs of serving these two populations differ significantly due to the types and intensity of services provided to meet their varied care needs. Because financial statements reflect the operating costs of serving all residents in the nursing home, operating costs need to be adjusted to reflect the services that are provided only to Medicaid residents. We used the all-payer operating cost and adjusted it to assure that the reported cost reflected only expenditures on cost centers which are reimbursable to Medicaid residents.[f] To calculate the per diem Medicaid cost, we divided this estimate of reimbursable costs to Medicaid by the number of resident days.

We made four primary adjustments to these costs. The first adjustment was for costs associated with physical, occupational, and speech therapy. Most therapy costs are paid by Medicare; Medicaid pays few of these costs. We therefore adjusted reported all-payer operating cost downward, reflecting Medicaid residents' significantly lower use of such services.[21] To adjust therapy costs for lower use among Medicaid residents, we obtained the total expenditure on each type of therapy staff for all nursing homes. We adjusted these expenditures downward to reflect the level of therapy provided at nursing homes with a high proportion of Medicaid

[e] In calculating the average Medicaid payment rate utilized in the analysis, the applicable rate for each month in the reporting period was determined. A simple average that assigned equal weight to each month was then calculated.

[f] The all-payer operating cost is equal to the total reimbursable expenditures found on Worksheet A, line 89 of the CMS 2540-10. The total reimbursable expenditure excludes costs associated with the gift shop, barber/beauty shop, patient laundry, and other non-reimbursable costs when Medicare reimbursed under a cost-plus reimbursement mechanism in the 1990s.

residents.[g] Further, most therapy is paid for by Medicare and only 16% of Medicaid residents are not enrolled in Medicare.[22] Therefore, therapy costs were adjusted to reflect that an estimated 84% of Medicaid residents would have their therapy paid by Medicare.

The second adjustment was for ancillary service costs other than physical, occupational, and speech therapy. The Medicare Cost Reports include various ancillary services as cost centers. These can include services such as supportive or diagnostic measures (e.g., dental, ancillary supplies, drug supplies, and tests) that supplement and support staff involved in treating a resident. These ancillary services can often be separately billed and paid for by Medicare or Medicaid instead of being bundled into the Medicaid payment rate that we calculated. If our calculated Medicaid payment rate does not include these ancillary services, inclusion of these cost centers would inflate the Medicaid cost per day. For that reason, we excluded these ancillary service cost centers.[h] Their exclusion should not have a major effect on our findings as the cost of these ancillary services as a proportion of the total cost of care is generally small.

The third adjustment was for capital costs. Capital costs are fixed costs that include expenditures on the building (e.g., rent) and movable equipment (e.g., beds). A fixed cost is an expenditure that is the same regardless of the number of residents in the nursing home. We adjusted capital costs to use the actual occupancy or a minimum occupancy rate of 80%, whichever was higher, to account for low occupancy nursing homes. We used the 80% occupancy rate threshold because it is close to the average occupancy rate in the sample.[i] Sensitivity analyses which used alternative minimum occupancy rates showed little impact on the Medicaid per diem cost (see ***Appendix 2***).

The fourth and final adjustment to the all-payer operating cost was to subtract any non-nursing home services. The study population was restricted to nursing homes without other components, such as a home health agency, hospice, or other long-term care settings. To assure these were not included, we subtracted any expenditures on potential non-nursing home components from total reimbursable expenditures. We also subtracted any special purpose costs centers (e.g., malpractice premiums, interest expenses) from the all-payer operating cost.

Many of these other adjustments and assumptions were guided by the input of an advisory committee with expertise in issues of nursing home costs, financing, and reimbursement policy and data. These individuals provided assistance in reviewing, guiding, and providing feedback on the analytic approaches in this study.

Medicaid Payment-to-Cost Ratio

In addition to the Medicaid payment rate and cost, we calculated the Medicaid payment-to-cost ratio. A payment-to-cost ratio that is less than 1.0 indicates that the nursing home's payments for caring for Medicaid

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[g] More specifically, we obtained the therapy staffing level for all nursing homes from the Medicare Cost Reports. Because our analysis is focused on the Medicaid population, we adjusted therapy downward to reflect the less intense therapy needs and services provided to Medicaid residents. For each therapist type, the median therapy staffing level associated with nursing homes serving a high proportion of Medicaid residents was used as a benchmark. Among all other nursing homes, if a nursing home staffed above the benchmark, the difference between the actual staffing levels and the benchmark staffing levels was used to calculate a discount factor that was applied to the reported therapy expenditures. If a nursing home staffed below the benchmark, no adjustment was made. For the few nursing homes in which therapy staffing levels were not reported, nursing homes were broken into groups based on their Medicaid payer mix and assigned the discount associated with that group among nursing homes for which data were available.

[h] The only exception was dental services that specifically indicated the expenditures were for Medicaid. The inclusion of dental services did not have any impact on the results. The average Medicaid cost per day associated with dental services was less than 1%.

[i] The objective of this study is to best examine actual nursing home operations. The 80% threshold is not an endorsement of any specific threshold for calculating Medicaid payment rates.

residents are lower than the estimated cost of care. A payment-to-cost ratio greater than 1.0 indicates that the Medicaid payment to the nursing home is higher than their costs for caring for Medicaid residents.

All-Payer Payment Rate, Cost, and Payment-to-Cost Ratio

For comparison, we calculated on a per diem basis each nursing home's all-payer payment rate, all-payer cost, and all-payer payment-to-cost ratio. These all-payer outcomes reflect the overall financial status of the nursing home and include payments and costs for all residents regardless of payment source (e.g., Medicaid, Medicare, private pay). These rates were calculated from the Medicare Cost Reports. The all-payer payment rate was calculated as the nursing home's net patient revenues divided by the number of resident days. The all-payer cost is equal to total reimbursable costs divided by the number of resident days.[j]

Key Nursing Home Characteristics and State Payment Methods

We analyzed the relationship between nursing home characteristics and state payment methods, and Medicaid costs, payments, and payment-to-cost ratios. A categorical variable identified nursing homes by ownership type (for-profit, not-for-profit, government-owned). Indicator variables identified chain and CCRC-affiliated nursing homes, and nursing homes with memory care SCUs, other SCUs, and urban versus rural location. We categorized the continuous variables of number of beds, occupancy rate, Medicaid payer mix, and total nursing staff levels in HPRD into groups for ease of interpretation. Nursing homes were categorized into 1-5 stars, depending on the overall five-star rating (which is an aggregated measure of quality). Categorical variables were used to identify nursing homes in states with cost-based, price-based, or combination bases for payment, and with 1 year, 2-4 years, 5+ years, and unknown rebasing frequencies. ***Table 3*** provides the distribution of nursing homes based on these nursing home characteristics and state payment policies.

Table 3: Distribution of Nursing Home Characteristics and State Payment Policies

Sample Characteristics	Number	%
Ownership		
Not-for-profit	1,720	18.02
For-profit	7,062	74.00
Government-owned	761	7.97
Chain Status		
Non-Chain	4,395	46.05
Chain	5,148	53.96
Part of Continuing Care Retirement Community		
Yes	590	6.18
No	8,953	93.82
Memory Care Special Care Unit		
Yes	1,489	15.60
No	8,054	84.40
Other Special Care Unit		
Yes	556	5.83
No	8,987	94.17

[j] The nursing home's net patient revenue was obtained from the Medicare Cost Reports (CMS-2540-10) Worksheet G-3, line 3. Total reimbursable cost was obtained from Worksheet A, line 89, and total resident days was obtained from Worksheet S-3, Part I.

Table 3 (*continued*)		
Sample Characteristics	**Number**	**%**
Location		
Urban	6,984	73.18
Rural	2,551	26.73
Number of Beds		
0–60	1,468	15.38
61–120	4,862	50.95
121–180	2,329	24.41
181+	884	9.26
Occupancy Rate		
90–100%	3,026	31.71
80–89%	2,925	30.65
70–79%	1,637	17.15
60–69%	998	10.46
<60%	957	10.03
Medicaid Payer Mix		
80–100%	1,540	16.14
70–79%	2,270	23.79
60–69%	2,083	21.83
50–59%	1,443	15.13
<50%	2,206	23.12
Total Nursing Staff Levels in Hours per Resident Day		
<3.00	869	9.11
3.00–3.25	1,249	13.09
3.25–3.50	1,742	18.25
3.50–3.75	1,685	17.66
3.75–4.00	1,472	15.42
4.00+	2,496	26.16
Overall Five-Star Rating		
1 Star	1,356	14.21
2 Stars	2,020	21.17
3 Stars	1,677	17.57
4 Stars	2,133	22.35
5 Stars	2,319	24.30
State Payment Method: Basis of Payment		
Cost-Based Method	5,668	59.39
Price-Based Method	3,288	34.45
Combination	587	6.15

Table 3 (*continued*)		
Sample Characteristics	**Number**	**%**
State Payment Method: Cost Rebasing Frequency		
1 Year	3,362	35.23
2–4 Years	2,727	28.58
Other	2,381	24.95
Not Found	1,073	11.24

Note: There are eight observations for location, 30 observations for total nursing staff levels, and 38 for overall star rating which are missing. They were excluded in bivariate analysis, but included in regressions and identified with an indicator for missing data.

Data Sources: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Other information that describes the nursing homes were obtained from Medicare Cost Reports, Certification and Survey Provider Enhanced Report data, Nursing Home Compare Archive data, Payroll-Based Journal data, and Medicaid and CHIP Payment and Access Commission.[3]

Statistical Methods

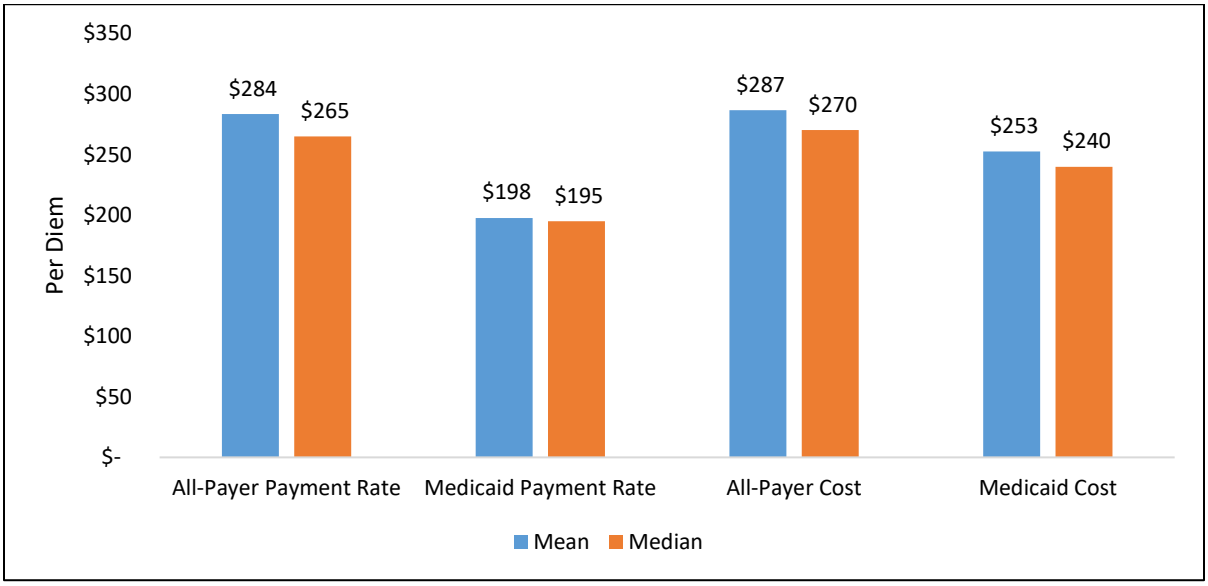
We analyzed the distributions of per diem Medicaid payment rates and costs, and Medicaid payment-to-cost ratios. For comparison, we also report the mean and median values of the all-payer payments, costs, and payment-to-cost ratios. We conducted descriptive subgroup analyses, reporting the means and medians of the Medicaid payment-to-cost ratios by specific nursing home characteristics and state payment policies. Descriptive subgroup analyses for Medicaid payment rates and costs are in ***Appendix 5***. Because many nursing home characteristics are highly correlated, we used regression analysis to isolate the independent relationship between these characteristics and particular outcome variables. The dependent variables in the regression analyses were the per diem Medicaid payment rates and costs, and Medicaid payment-to-cost ratios. The independent variables that may explain the variation in the dependent variables included the nursing home characteristics listed in ***Table 3***, in addition to a state fixed effects variable to account for differences between states not captured by other independent variables. We estimated the models using ordinary least squares (which is based on conditional means) and quantile regression (which is based on conditional medians). Because both regression approaches led to similar conclusions, we report only the results for the ordinary least squares regression models.

FINDINGS

All-Payer and Medicaid Costs and Payments: Full Study Sample

Figure 1 reports the mean and median all-payer and Medicaid payment rates and costs (see also ***Appendix 1***; state-by-state results are reported in ***Appendix 3***). The all-payer payment rates and costs were similar, with small differences whether reported as mean or median. By contrast, the mean Medicaid cost was higher than the median Medicaid cost, consistent with a modest skewness toward some nursing homes reporting high costs. The all-payer payment rates and costs exceeded the Medicaid payment rates and reported costs, potentially due to the inclusion of differences in payment rates from non-Medicaid payers (including Medicare and self-pay). More notably, however, the Medicaid-only reported costs were higher than the Medicaid payment rates, whether reported as mean or median, compared to the all-payer category.

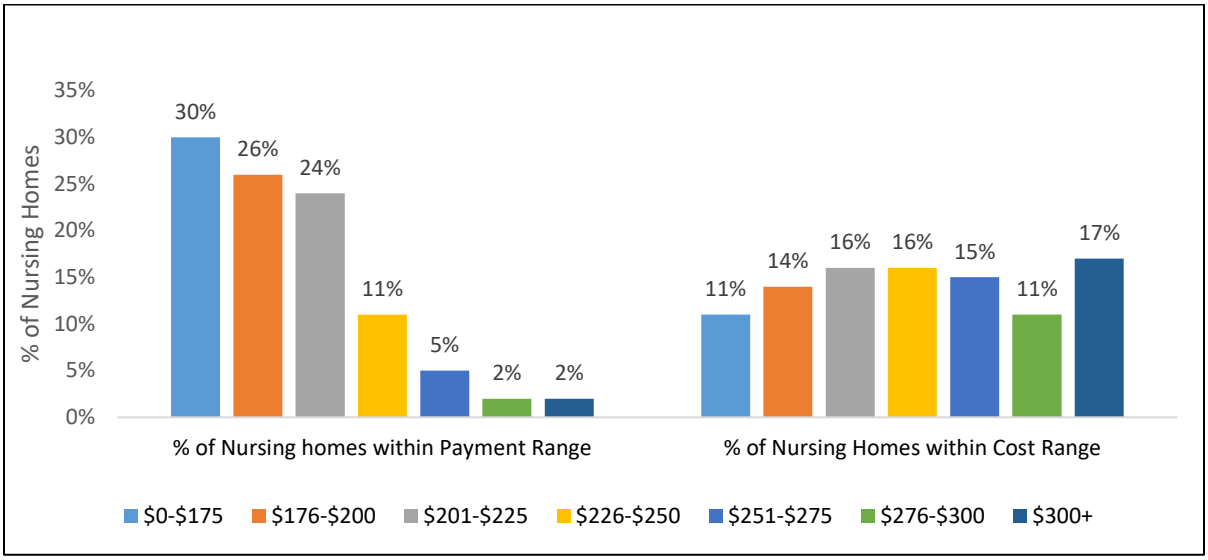
Figure 1: All-Payer and Medicaid Mean Per Diem Payment Rates and Costs, 2019



Data Source: Medicaid payment rates were calculated from data provided by states. Estimated all-payer payment rate, all-payer cost and Medicaid cost were calculated from Medicare Cost Reports.

Figure 2 shows the distribution of the nursing home sample by the level of Medicaid payment and Medicaid cost. A majority of nursing homes are in the lower categories of Medicaid payment, while a majority are in the higher categories of Medicaid cost. Overall, higher proportions of nursing homes tend to receive lower payments than have lower costs. For example, whereas 56% of nursing homes receive Medicaid per diem payments that are between $0 and $200, only 25% have mean per diem Medicaid costs that are in this range. Conversely, whereas 28% have mean daily Medicaid costs greater than $275, only 4% of nursing homes receive Medicaid payments greater than $275. This indicates that a meaningful percentage of nursing homes are incurring expenses for Medicaid residents in excess of the amount paid by Medicaid to care for those residents.

Figure 2: Distribution of Nursing Homes by Mean Medicaid Payment and Mean Medicaid Cost

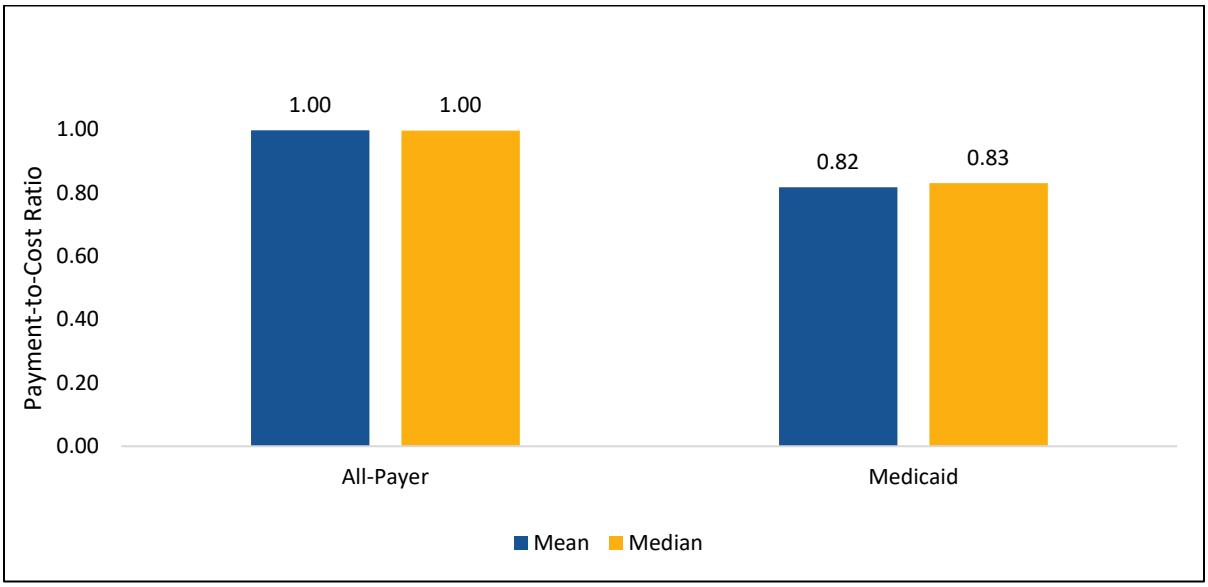


Data Source: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports.

All-Payer and Medicaid Payment-to-Cost Ratios: Entire Study Sample

The Medicaid payment rate for the mean or median nursing home covered about 82 cents and 83 cents respectively for every dollar in reported costs nursing homes incurred caring for Medicaid residents in the study period (***Figure 3***). (See also ***Appendix 1***; state-specific results are provided in ***Appendix 3.***) In contrast, the mean and median all-payer payment-to-cost ratios were nearly 1, meaning that total payments from all-payer sources to nursing homes were equal to their reported reimbursable costs. This finding indicates that revenue sources other than Medicaid payments helped cover the excess cost of care to Medicaid residents. We emphasize that this study did not assess what threshold of the Medicaid payment-to-cost ratio is the most appropriate, accurate, or efficient level, nor whether the costs reported represent the costs of providing efficient, high-quality care. Without such an assessment, a Medicaid payment-to-cost ratio does not indicate whether Medicaid payments rates were adequate per federal regulations (42 CFR 447.204).

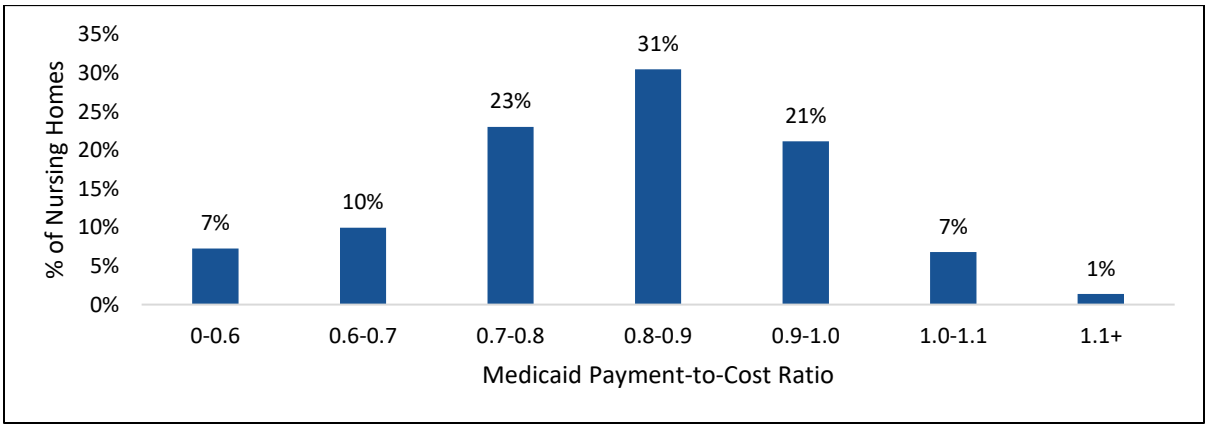
Figure 3: All-Payer and Medicaid Payment-to-Cost Ratios, 2019



Data Source: Medicaid payment rates were calculated from data provided by states. Estimated all-payer payment rate, all-payer cost and Medicaid cost were calculated from Medicare Cost Reports.

Figure 4 shows the distribution of the nursing home sample by various Medicaid payment-to-cost ratios. For approximately 40% of nursing homes, Medicaid per diem payments covered 80% or less of their per diem costs. Fifty-one percent (51%) of nursing homes had 80-100% of their Medicaid per diem costs covered; and the remaining 8% had payments exceed their per diem costs.

Figure 4: Distribution of Nursing Homes by Mean Medicaid Payment-to-Cost Ratio



Data Source: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports.

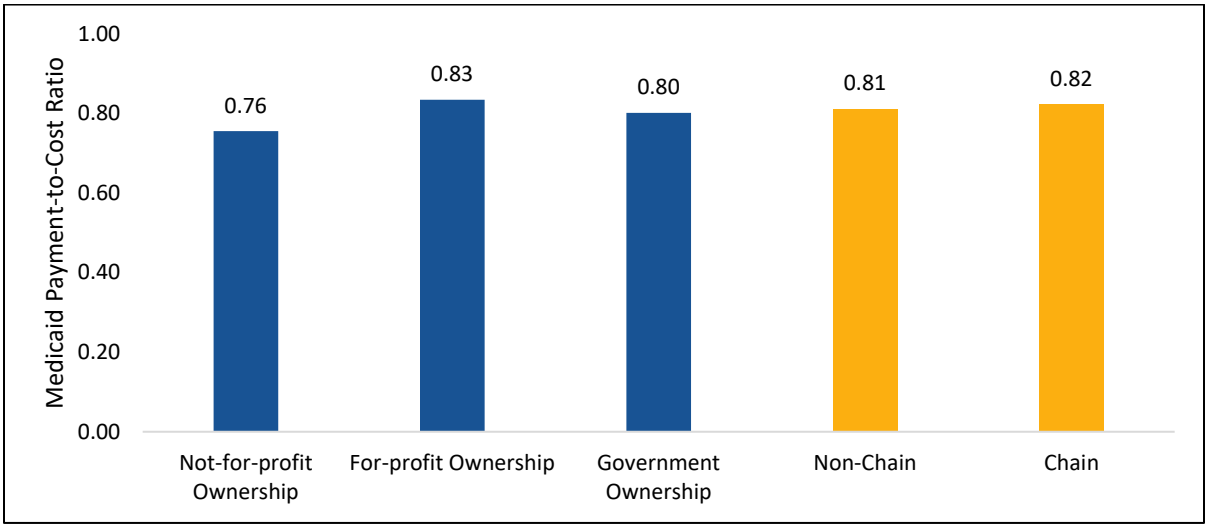
Subgroup Analyses

This section reports the subgroup analyses based on nursing home characteristics and state payment policies. The results using mean and median values vary, but have similar patterns across subgroups; hence, we focus this discussion on mean Medicaid payment-to-cost ratios. Complete results for mean and median Medicaid payment rate, cost, and payment-to-cost ratios are reported in ***Appendix 5***.

Nursing Home Characteristics

Not-for-profit nursing homes had the lowest mean Medicaid payment-to-cost ratio among the three ownership types (i.e., not-for-profit, for-profit, or government-owned). There was little difference in the mean Medicaid payment-to-cost ratio based on chain affiliation (***Figure 5***).

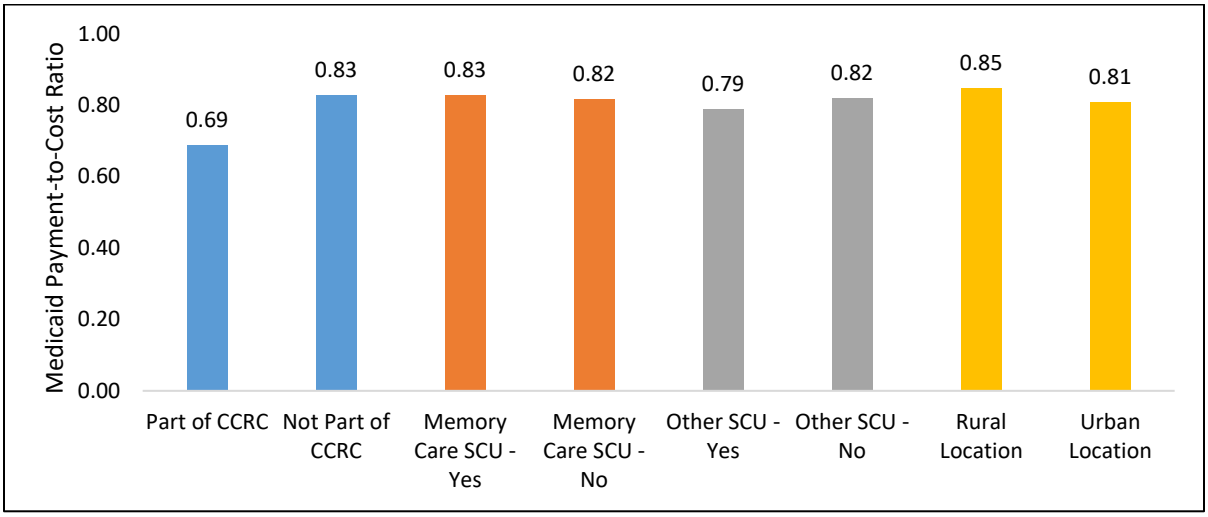
Figure 5: Mean Medicaid Payment-to-Cost Ratios by Ownership and Chain Affiliation



Data Source: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs and other nursing home characteristics were sourced from Medicare Cost Reports.

Figure 6 reports the mean Medicaid payment-to-cost ratios by select nursing home structural characteristics. Nursing homes that are part of a CCRC had a lower mean Medicaid payment-to-cost ratio than nursing homes that are not part of a CCRC. It should be noted that most CCRCs (69%) are owned by not-for-profit organizations which, as reported previously, were found to have a lower mean Medicaid payment-to-cost ratio than for-profit and government-owned nursing homes. Having a memory care SCU was not associated with meaningful differences in the level of Medicaid payment-to-cost ratio. Nursing homes with other types of SCUs had a slightly lower mean Medicaid payment-to-cost ratio than nursing homes without other types of SCUs. Finally, nursing homes in urban locations had a lower mean payment-to-cost ratio than did rural nursing homes.

Figure 6: Mean Medicaid Payment-to-Cost Ratios by Nursing Home Structural Characteristics

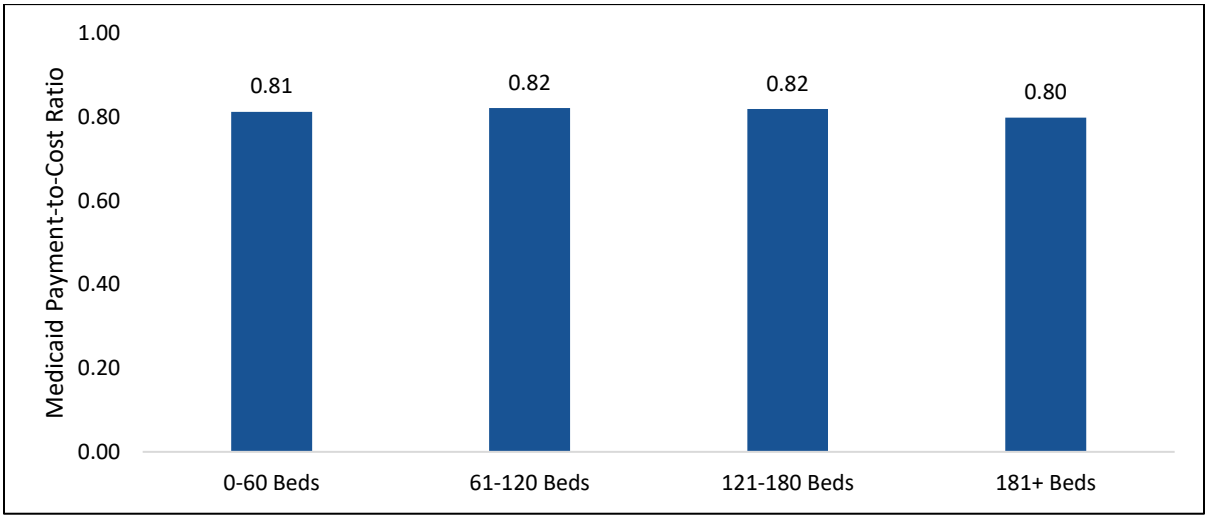


Data Source: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Nursing home characteristics were sourced from Certification and Survey Provider Enhanced Report data and Medicare Cost Reports.

CCRC = Continuing Care Retirement Community. SCU = Special Care Unit.

The mean Medicaid payment-to-cost ratio exhibited little variation by the number of beds, with the ratio ranging between 0.80 and 0.82 for nursing homes of all sizes (***Figure 7***).

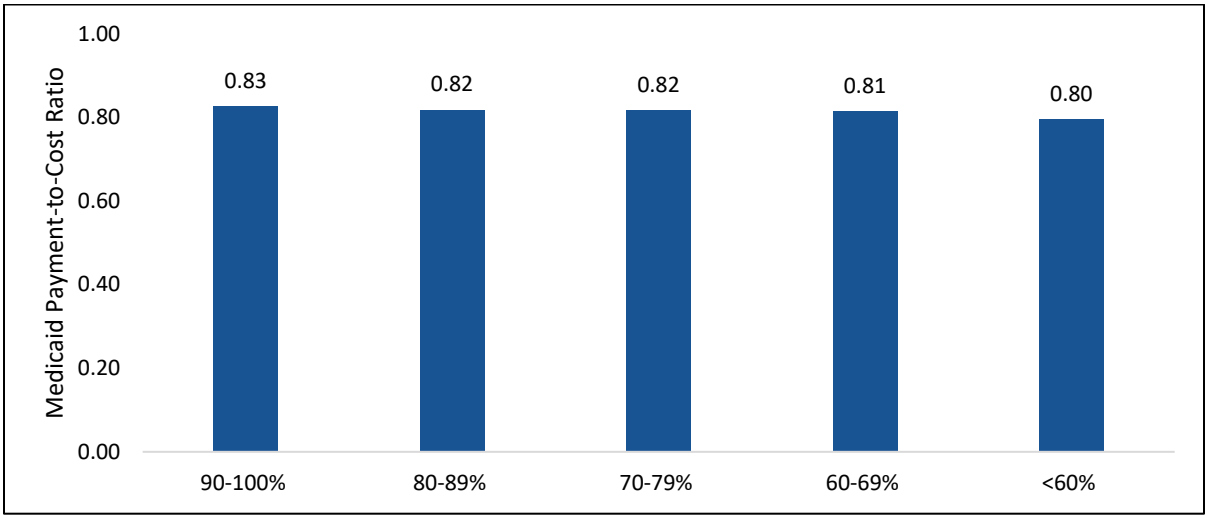
Figure 7: Mean Medicaid Payment-to-Cost Ratios by Number of Beds



Data Source: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Number of beds was sourced from the Medicare Cost Reports.

Figure 8 shows mean Medicaid payment-to-cost ratios by occupancy rate. As occupancy rates increased, so did the mean Medicaid payment-to-cost ratio, from 0.80 in nursing homes with less than 60% occupancy to 0.83 in nursing homes with occupancy rates in the 90% to 100% range, suggesting some economies of scale.

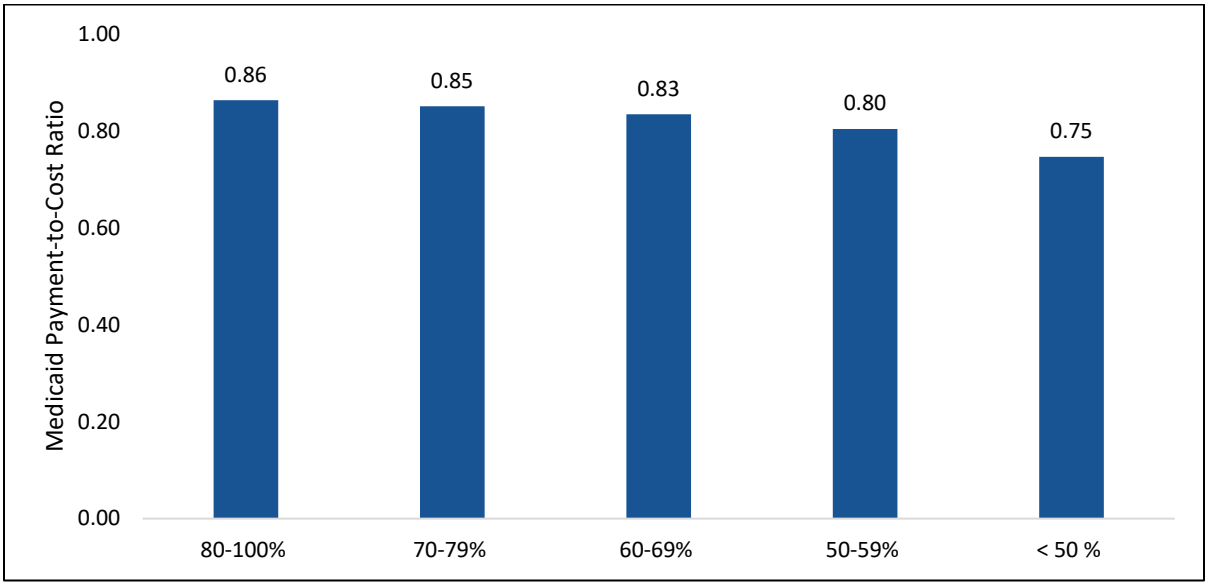
Figure 8: Mean Medicaid Payment-to-Cost Ratios by Occupancy Rate



Data Source: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Medicaid payer mix was derived from the Medicare Cost Reports.

Figure 9 reports the mean Medicaid payment-to-cost ratios by Medicaid payer mix. Nursing homes with very low Medicaid payer mix (<50%) had a much lower Medicaid payment-to-cost ratio (0.75) than nursing homes with the highest Medicaid payer mixes of 80-100% (0.86). This finding is consistent with nursing homes with less reliance on Medicaid having expenditures that exceed those of nursing homes more reliant on Medicaid. Identifying all of the source of these differences by Medicaid payer mix is beyond the scope of this study, but some of these differences may be associated with nursing staff expenditures. Research and our own data analysis show higher staffing levels in low Medicaid-reliant nursing homes.[18] Even so, it is unknown whether these increases in expenditures among low Medicaid-reliant nursing homes are solely invested into resident care, and if so, whether such investments are primarily focused on non-Medicaid residents. It is also possible that these expenditures differences are unrelated to resident care.

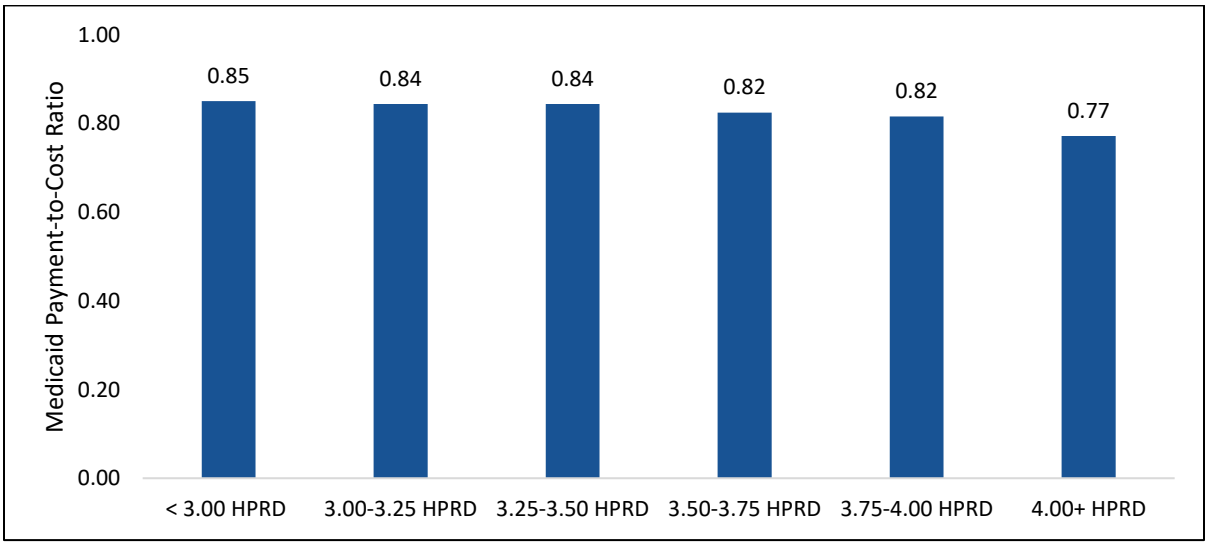
Figure 9: Mean Medicaid Payment-to-Cost Ratios by Medicaid Payer Mix



Data Source: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Medicaid payer mix was derived from the Medicare Cost Reports and Certification and Survey Provider Enhanced Report data.

Figure 10 shows the mean Medicaid payment-to-cost ratios by total nursing staff level. Nursing homes with total nursing staff levels less than 3.00 HPRD had the highest average Medicaid payment-to-cost ratio (0.85), while nursing homes with nursing staff levels above 4.00 HPRD had the lowest average Medicaid payment-to-cost ratio (0.77).

Figure 10: Mean Medicaid Payment-to-Cost Ratios by Total Nursing Staff Level

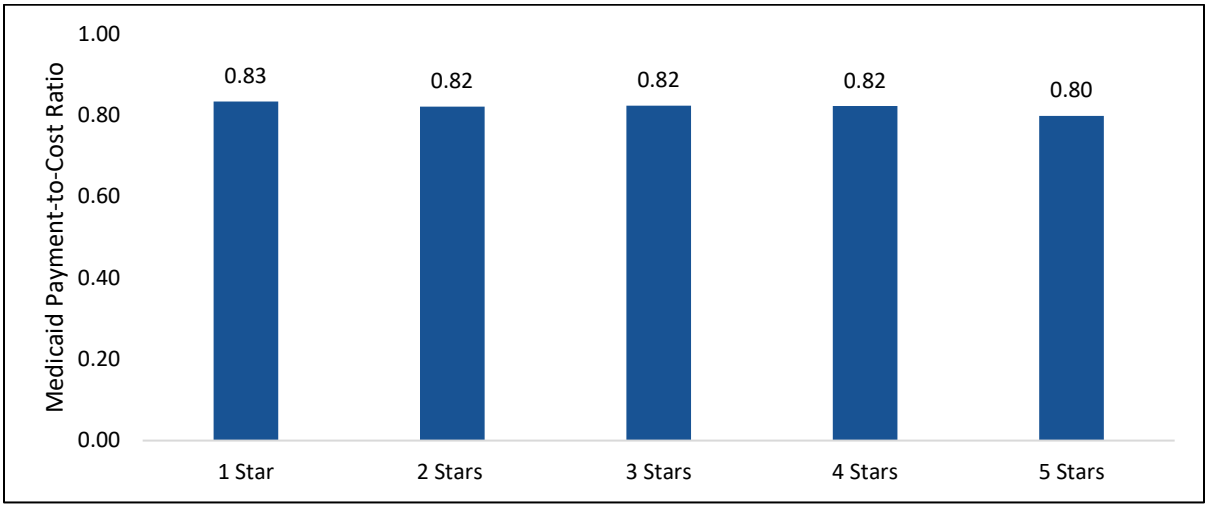


Data Source: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Total nursing hours per resident day (HPRD) derived from the Payroll-Based Journal data.

Figure 11 reports the mean Medicaid payment-to-cost ratios by overall star rating. Nursing homes with the lowest (one-star) quality ratings had the highest average Medicaid payment-to-cost ratio of 0.83, whereas nursing homes with five-star ratings had the lowest average Medicaid payment-to-cost ratio at 0.80. The

five-star system is highly correlated with staffing and Medicaid payer mix, so the lower ratios observed for five-star facilities may be an indication of higher cost of investing in nursing staff (***Figure 10***) or associated with the effect of having lower Medicaid payer mix (***Figure 9***).

Figure 11: Mean Medicaid Payment-to-Cost Ratios by Overall Five-Star Rating

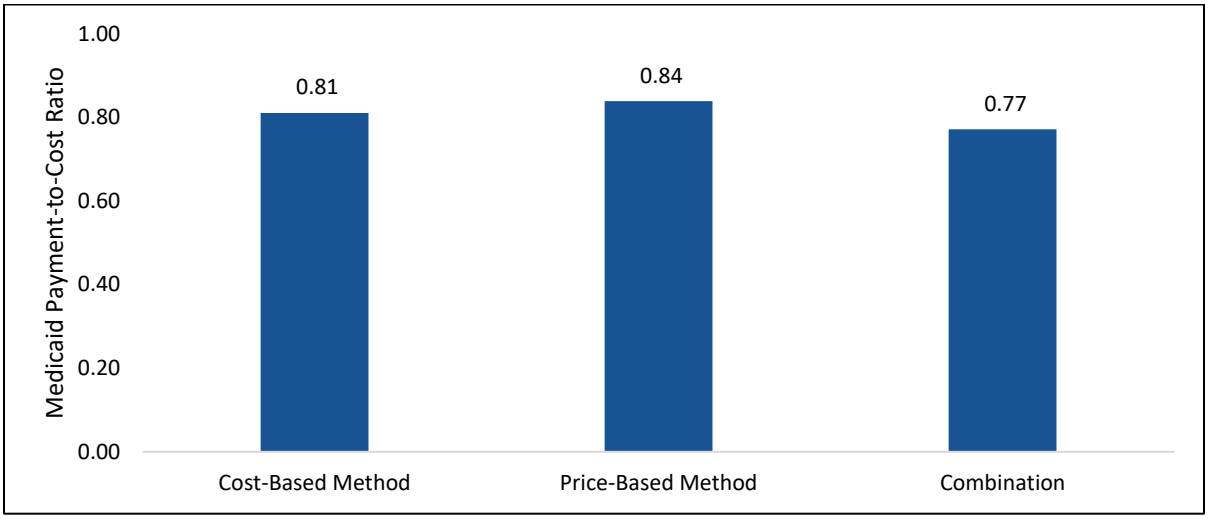


Data Source: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Star ratings were obtained from the Nursing Home Compare Archive data.

State Medicaid Payment Policies

We examined two state Medicaid payment policies: (1) how nursing homes rebase Medicaid payment rates; and (2) how often Medicaid payment rates are reviewed. The first policy identified whether the state used a cost-based system (n=5,668), a price-based system (n=3,288), or a combination of cost-based and price-based system (n=587) to determine Medicaid payment rates. A cost-based system uses a nursing home's actual costs, often from Medicaid Cost Reports to calculate a Medicaid payment rate that is specific to each nursing home. A price-based system uses the costs of a peer group of the nursing homes to determine a fixed and pre-determined Medicaid payment that is applied equally to all nursing homes in that peer group. Nursing homes in cost-based system states had higher average Medicaid payment rates than those in price-based states; in turn, both were higher than states that used a combination of price-based and cost-based systems. Average per diem reported Medicaid costs were highest in nursing homes that had Medicaid payments determined by a cost-based system, whereas the lowest costs were in nursing homes in states using a price-based system, which could be due to incentives that are inherent in a price-based payment system. Medicaid payment-to-cost ratios were highest in price-based system states and lowest in states using a combination method (***Figure 12***).

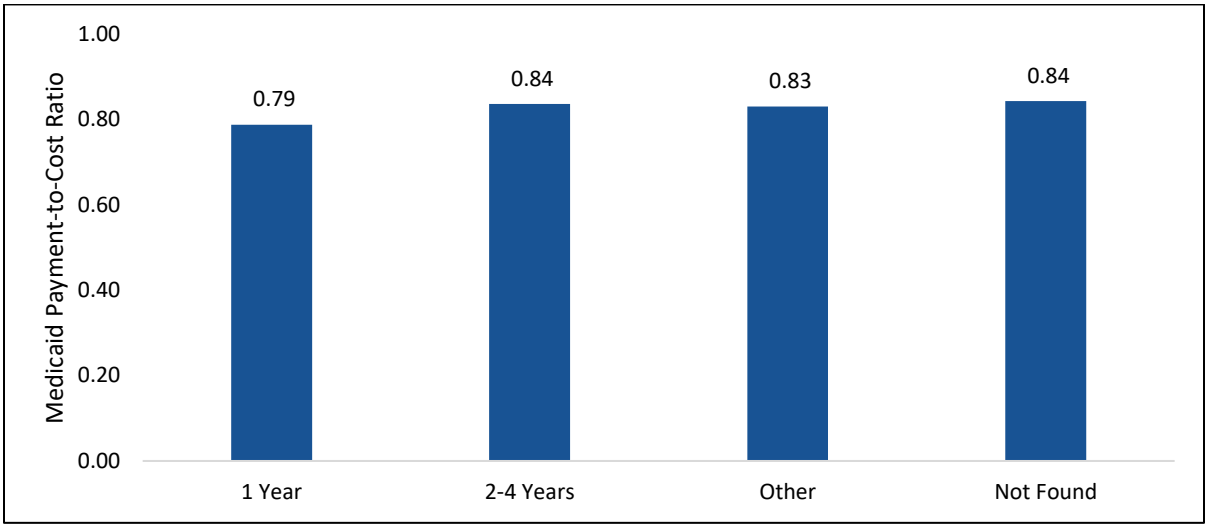
Figure 12: Mean Medicaid Payment-to-Cost Ratios by State's Basis of Payment



Data Source: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. State Medicaid policies were obtained from Medicaid and CHIP Payment and Access Commission.[3]

A second state payment policy issue concerns how often the state is required to review nursing home costs in order to update Medicaid payment rates. This is called rebasing. Nursing homes in states that rebase every 2-4 years or 5 or more years had higher average Medicaid payment-to-cost ratios than did nursing homes that rebased annually (***Figure 13***).

Figure 13: Mean Medicaid Payment-to-Cost Ratios by State's Rebasing Frequency



Data Source: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. State Medicaid policies were obtained from Medicaid and CHIP Payment and Access Commission.[3]

Regression Analyses

The results of the regression analyses for the three outcomes of per diem Medicaid payment rate, Medicaid cost, and Medicaid payment-to-cost ratio are reported in ***Table 4***. Regression results indicate that for-profit nursing homes received on average $3.48 more from Medicaid per resident per day and government-owned nursing homes $3.49 more per resident per day, compared to not-for-profit nursing homes. This means that

even after accounting for other variables that could influence payment levels -- like Medicaid payer mix or total nursing staff levels -- not-for-profit nursing homes received about $3.50 less per diem in Medicaid payment rates. We are unable to determine why this may be the case, and differences by ownership may be due to our statistical model not accounting for all factors states may use in determining Medicaid payment rates. However, given the high level of variation in rates across states, this difference was not statistically significant, which means that in this sample, there was not enough evidence to conclude that there is a statistically significant difference in payment rates by ownership status. On the other hand, for-profit nursing homes were found to have Medicaid costs that we lower ($15.75 per day lower on average relative to a sample mean of $253 for all nursing homes) and statistically different from not-for-profit nursing homes. There was no statistically significant difference between not-for-profit and government-owned nursing home with respect to Medicaid costs. In terms of Medicaid payment-to-cost ratios, for-profit and government-owned nursing homes had higher ratios relative to not-for-profit nursing homes, with the difference being larger among for-profits.

There was no statistically significant difference in the three outcomes by chain affiliation. Being a part of a CCRC was associated with higher average Medicaid costs of $52.10 per day, but only a marginally significant difference of $3.82 in Medicaid payment rates, with a lower mean Medicaid payment-to-cost ratio on the order of -0.078. Having a memory care unit was associated with both lower Medicaid payment rates and costs, but a slightly higher Medicaid payment-to-cost ratio (0.009). By contrast, having other types of SCUs was associated with higher Medicaid costs, but marginally significant differences in Medicaid payment rates and no statistical difference in the payment-to-cost ratio. Compared to rural nursing homes, those located in urban areas had higher average per diem Medicaid payment rates of $8.77 but also higher per diem costs of $22.01, thus leading to lower Medicaid payment-to-cost ratios (-0.025).

Larger nursing homes (121 beds or more) had higher Medicaid payment rates than did the smallest (60 beds or fewer). There were no statistically significant differences between facility size and Medicaid payment rates, costs, or payment-to-cost ratios. Nursing homes with the lowest level of occupancy (<60%) had lower Medicaid payment rates ($-4.42), than nursing homes with the highest level of occupancy (90-100%). By contrast, nursing homes with progressively lower occupancy rates had higher average Medicaid costs. For example, compared to nursing homes with the highest occupancy levels of 90-100%, nursing homes with occupancy rates below 60% averaged $25.31 higher per diem Medicaid costs. Even though capital related costs were adjusted so nursing homes had at least 80% occupancy, there may be economies of scale for certain expenditures or non-capital related fixed costs (e.g., nursing home administrator, dietitian) which have a lower cost per resident as occupancy increases. Consequently, nursing homes with lower occupancy rates had lower per diem Medicaid payment-to-cost ratios compared to nursing homes with the highest occupancy rates.

Nursing homes with lower Medicaid payer mixes had slightly higher Medicaid payment rates as well as higher per diem Medicaid costs. Thus, nursing homes with lower Medicaid payer mixes had lower average Medicaid payment-to-cost ratios compared to nursing homes with the highest proportion of Medicaid residents. The difference in the Medicaid payment-to-cost ratio between the average nursing home with an 80-100% Medicaid payer mix compared to the average nursing home with a Medicaid payer mix below 50% was 0.081. Although we did not evaluate the reasons for the association between lower Medicaid payer mix and our findings, there may be several factors which lead to lower Medicaid-reliant nursing homes to have higher Medicaid payments and costs, but lower Medicaid payment-to-cost ratios. These include having a more profitable mix of residents, investments to attract non-Medicaid residents, investments in quality or staffing, and many other operational decisions.

Overall, nursing staff levels were found to have a statistically significant association with Medicaid payment and Medicaid cost for nursing homes with over 3.75 HPRD of nursing staff. Relative to nursing homes with the lowest nursing staff level (<3.00), the highest staffed nursing homes (≥4.00) received average per diem

payments of $13.55 more from Medicaid (relative to a sample mean of $287 for all nursing homes) and had $47.00 more in Medicaid costs per day (relative to a sample mean of $253). Compared to nursing homes with the lowest nursing staff level, the Medicaid payment-to-cost ratio decreased with each subgroup of nursing homes with higher nursing staff levels.

Nursing homes with higher overall five-star ratings had higher Medicaid payment rates compared to one-star rated nursing homes. By contrast, nursing homes rated with 3 and 5 stars had statistically higher Medicaid costs compared to one-star rated nursing homes, but the result was only marginally significant for three-star nursing homes. The Medicaid payment-to-cost ratios also was higher among four-star and five-star rated nursing homes compared to one-star rated nursing homes.

Table 4: Regression Results: Medicaid Payment Rate, Costs, and Payment-to-Cost Ratios

Variables	Medicaid Payment Rate	Medicaid Cost	Medicaid Payment-to-Cost Ratio
Ownership (Ref = Not-for-Profit)			
For-profit	3.48	-15.75***	0.043***
	(2.57)	(3.73)	(0.007)
Government-owned	3.49	-5.67	0.014*
	(2.24)	(4.44)	(0.007)
Chain	0.82	2.72	-0.004
	(1.40)	(3.95)	(0.006)
Part of Continuing Care Retirement Community	-3.82*	52.10***	-0.078***
	(1.94)	(14.95)	(0.014)
Memory Care Special Care Unit	-3.10**	-7.82***	0.009**
	(1.21)	(2.35)	(0.004)
Other Special Care Unit	5.55*	11.43**	-0.013
	(3.27)	(5.17)	(0.011)
Urban Location	8.77***	22.01***	-0.025***
	(1.55)	(3.80)	(0.007)
Number of Beds (Ref = 0-60 beds)			
61–120	1.25	-5.61	0.005
	(1.57)	(3.38)	(0.005)
121–180	4.27*	-6.70	0.013
	(2.14)	(4.69)	(0.008)
181+	12.01*	4.94	0.020
	(6.19)	(12.58)	(0.013)
Occupancy Rate (Ref = 90-100%)			
80–89%	-1.36	6.25***	-0.016***
	(1.53)	(2.10)	(0.004)
70–79%	-2.78	8.32***	-0.026***
	(2.11)	(2.35)	(0.005)
60–69%	-2.93	13.25***	-0.032***
	(1.91)	(4.62)	(0.006)
<60%	-4.42**	25.31**	-0.052***
	(2.12)	(10.14)	(0.014)

Table 4 (*continued*)			
Variables	**Medicaid Payment Rate**	**Medicaid Cost**	**Medicaid Payment-to-Cost Ratio**
Medicaid Payer Mix (Ref = 80-100%)			
70–79%	0.60	6.48***	-0.019***
	(1.07)	(1.87)	(0.004)
60–69%	2.93*	10.03***	-0.030***
	(1.71)	(2.68)	(0.006)
50–59%	4.79**	18.86***	-0.048***
	(1.93)	(3.19)	(0.008)
<50%	3.96**	37.45***	-0.081***
	(1.49)	(7.36)	(0.012)
Total Nursing Staff Levels in Hours per Resident Day (Ref = <3.00)			
3.00–3.25	0.36	-0.05	-0.021**
	(1.37)	(7.18)	(0.009)
3.25–3.50	2.23	3.84	-0.030***
	(1.58)	(8.35)	(0.010)
3.50–3.75	3.40	10.24	-0.047***
	(2.27)	(7.67)	(0.010)
3.75–4.00	4.82*	18.50**	-0.062***
	(2.71)	(6.98)	(0.011)
4.00+	13.55***	47.00***	-0.095***
	(3.04)	(8.16)	(0.013)
Overall Five-Star Rating (Ref = 1 Star)			
2 Stars	1.31	2.02	0.004
	(1.06)	(1.78)	(0.003)
3 Stars	2.99*	5.03*	0.005
	(1.67)	(2.97)	(0.006)
4 Stars	4.73**	4.41	0.015***
	(2.07)	(4.08)	(0.004)
5 Stars	6.47**	9.81**	0.012*
	(2.75)	(4.86)	(0.006)
Constant	178.98***	169.38***	1.032***
	(3.71)	(11.77)	(0.019)
Observations	9,543	9,543	9,543
R-squared	0.72	0.38	0.46

Notes: The model was estimated using ordinary least squares with standard errors adjusted for clustering within state. State fixed effects and indicators for missing values were included in the regression models but are not reported.

Data Sources: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Other information that describes the nursing homes were obtained from Medicare Cost Reports, Certification and Survey Provider Enhanced Report data, Nursing Home Compare Archive data, and Payroll-Based Journal data.

*** p<0.01, ** p<0.05, * p<0.1.

DISCUSSION AND LIMITATIONS

Medicaid is an important program responsible for covering the expense of nursing home care for over 60% of residents residing in nursing homes. Given that role, understanding the relationship between per diem Medicaid payments and estimated per diem Medicaid costs is important, particularly when focusing on the quality of care provided.

Using data collected from states, the average and median nursing home in our analytic sample of 44 states received an average Medicaid payment of $198 and a median Medicaid payment of $195 per resident per day. This compared to an average estimated Medicaid cost of $253 and median estimated Medicaid cost of $240 per resident per day. The average Medicaid payment-to-cost ratio, which is a measure of Medicaid payments relative to costs, was 0.82, indicating that Medicaid payments covered 82 cents per every dollar of reported nursing homes costs incurred caring for Medicaid residents. This finding is consistent with those reported in a recent study conducted by MACPAC, which used different data sources and method to assess a similar question. MACPAC found the median Medicaid payment-to-cost ratio was 0.86.[15] We also found that the mean and median all-payer payment-to-cost ratio is 1.0, indicating that, on average, nursing homes had all their reimbursable costs covered after all revenue sources were included.

The findings from this work do not address the adequacy of the Medicaid payment, because we did not conduct an analysis that assessed the current federal regulation (42 CFR § 447.204) that requires states to set Medicaid payments that are "consistent with efficiency, economy, and quality of care and sufficient to enlist enough providers so that the services are available to beneficiaries at least to the extent that those services are available to the general population." In particular, we did not assess whether nursing homes were adequately staffed based on the acuity of their residents. Nursing homes need to staff to the needs of their residents and Medicaid residents generally have lower staff time needs than other residents.[23] If nursing homes are not adequately staffed, then expenditures on staffing would need to increase and our estimated Medicaid costs are too low relative to the federal regulation. Conversely, if a nursing home is overstaffed relative to the needs of their residents, this nursing home is spending more on staffing and Medicaid cost are too high relative to the federal regulation. Because we did not assess whether nursing homes were adequately staffed, our Medicaid payment-to-cost ratios reflect how nursing homes are actually staffed and operated, and not whether Medicaid payment rates are adequate. Furthermore, we did not assess whether nursing homes could seek efficiencies to lower costs to better align with payments. Finally, we did not assess the accuracy or reliability of the reported costs in the Medicare Cost Reports, something discussed in further detail in the limitation section of this report. In summary, additional analyses are needed to gain a more comprehensive understanding of the adequacy of Medicaid payments as it relates to cost, access, and quality.

Recognizing these caveats, we did find that 40% of nursing homes had per diem Medicaid payments covering less than 80% of their per diem reported Medicaid costs. We also found that the majority, or 60% of nursing homes, had more than 80% of their Medicaid per diem costs covered (8% of those nursing homes with payments exceeding 100% of their per diem costs). Too low of a Medicaid payment-to-cost ratio may be concerning, especially for those nursing homes with a high proportion of Medicaid residents. If these nursing homes are being operated efficiently, they have less revenue from more profitable revenue sources (e.g., private pay, private insurance, Medicare) to fund nursing staff and other quality improvement efforts. We found that nursing homes with the highest proportion of Medicaid residents had the highest Medicaid payment-to-cost ratios but also had lower nursing staff levels and lower overall five-star ratings. This may indicate there may be lower expenditures, and hence Medicaid costs, among high-Medicaid payer mix nursing homes. These findings are consistent with other studies. For example, nursing homes with a high Medicaid payer mix were recently found to spend a greater share of revenues on nursing staff but also to have lower nursing staff levels,[18] suggesting nursing homes with a high Medicaid population may be constrained in their ability to increase staffing or require less staff due to lower resident acuity. Additionally, research findings

show that higher Medicaid and Medicare payment rates are associated with higher staffing levels and higher levels of other quality indicators.[14,24,25] In this study we also found that nursing homes in states that rebase annually have lower average Medicaid payment-to-cost ratios. This highlights the importance of payment systems and how payment reform efforts should be designed to ensure that nursing homes are sufficiently staffed and operated in a way that provides high quality care in an efficient manner.[26]

To facilitate payment reform, more comprehensive information is needed on Medicaid revenue and costs. Our study was limited by the financial information that was reported in the Medicare Cost Reports and the need to collect Medicaid payment information from individual states. CMS currently has an important reporting instrument which, if modified, can improve research to inform policies related to payment reform. This instrument is the CMS-2540-10, which collects financial information found in the Medicare Cost Reports. While the CMS-2540-10 collects aggregated revenues from all-payer sources, it could be improved by requiring nursing homes to report revenues broken out by payer (e.g., Medicare FFS, Medicare Advantage, Medicaid managed care, Medicaid FFS), as is done in some state Medicaid Cost Reports. Also, the revenues reported on this form should include all revenues (either paid by the state or resident as part of their copayment) for routine nursing home services, as well as supplemental payments. Additional fields should be considered to capture revenue from ancillary services that are not bundled into routine Medicaid payments. When combined with census information on the number of resident days paid for by these payer sources, average payment rates by payer source could easily be calculated and would be more accurate.

On the cost side, additional transparency around labor costs would be helpful and would satisfy the CMS requirement to document spending on direct care staffing for its proposed rules on Minimum Staffing Standards for Long-term Care Facilities.[27] Currently, the CMS-2540-10 reports total wage expenses, fringe benefit expenses, and total hours worked by nursing and therapy staff in Worksheet S-3, Part V. However, many nursing homes fail to report information for therapy staff, and, in some cases, the number of hours paid in the Medicare Cost Reports are lower than in the PBJ data, which are based on hours worked. Revising this Worksheet S-3, Part V to categorize nursing and non-nursing staff the same way as the PBJ data would provide more insight into nursing home staff expenditures. It would also allow the data to be better audited in a manner that is similar to the PBJ data.

Limitations

Three principles guided the construction of our analytic file. First, all information had to be consistently collected and only information that was found to be reliable was used. Second, we had to be able to match payment and cost information to each nursing home and assure comparability across nursing homes and states. Finally, payment and cost information had to be able to be linked to facility-specific information on nursing home characteristics, staffing levels, and quality. Even in the presence of these guiding principles for database construction, our study has a number of important limitations.

First, our analysis is based on data from 2019, and there have been major changes in the nursing home payment and cost landscape since the COVID-19 pandemic. A Kaiser Family Foundation report found that in fiscal year 2023, 43 states increased their Medicaid fee-for-service payment rates to nursing homes.[28] Also, the underlying cost structure of nursing homes have changed, as wages and the costs of borrowing may have increased over the past few years.[29] Because the size of these payment and cost increases were not examined, Medicaid payment-to-cost ratios are likely to be different today. Additionally, the Patient Driven Payment Model was introduced by Medicare on October 1, 2019.[30] This new payment model for Medicare FFS has been associated with changes in nursing home staff,[31] which could also lead to nursing homes changing staffing patterns and expenditures for all nursing home residents, including Medicaid residents, as nursing homes adjust to the new model. Thus, there is a clear need for further analysis using post-pandemic data to

determine how changes in the payment and provider landscape have affected the relationship between per diem Medicaid payments and costs.

Second, our analyses used the states' statutory Medicaid payment rates, which may not capture all payments made to a nursing home. Although the statutory rate typically refers to the total payment rate owed to the provider, including the share of payment that is the responsibility of the Medicaid beneficiary, there is no way to know whether resident payments, that are the responsibility of the Medicaid resident, are actually made or being collected by the nursing home. Closely related is the fact that not all supplemental payments were captured, although our sensitivity analyses suggest that this is not likely to be material.

Third, we made a number of decisions related to sample inclusion to ensure that we had the most homogeneous group of nursing homes to analyze. We excluded outliers, nursing homes that did not have full-year cost data to eliminate nursing homes that underwent ownership changes during the period, and nursing homes that had expenses not associated with a nursing home from our analyses. If these nursing homes had significantly different cost structures that would affect Medicaid payment-to-cost ratios, they will not be reflected in our data.

Fourth, although we made several adjustments to properly attribute costs to Medicaid residents, we made no adjustments pertaining to nursing staff costs. Per federal regulations, nursing homes must staff to the needs and preferences of their residents, implying that nursing homes with higher acuity residents would require more nursing staff. Although it is expected that Medicaid residents need less nursing time than post-acute care patients whose care is paid for by Medicare,[23] properly adjusting nursing costs requires a clear metric for the level of nursing required to meet the needs and preferences of residents. The acuity measures available to us are not sensitive enough to allow for this, and therefore we could not properly assess whether the observed level of staffing meets resident needs.

Further, nursing staff levels in nursing homes with a high proportion of Medicaid residents are lower,[18] and some advocates argue nursing homes are not adequately staffed at current levels.[32] For these reasons, this study focused on the actual staffing present in the nursing home rather than on the costs and payments associated with an optimal or "appropriate" staffing level for Medicaid residents. Thus, our analysis is based on current care practices and not the adequacy of the payment in light of those practices. If optimal nursing staff levels are supposed to be higher than current staffing levels in efficiently operating nursing homes, then the Medicaid payment-to-cost ratio would be lower in our analysis.

Fifth, this study relied on cost information from Medicare Cost Reports. Some nursing home stakeholders have questioned the accuracy and completeness of this data. For example, a 2016 General Accountability Office (GAO) report stated that CMS relies on the nursing homes to "validate their own data…[and] required SNFs to self-certify to the accuracy and completeness of their cost reports." This GAO report further stated that CMS conducts "extremely limited" reviews of cost report data, instead focusing their enforcement efforts on improper payments. Because CMS does not take the steps to "ensure accuracy and completeness" the GAO report questioned the reliability of the data collection process.[33] While the data is self-reported, any deliberate misrepresentation or falsification of information in Medicare Cost Reports is still subject to federal criminal, civil, or administrative action. Also, the financial information reported by any specific nursing home does not affect the amount of Medicare payments the nursing home receives,[33] and Medicaid payment rates are typically determined by financial information from state-specific Medicaid Cost Reports which undergo varying degree of audits. These factors reduce the incentive for nursing homes to report inaccurate information on Medicare Cost Reports but also there is not a strong incentive to assure accuracy either. Regardless, it is well known that some individual Medicare Cost Reports have outliers, and in this study we have followed standard statistical techniques used by the GAO and other researchers to identify and address extreme values in our Medicaid cost calculations.[18,33] The Medicare Cost Reports are the only nationally

available financial data on nursing homes, thus providing important financial information about nursing homes.

And finally, a closely related issue is that some nursing home stakeholders have argued that that nursing homes use complex corporate structures and transactions with related parties to inflate reported costs to make profits appear lower than they actually are.[13] While this does not impact the accuracy or reliability of the Medicare Cost Reports, if these allegations have merit, some nursing homes may not be operating efficiently by paying higher prices for services than they could receive from market. Our analysis showed that results were not sensitive to related party transactions and these allegations on average, although more rigorous analysis is needed. Further background and discussion of the issue is available in ***Appendix 4***.

Given these limitations, this study could not assess the sufficiency or determine the optimal and most efficient Medicaid payment-to-cost ratio. Additional analyses are needed to gain a more comprehensive understanding of the adequacy of Medicaid payments as it relates to quality and expenses. For example, further research could include an examination of Medicaid payment-to-cost ratios, along with outcomes, finances, and staffing focusing on a subset of nursing homes that closed, nursing homes characterized by exceptional efficiency (i.e., relatively low cost and high quality), or nursing homes under the management of private equity and real estate investment trust firms.

CONCLUSION

The purpose of our study was to improve our general understanding of the financial relationship between Medicaid payment rates and estimated Medicaid costs. We did so by constructing a comprehensive facility-level national database which links payment, cost, staffing, and quality information from a variety of sources to enable detailed analysis of key financial and other metrics. The knowledge generated from this study can be used to inform assessments and discussion supporting Medicaid payment reforms; provide the data needed to examine the impact of potential changes in Medicaid payment policy on the financial performance of nursing homes at the state and facility-level; and shed light on potential disparities in Medicaid payment and costs of nursing homes.

APPENDIX 1: PAYMENT, COSTS, AND PAYMENT-TO-COST RATIOS BY ALL-PAYER AND MEDICAID

Appendix Table 1: Per Diem Mean and Median Nursing Home All-Payer and Medicaid Payments, Costs, and Payment-to-Cost Ratios		
	Mean	**Median**
All-Payer Payment Rate	$284	$265
Medicaid Payment Rate	$198	$195
All-Payer Cost	$287	$270
Medicaid Cost	$253	$240
Payment-to-Cost Ratios	**Mean**	**Median**
All-Payer	1.00	1.00
Medicaid	0.82	0.83
N	9,543	9,543

Data Sources: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports.

APPENDIX 2: SENSITIVITY ANALYSES

A. Capital Costs and Occupancy

Capital costs (e.g., cost of the building and equipment) are fixed costs, meaning that they do not change with the number of residents in the nursing home. Because capital costs are fixed, as occupancy rates decline, per diem capital costs increase. In order to promote efficiency when calculating Medicaid payment rates, many states adjust the capital component of costs to assure payments reflect a minimum occupancy. The objective of this study was to reflect normal nursing home operations, which for the study period had average occupancy rate of about 80%. Therefore, the baseline analyses presented adjusted the capital cost component of Medicaid costs to 80% for nursing homes with occupancy rates below 80%. There is no presumption that this is a desirable occupancy rate, but rather it is reflective of the average occupancy rate during the period studied. Based on PBJ data, occupancy rates below this 80% threshold are due to the lingering effects of the pandemic.

We conducted sensitivity analyses to evaluate whether adjusting capital costs to a minimum occupancy rate of 80% impacted the study's findings. These sensitivity analyses tested the impact of using higher minimum occupancy rates across nursing homes. Results reported in ***Appendix Table 2*** show that increasing occupancy rates had a minimal impact on the Medicaid cost and Medicaid payment-to-cost ratios. Comparing the minimum occupancy rate of 80-95% shows average Medicaid costs decreased approximately $3 per day and the average Medicaid payment-to-cost ratio increased from 0.81 to 0.83.

Appendix Table 2. Capital Costs Adjustment for Minimum Occupancy Rate (N=9,543)

Medicaid Costs	Mean	Median
Baseline - 80% minimum occupancy rate	$253	$240
85% minimum occupancy rate	$252	$239
90% minimum occupancy rate	$251	$239
95% minimum occupancy rate	$250	$238
Medicaid Payment-to-Cost Ratios	**Mean**	**Median**
Baseline - 80% minimum occupancy rate	0.82	0.83
85% minimum occupancy rate	0.82	0.83
90% minimum occupancy rate	0.82	0.84
95% minimum occupancy rate	0.83	0.84

Data Sources: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Occupancy rates were sourced from Medicare Cost Reports.

B. Supplemental Payments

Some states have Medicaid supplemental or incentive payments that are made to nursing homes in addition to their normal per diem Medicaid payment rate. According to the Medicaid Budget and Expenditure System, these payments accounts for approximately 7% of all total payments to nursing homes in Fiscal Year 2019.[34] If these payments were paid as part of the daily rate and were provided by the state, we included these supplemental or incentive payments in our calculated Medicaid payment rate. However, supplemental and incentive payments that are provided as lump sum payments are not included in our construction of Medicaid payment rates, including those made to select government nursing homes that receive intergovernmental transfers or certified public expenditures. The exclusion of these lump sum payments should not affect the general conclusions drawn from the analyses because they tend to be a small fraction of the per diem rate. A number of sensitivity analyses were conducted to evaluate the potential impact of excluding supplemental payments.

First, most nursing homes are operated by for-profit or not-for-profit entities. Because the largest source of supplemental payments is to select government nursing homes, a sensitivity analysis compared Medicaid payment rates, costs, and payment-to-cost ratios results excluding all government nursing homes to the baseline results (which included government nursing homes). These results are reported in ***Appendix Table 3***. Mean and median Medicaid payment rates and costs are about $1 higher in the sample excluding government nursing homes, but there is no difference in the Medicaid payment-to-cost ratios.

Appendix Table 3: Excluding Government-Owned Nursing Homes

	Mean		Median	
	Baseline	Excludes Government Nursing Homes	Baseline	Excludes Government Nursing Homes
Medicaid Payment Rate	$198	$199	$195	$196
Medicaid Cost	$253	$254	$240	$241
Payment-to-Cost Ratio	0.82	0.82	0.83	0.83
N	9,543	8,782	9,543	8,782

Data Sources: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Ownership was sourced from Medicare Cost Reports.

Second, the sample was restricted to government nursing homes. Medicaid payment rates, costs, and payment-to-cost ratios were then calculated for government nursing homes in states that have and do not have supplemental payments to select government nursing homes. These results are reported in ***Appendix Table 4***. While there is some variation in Medicaid payment rates and costs, there is minimal change in the Medicaid payment-to-cost ratios. For example, the mean Medicaid payment-to-cost ratio in states with supplemental payments to government nursing homes was 0.80 compared to 0.79 for stated without supplemental payments. The median Medicaid payment-to-cost ratios were equal at 0.82.

Appendix Table 4: Government-Owned Nursing Homes by Whether State Has Government Supplemental Payment

	Mean		Median	
	Has Supplemental Payment	Does Not Have Supplemental Payment	Has Supplemental Payment	Does Not Have Supplemental Payment
Medicaid Payment Rate	$179	$193	$183	$177
Medicaid Cost	$226	$256	$223	$229
Payment-to-Cost Ratio	0.80	0.79	0.82	0.82
N	594	167	594	167

Data Sources: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Ownership was sourced from Medicare Cost Reports. State policies on supplemental payments was sourced from Medicaid and CHIP Payment and Access Commission.[3]

As a final sensitivity analysis related to supplemental payments, baseline results were compared to a sample of nursing homes in states that had no supplemental payments to government-owned nursing homes or other types of supplemental payments. These results are reported in ***Appendix Table 5***. Compared to the baseline, Medicaid payment rates and costs are slightly higher in states with no supplemental payments of any type ($7

on average). There is minimal change in the average Medicaid payment-to-cost ratio, going from the baseline of 0.82-0.83 in states with no supplemental payments of any type.

In conclusion, these sensitivity analyses find that the presence of supplemental payments does not significantly change the conclusions drawn from the baseline results.

Appendix Table 5: Excluding States with Any Supplemental Payments

	Mean		Median	
	Baseline	Excluded States with Supplemental Payments	Baseline	Excluded States with Supplemental Payments
Medicaid Payment Rate	$198	$205	$195	$199
Medicaid Cost	$253	$258	$240	$242
Payment-to-Cost Ratio	0.82	0.83	0.83	0.85
N	9,543	3,568	9,543	3,568

Data Sources: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. State policies on supplemental payments was sourced from Medicaid and CHIP Payment and Access Commission.[3]

C. Exclusion of Nursing Homes with Other Components

The Medicare Cost Reports allow nursing homes to report cost information related to the nursing home and other components, such as a home health agency, hospice, or other long-term care setting. To assure Medicaid costs were only for nursing home related services, the study sample was restricted to nursing homes that did not have any of these other components. As a sensitivity analysis, we compared the baseline results -- which exclude nursing homes with these other components -- to a sample that did not exclude these nursing homes. These results are reported in ***Appendix Table 6***. Had these nursing homes been included in the analysis, our overall nursing home sample would have increased by 985 nursing homes. Even so, the mean and median per diem Medicaid payment rates were found to be identical to the baseline sample, per diem Medicaid costs are slightly higher ($9 on average). The average and median Medicaid payment-to-cost ratios were roughly similar (0.82 versus 0.80 when these nursing homes are included) and 0.83 versus 0.82 (median).

Appendix Table 6: Excluding Nursing Homes with Non-Nursing Home Components

	Mean		Median	
	Baseline	Include Additional Nursing Homes	Baseline	Include Additional Nursing Homes
Medicaid Payment Rate	$198	$198	$195	$195
Medicaid Cost	$253	$262	$240	$244
Payment-to-Cost Ratio	0.82	0.80	0.83	0.82
N	9,543	10,528	9,543	10,528

Data Sources: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Nursing homes with non-nursing home components was sourced from Medicare Cost Reports.

APPENDIX 3: STATE-BY-STATE RESULTS

Appendix Table 7: Medicaid Payment Rates, Costs, and Payment-to-Cost Ratios by State (N=9,543)							
States	Means			Medians			N
	Medicaid Payment Rate	Medicaid Cost	Payment-to-Cost Ratio	Medicaid Payment Rate	Medicaid Cost	Payment-to-Cost Ratio	
US	$198	$253	0.82	$195	$240	0.83	9,543
AL	$203	$210	0.97	$204	$208	0.97	174
AR	$185	$198	0.94	$183	$197	0.94	111
CA	$218	$292	0.76	$216	$283	0.77	838
CO	$217	$266	0.82	$218	$262	0.83	149
CT	$232	$287	0.81	$233	$285	0.81	162
DE	$363	$347	1.10	$356	$317	1.15	25
FL	$233	$278	0.86	$232	$265	0.87	528
GA	$189	$210	0.91	$187	$207	0.92	266
HI	$277	$402	0.78	$274	$346	0.80	24
IA	$172	$204	0.86	$170	$193	0.86	290
ID	$231	$282	0.82	$226	$277	0.82	41
IL	$155	$282	0.66	$153	$228	0.70	495
IN	$202	$240	0.85	$200	$234	0.85	350
KS	$187	$222	0.88	$186	$205	0.91	222
KY	$190	$218	0.88	$190	$216	0.87	142
LA	$180	$183	0.99	$180	$181	1.00	232
MA	$219	$275	0.80	$212	$270	0.78	288
MD	$257	$293	0.89	$260	$281	0.90	151
ME	$239	$279	0.87	$236	$268	0.89	36
MN	$245	$294	0.85	$241	$278	0.86	225
MO	$157	$219	0.84	$156	$176	0.88	388
MS	$204	$217	0.94	$204	$214	0.94	137
MT	$193	$257	0.78	$193	$241	0.78	22
NC	$181	$227	0.81	$181	$221	0.83	190
ND	$284	$287	0.99	$286	$283	1.00	32
NE	$179	$236	0.76	$174	$230	0.77	118
NH	$167	$298	0.58	$167	$282	0.59	57
NJ	$213	$297	0.75	$213	$274	0.78	257
NV	$129	$286	0.46	$127	$289	0.46	33
NY	$246	$314	0.80	$241	$305	0.81	457
OH	$197	$227	0.88	$197	$223	0.89	667
OK	$148	$169	0.90	$148	$162	0.91	202
OR	$311	$324	0.97	$309	$321	0.98	88
PA	$197	$300	0.70	$195	$264	0.73	371
RI	$264	$266	1.01	$244	$258	0.97	67
SC	$185	$210	0.89	$183	$204	0.90	110
TX	$145	$189	0.79	$145	$182	0.80	865
UT	$196	$265	0.75	$195	$256	0.76	64

Appendix Table 7 (*continued*)							
States	Means			Medians			N
	Medicaid Payment Rate	Medicaid Cost	Payment-to-Cost Ratio	Medicaid Payment Rate	Medicaid Cost	Payment-to-Cost Ratio	
VA	$183	$281	0.80	$183	$218	0.83	188
VT	$233	$287	0.82	$241	$285	0.85	24
WA	$223	$304	0.75	$219	$288	0.76	151
WI	$173	$277	0.65	$171	$259	0.67	224
WV	$225	$292	0.78	$225	$295	0.76	68
WY	$188	$263	0.73	$188	$267	0.72	14

Data Sources: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports.

APPENDIX 4: TRANSACTIONS WITH RELATED PARTIES

To calculate Medicaid costs, this study relied upon Medicare Cost Reports which report the expenses the nursing home incurred in providing care to residents. Some nursing home stakeholders have been critical of cost reports, arguing nursing homes inflate expenses through the use of transactions with related parties. In the context of nursing homes, a related party is supplier of goods or services to a nursing home in which there is common ownership between the nursing home and the supplier. Because there is the potential for these transactions to not be at "arms-length," some nursing home stakeholders have argued that nursing home use related party transactions to inflate costs and hide profits.[12] However, it is important to note that there are legitimate reasons for using related party suppliers. Examples of related party transactions include administrative service consultants, nursing and therapy staffing, pharmacy services, and rental of the building.

Federal regulations require nursing homes to report in the Medicare Cost Reports their actual expenses and whether those expenses are paid to related parties. The expenses paid to related parties are required to be "at market rates". If we assume that the average and median nursing home is following the law, there should be little difference in the Medicaid costs incurred by a nursing home even when a related party or third party is the supplier. Unfortunately, cost report data does not contain enough information to assess the appropriateness of the level of expenses associated with related party transactions, and whether they are in line with local "market rates".

Given these issues, sensitivity analyses were performed to understand whether the use of related party transactions affected study findings. Following recent studies (e.g., Bowblis, 2022[30]) we performed two sensitivity analyses. The first sensitivity analysis restricted the sample to government-owned nursing homes under the assumption that they are not profit-motivated and would purchase goods and services at market rates. This means if related parties were inflating costs, the Medicaid payment-to-cost ratio would be expected to be significantly lower in the entire sample compared to government-owned nursing homes. Our analysis showed that this is not the case. For the study sample, the mean Medicaid payment-to-cost ratio was 0.82. Among government-owned nursing homes, the mean Medicaid payment-to-cost ratio was lower, at 0.79 or 0.80 depending on whether the state made supplemental payments to government-owned nursing homes (See ***Appendix Tables 3 and 4***).

The second sensitivity analysis compared Medicaid payment rates, costs, and payment-to-cost ratios for nursing homes that report having and not having any related party transactions. In this analysis, a nursing home that reported having a home office was treated as if it had a related party transaction. This comparison isolates the impact of related party transactions on reported costs, and hence Medicaid payment-to-cost ratios. If related party transactions were used to inflate costs, nursing homes using related party transactions should have higher Medicaid costs and lower Medicaid payment-to-cost ratios than nursing homes not using related party transactions. Results reported in ***Appendix Table 8*** reveal the opposite or no difference. Nursing homes that have related party transactions have lower mean Medicaid costs ($3). The median Medicaid cost for nursing homes using related party transactions is about $3 higher, but this is offset by a $4 higher median Medicaid payment rate. Nursing homes with related party transactions also had slightly higher Medicaid payment-to-cost ratios. In the aggregate, these sensitivity analyses suggest that related party transactions have no impact on study findings and conclusions, which focus on the average and median nursing home.

While the sensitivity analyses did not find significant concerns with the use of related party transactions, we did not conduct an assessment of how different groups may use related parties (e.g., for-profit chains) and whether there are differences in the Medicaid payment-to-cost ratios across these groups. Additional research into the role of related parties in the quality and expenditures needs to be considered in future work.

Appendix Table 8: Results by Use of Related Party Transactions				
	Mean		Median	
	No	Yes	No	Yes
Medicaid Payment Rate	$194	$199	$190	$196
Medicaid Cost	$255	$252	$237	$240
Payment-to-Cost Ratio	0.80	0.82	0.82	0.83
N	1,976	7,567	1,976	7,567

Data Sources: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Use of related party transactions was sourced from the Medicare Cost Reports.

APPENDIX 5: RESULTS TABLES FOR SUBGROUPS

Appendix Table 9: Medicaid Payment Rates, Costs, and Payment-to-Cost Ratios by Subgroups							
	Means			Medians			N
	Payment	Cost	Payment-to-Cost Ratio	Payment	Cost	Payment-to-Cost Ratio	
All	$198	$253	0.82	$195	$240	0.83	9,543
Ownership							
Not-for-profit	$204	$291	0.76	$199	$267	0.78	1,720
For-profit	$198	$245	0.83	$195	$236	0.84	7,062
Government-owned	$182	$232	0.80	$181	$224	0.82	761
Chain Status							
Non-Chain	$196	$252	0.81	$193	$238	0.83	4,395
Chain	$200	$253	0.82	$197	$241	0.83	5,148
Part of Continuing Care Retirement Community							
Yes	$196	$328	0.69	$196	$274	0.73	590
No	$198	$248	0.83	$195	$238	0.83	8,953
Memory Care Special Care Unit							
Yes	$198	$251	0.83	$194	$235	0.84	1,489
No	$198	$253	0.82	$195	$241	0.83	8,054
Other Special Care Unit							
Yes	$214	$283	0.79	$207	$271	0.80	556
No	$197	$251	0.82	$194	$238	0.83	8,987
Location							
Rural	$180	$221	0.85	$176	$207	0.87	2,551
Urban	$204	$264	0.81	$202	$253	0.82	6,984
Number of Beds							
0–60	$195	$255	0.81	$193	$236	0.84	1,468
61–120	$195	$247	0.82	$193	$235	0.83	4,862
121–180	$199	$251	0.82	$197	$243	0.83	2,329
181+	$215	$284	0.80	$207	$265	0.81	884
Occupancy Rate							
90–100%	$214	$268	0.83	$208	$259	0.84	3,026
80–89%	$202	$258	0.82	$200	$246	0.83	2,925
70–79%	$188	$240	0.82	$184	$225	0.83	1,637
60–69%	$179	$232	0.81	$173	$213	0.83	998
<60%	$169	$232	0.80	$156	$203	0.82	957
Medicaid Payer Mix							
80–100%	$192	$229	0.86	$190	$224	0.87	1,540
70–79%	$193	$233	0.85	$193	$227	0.86	2,270
60–69%	$199	$243	0.83	$196	$238	0.84	2,083
50–59%	$204	$262	0.80	$201	$253	0.82	1,444
<50%	$201	$292	0.75	$198	$266	0.77	2,206

Appendix Table 9 (*continued*)							
	Means			Medians			N
	Payment	Cost	Payment-to-Cost Ratio	Payment	Cost	Payment-to-Cost Ratio	
Total Nursing Staff Levels in Hours per Resident Day							
<3.00	$172	$219	0.85	$164	$192	0.88	869
3.00–3.25	$180	$220	0.84	$177	$208	0.85	1,249
3.25–3.50	$188	$228	0.84	$186	$221	0.85	1,742
3.50–3.75	$197	$244	0.82	$194	$240	0.83	1,685
3.75–4.00	$206	$260	0.82	$204	$255	0.82	1,472
4.00+	$218	$300	0.77	$216	$283	0.79	2,496
Overall Five-Star Rating							
1 Star	$180	$223	0.83	$178	$212	0.84	1,356
2 Stars	$194	$245	0.82	$192	$235	0.83	2,020
3 Stars	$196	$247	0.82	$193	$235	0.84	1,677
4 Stars	$201	$256	0.82	$198	$243	0.84	2,133
5 Stars	$210	$278	0.80	$207	$263	0.82	2,319

Notes: The observations with missing data for location, total nursing staff, and overall five-star rating are not reported.

Data Sources: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. Other information that describes the nursing homes were obtained from Medicare Cost Reports, Certification and Survey Provider Enhanced Report data, Nursing Home Compare Archive data, and Payroll-Based Journal data.

Appendix Table 10: Medicaid Payment Rates, Costs, and Payment-to-Cost Ratios by State Reimbursement Method							
	Means			Medians			N
	Payment	Cost	Payment-to-Cost Ratio	Payment	Cost	Payment-to-Cost Ratio	
Basis of Payment							
Cost-Based Method	$200	$259	0.81	$199	$247	0.83	5,668
Price-Based Method	$197	$242	0.84	$191	$226	0.84	3,288
Combination	$180	$254	0.77	$179	$238	0.78	587
Cost Rebasing Frequency							
1 Year	$203	$272	0.79	$202	$258	0.80	3,362
2–4 Years	$191	$237	0.84	$184	$226	0.84	2,727
Other	$188	$239	0.83	$187	$224	0.85	2,381
Not Found	$217	$264	0.84	$206	$250	0.85	1,073

Data Sources: Medicaid payment rates were calculated from data provided by states. Estimated Medicaid costs were calculated from Medicare Cost Reports. State policies were obtained from Medicaid and CHIP Payment and Access Commission.[3]

LIST OF ACRONYMS

AIDS	Acquired Immunodeficiency Syndrome
CASPER	Certification and Survey Provider Enhanced Report
CCRC	Continuing Care Retirement Community
CHIP	Children's Health Insurance Program
COVID-19	Novel Coronavirus
FFS	Fee-For-Service
HPRD	Hours Per Resident Day
MACPAC	Medicaid and CHIP Payment and Access Commission
PBJ	Payroll-Based Journal
SCU	Special Care Unit

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