



# How Does Medicaid Reimbursement Impact the Quality of Ohio Nursing Homes?

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# **How Does Medicaid Reimbursement Impact the Quality of Ohio Nursing Homes?**

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## EXECUTIVE SUMMARY

### BACKGROUND

In 2012 Ohio's Medicaid program spent more than \$2.4 billion on nursing home care. Although spending public dollars for Ohioans with severe disability to receive assistance in skilled nursing facilities is an important role of state government, an ever growing older population highlights that nursing home expenditures must be efficient and effective. In an effort to improve the efficiency of the Medicaid reimbursement system, beginning in 2006 the state shifted to a "*price reimbursement*" system. The revised reimbursement system was designed to reward providers seen as having more efficient staffing patterns and to reduce payments to facilities that the state believed to be overstaffed. Under the *price system* the expectation was that some facilities would receive an increase in their reimbursement rate, while others would see rates decrease. Because a big component of the nursing home reimbursement rate is based on the level of disability of the residents (known as case mix), there will always be rate differences across facilities. However, the move to the *price system* was an attempt to lower the variation between the highest and lowest priced facilities. This policy change has been both praised and criticized. The key policy question is: does the move to price impact the quality of care in Ohio's nursing homes?

### STUDY FINDINGS

- Our review of data for 2007 (prior to any reimbursement changes) found that higher priced facilities had higher levels of direct care staffing and a lower number of inspection citations compared to the lowest priced facilities.
- Analysis of 2007 data did not show any significant quality differences between high price and low price nursing homes on other quality measures, including resident or family satisfaction, or for quality indicators included on the Nursing Home Minimum Data Set, such as the proportion of residents with falls, pressure ulcers or physical restraints.
- Prior to the implementation of the *price system* the variation between the highest priced facility in the state (\$253 per day) and the lowest priced facility (\$113) was \$140 per day. In 2012 that difference was reduced to \$77 per day.
- The changes in the reimbursement system resulted in the average daily reimbursement for the highest priced facilities being reduced from \$186 per day to \$169 and the reimbursement for the lowest priced facilities being increased from \$144 per day to \$168 per day.
- A review of staffing patterns between 2007 and 2012 found that there was an increase in direct care staffing for the lowest priced facilities and there was a decrease in direct care staffing for the highest priced facilities compared to those already at price over this time period.

- Despite the staffing changes, there were no significant changes in quality for the low or high priced facilities compared to the facilities that were already at price over this time period.

## **STUDY CONCLUSIONS**

Over the six year time period we found that there were significant changes in the pricing structure in the Medicaid reimbursement system. The variation between the highest and lowest priced facilities was reduced from \$140 to \$77 per day. Over the study period the lowest priced facilities increased direct care staffing and the highest priced facilities reduced direct care staffing. Our analysis across an array of quality measures did not find any significant changes in quality across the three groups (above and below price) compared to the group that was at price in 2007. Despite these findings, it will be important to look at these data for 2013, when more sizable changes could be experienced. Also, it is possible that facilities have been able to use reserves to mitigate impacts and these protections could be limited over time. Finally, it is important to note that at the start of this change Ohio was a very high reimbursement state and as it approaches a median ranking of state reimbursement, changes to rates could have a bigger impact on quality.



## INTRODUCTION

As one of the largest states in the nation, Ohio's 2012 Medicaid expenditures topped \$2.42 billion on nursing home care for individuals with physical and cognitive disabilities. Because Medicaid represents such an important commitment of state resources, it is critical for Ohio policy makers to make sure that the approach to reimbursing nursing facilities is both effective and efficient. In an effort to improve the state's reimbursement strategy, Ohio passed a law that revamped the Medicaid reimbursement system for nursing homes in 2005. The revised reimbursement system was designed to reward providers seen as having more efficient staffing patterns and to reduce payments for facilities that the state believed to be overstaffed. This was to be accomplished by reimbursing comparable nursing homes the same amount or "*price.*" Under the 2005 law, reimbursement rates under the revamped system were to be slowly phased-in, to allow facilities time to make adjustments to funding changes. On July 1, 2011, Ohio accelerated the implementation of the revamped system.

The move towards a *price system* has been both lauded and criticized. Those praising the approach highlight the wide variation in reimbursement rates without major differences in quality under the previous system. Reimbursement rates that are too high could increase profits of providers without adding to quality or at best reimburse facilities for more staff than needed to achieve a quality outcome. By making reimbursement rates more uniform across the state, the revamped system could save money without having any discernible impact on quality. However, critics have suggested that higher reimbursement leads to higher staffing levels, which have been shown to improve resident outcomes. Furthermore, payments that are too low can result in facilities needing to reduce quality in order to break-even financially. Therefore, low payments could result in poor quality and access issues.

The key challenge for state policy makers is finding the right balance. One of the criticisms of the previous system was that it was re-based annually, and facilities had an incentive to increase staffing, ancillary service, and capital costs as a way to increase their future reimbursement rate. An outcome of the previous system was significant variation in both staffing and cost of facilities across the state. As reimbursement rates change under the new reimbursement system, Ohio's nursing homes are experiencing rate changes of different magnitudes depending on individual home circumstances, providing an opportunity to study whether nursing home quality is impacted as a result of the new reimbursement system.

To conduct this study we examine a series of quality outcomes in the context of nursing facility reimbursement levels. Measures include nursing home staffing levels, resident clinical outcomes, resident and family satisfaction, and Department of Health Inspection Survey findings. Total reimbursement rates for each facility, comprising direct care, ancillary and support, capital, quality incentive payment, and taxes, are then compared to facility-specific quality outcome

measures. The analysis also includes a series of factors that could affect the quality/reimbursement relationship. For example, a facility having a higher proportion of Medicaid and thus fewer private pay residents could have fewer resources available, and this could impact quality scores. Facilities with higher Medicare census could have additional resources available and this could have an impact on quality outcomes. Other factors examined include percent of residents with dementia, ownership, corporate structure, occupancy rates, size of facility, and geographic region. For clinical measures of quality, we also include characteristics of the individual resident. The goal of the research is to explore the relationships between reimbursement levels and quality to better understand whether Ohio's nursing home reimbursement changes had an impact on quality.

## **PREVIOUS RESEARCH ON REIMBURSEMENT AND QUALITY**

What does the previous research tell us about the relationship between reimbursement and quality? Our review of the recent literature found only seven studies addressing this topic. Overall these earlier studies consistently found that an increase in reimbursement rates did show an increase in staffing, but the impacts on quality were less consistent. Four of the studies reported a positive link between reimbursement and quality; two found no relationship, and one showed a negative impact.

A 2001 study found an increase in a state Medicaid reimbursement of \$40 per day significantly increased the number of RNs by 1.42 per 100 residents. A small but not statistically significant increase in the number of LPNs and CNAs was also reported. The study found a small impact on reducing medical errors, feeding tube use and catheterizations (Grabowski, 2001). A 2004 study found a 10% increase in the Medicaid reimbursement rate was associated with 1.8% decrease in bedsores, 7.4% decrease in physical restraints and 1.3% decrease in feeding tube use for Medicaid residents (Grabowski, 2004).

A study of Florida nursing homes in 2001 examined a Medicaid mandate for a new staffing standard that was coupled with a rate increase. The study found that the average hours of nurse staffing per resident day increased. Medicaid reimbursement in Florida was increased by \$12.75 per day from January 2001 to January 2002 to an average rate of \$132 per day. As a result of the mandate, staffing (including RNs, LPNs and CNAs) per resident day increased from 3.6 in 2001 to 4.6 in 2007, which was significantly higher than national average of 3.7 in 2007 (Hyer et al., 2009). The study also found the prevalence of adverse incidents decreased by 32% from 3505 in 2001 to 2389 in 2005 and regulatory deficiencies were reduced by 50% (Hyer et al., 2009). The number of citations for insufficient staffing also decreased from 12.4% in 1999 to 4.9% in 2004 (Hyer et al., 2009).

Finally, a study by Mor et al., (2011) found a \$10 daily increase in Medicaid payment was associated with improved resident outcomes; resident functioning, as measured by activities of daily living, improved by 9.2%, reported pain was reduced by 5.5%, and pressure ulcer prevalence declined by 2.1%. In another study, Intrator and Mor (2004) found a \$10 increase in state Medicaid reimbursement rates reduced the risk of a resident being hospitalized by 9% and lowered the mortality rate by 12%. In addition, residents in facilities with a case mix reimbursement were 30% less likely to be hospitalized compared to residents in systems not using a case mix reimbursement methodology (Intrator and Mor, 2004).

Two other studies showed that staffing levels increased due to higher Medicaid reimbursement, but they did not provide evidence of quality improvement. It has been argued that increased staffing is associated with nursing home quality. A study of wage pass through policies for the period of 1996 through 2004 found an increase in hours per resident days for certified nursing aides (CNAs) in the year following policy adoption, but no impact on quality (Feng, Lee, Kuo, Intrator, Foster, & Mor, 2010). The study did not find any significant increase in RNs and LPNs hours per resident days. Harrington and colleagues (2007) found a \$10 increase in Medicaid reimbursement increased RN hours by 1 hour for every 100 residents, while a \$10 increase in Medicaid reimbursement per resident day increased the total direct care staffing by 10 hours per 100 residents, but found no impact on quality. Finally, one study found increased Medicaid reimbursement had a negative impact on quality. Higher reimbursement for feeding tubes resulted in increased prevalence of feeding tubes (Teno et al., 2008). The increased use of feeding tubes appeared to result in increased incidents of aspiration pneumonia, weight loss, and death of persons with dementia (Teno et al., 2008).

Studies done before 1990 examined facility-specific rates, but the results are dated and correspond to a period where the nursing home industry suffered from excess demand. Using data from the 1980s for the state of Wisconsin, Nyman (1985; 1988) found that the number of severity-weighted deficiency citations were not affected by Medicaid reimbursement rates if there was no excess demand, but were higher (lower quality) if there was excess demand. Since then, occupancy rates have declined as alternatives to nursing homes have become available and excess demand is typically no longer an issue.

In summary, the studies identified generally found that higher Medicaid reimbursement rates lead to higher nurse staffing levels, but the results on resident outcomes were mixed. The overall evidence on the link between quality and reimbursement has not been widely examined, despite the importance of this question. Several reasons for the limited research in this area include the lack of a standard definition of quality, and significant variation in data collection, methods, and quality measures. Finally, none of the studies reviewed included resident and/or family views of the nursing home experience.

## STUDY DATA AND METHODS

Information from multiple sources was used in this study. We first compared Ohio's Medicaid reimbursement rates to other states. Data for this component were obtained from the Brown University Long-Term Care Focus website. The data contains per diem Medicaid reimbursement rates for the lower forty-eight states from calendar years 2000 to 2009. These rates have been adjusted for inflation to 2009 dollars by researchers at Brown University.

The main analysis for our study used data on Ohio's Medicaid-reimbursed nursing facilities from an array of sources. First, facility-specific Medicaid reimbursement rates were provided by the Ohio Department of Medicaid (ODOM). The reimbursement data included the rates that would have been in place had the *price system* been fully enacted in 2007 and the actual reimbursement rates. Second, to examine the characteristics of facilities impacted by the implementation to the *price system* and how quality in those facilities change over time, the reimbursement data were merged with facility-level data from the Online Survey Certification and Reporting System (OSCAR), Certification and Survey Provider Enhanced Reports (CASPER), and the Ohio resident and family satisfaction surveys. These sources of data provided information on facility structure, number of deficiencies, staffing levels, and satisfaction. Satisfaction scores are from surveys for the closest available year. We should note that because of data availability, the analysis focuses on the 811 nursing homes that had reimbursement and quality data for Fiscal Years 2007 and Fiscal Years 2012.

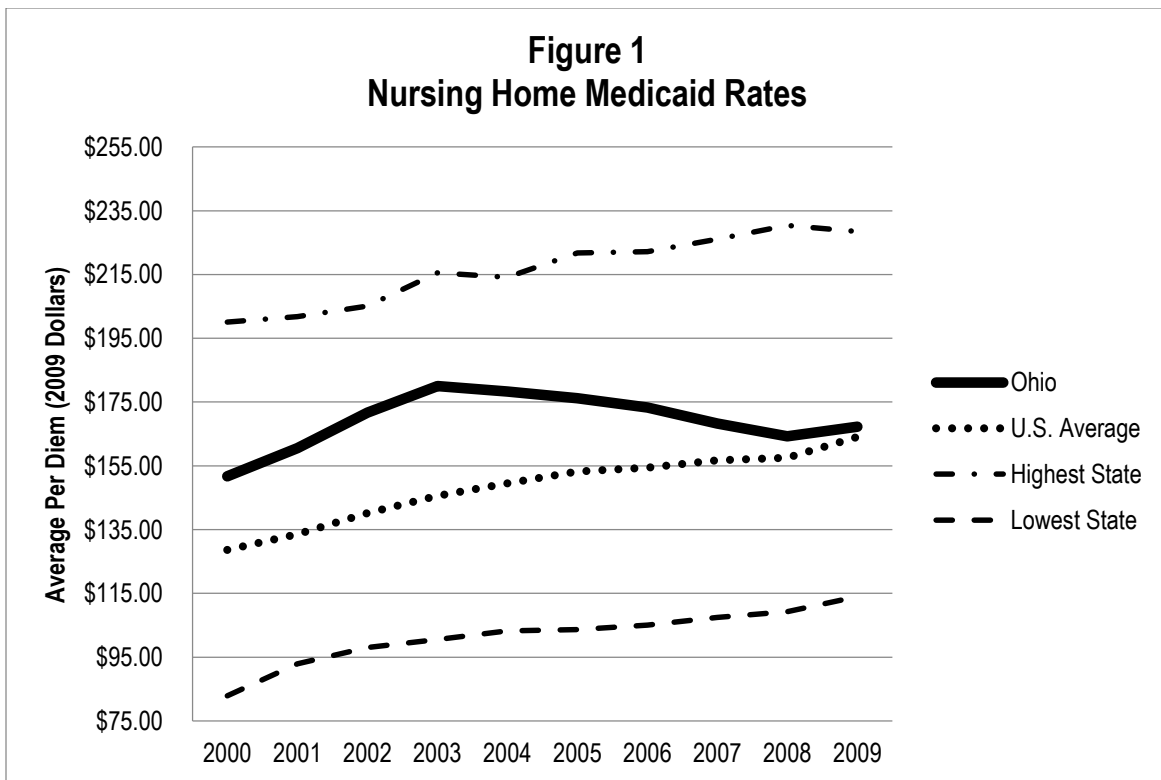
We also use quality information from the Minimum Data Set (MDS) to construct resident-level measures of quality for long-stay residents as defined by the Center for Medicaid and Medicare Service's (CMS) Nursing Home Compare website. We only use MDS to compare quality in Fiscal Year 2007 because the MDS changed from version 2.0 to version 3.0 in 2011. Many of the items collected in MDS 3.0 were changed as was the CMS approach to calculating the quality measures.

### OHIO NURSING HOME REIMBURSEMENT RATES IN A NATIONAL CONTEXT

Prior to 2006, Ohio's nursing home per diem Medicaid reimbursement was primarily based on the cost of providing care for each specific facility. This system led to significant variation in reimbursement rates across the state. Facilities with higher direct care and higher capital costs received higher reimbursement rates. Policy-makers were concerned that this system rewarded facilities for inefficient staffing and promoted strategies that increased capital costs to enhance reimbursement rates. In fact, there was some concern that the rate Ohio was paying nursing homes was not aligned with what other states were paying. To reward providers that had more efficient staffing patterns and to reduce payments for facilities that the state believed to be overstaffed, the state legislature in 2005, revised the reimbursement system. This law became effective starting Fiscal Year 2006 (July 1, 2006).

Data comparing the average Ohio reimbursement rate to other states shows that in 2003, prior to the shift to the new *pricing system*, Ohio's reimbursement rate was the sixth highest in the nation (See Table 1). In 2006, average reimbursement dropped to \$173.34 which corresponded to the 13th highest reimbursement rates and by 2009, Ohio was ranked 21st with an average rate of \$167.25.

Figure 1 summarizes the average Medicaid reimbursement rate paid between 2000 and 2009 for Ohio (solid black line), the average in the United States (dotted line) and the lowest (dashed line) and highest (dash-dotted line) reimbursement rate in the United States. Ohio had a higher reimbursement rate than the average for the entire period, with Ohio having its highest rate compared to the U.S. average in 2003. However, since the passage of the *price system* and other policy changes made in the state, there has been a convergence of Ohio with the U.S. average.



**Table 1: Average Medicaid Reimbursement Rates (Adjusted for Inflation)**

Ranking	Year 2000		Year 2003		Year 2006		Year 2009	
	State	Rate (\$)	State	Rate (\$)	State	Rate (\$)	State	Rate (\$)
1	NY	200.13	DE	215.54	NY	222.15	NY	228.52
2	CT	188.83	NY	206.72	CT	217.87	MD	218.25
3	NJ	158.98	CT	195.85	DE	206.61	CT	216.69
4	MA	155.05	MD	189.42	MD	198.34	OR	211.14
5	PA	153.10	MI	184.19	MA	190.63	DE	210.65
6	MD	152.16	<b>OH</b>	<b>180.06</b>	NH	189.85	NH	194.97
7	NC	152.14	NJ	175.26	OR	187.19	MA	194.70
8	WA	151.71	MA	175.13	PA	181.69	FL	192.49
9	<b>OH</b>	<b>151.67</b>	FL	172.42	RI	179.91	PA	188.70
10	NH	148.12	RI	165.21	WV	179.82	RI	186.49
11	DE	146.56	WV	164.96	ME	175.32	VT	180.92
12	MN	145.54	VT	161.62	NV	175.09	ND	180.90
13	ID	144.96	ID	161.40	<b>OH</b>	<b>173.34</b>	ME	176.94
14	RI	144.53	OR	159.57	FL	172.97	MS	176.05
15	ME	144.21	WI	157.87	NJ	169.53	NV	175.81
16	WV	141.60	WA	156.74	ID	166.72	CO	174.61
17	FL	141.32	ME	154.86	VT	164.01	NM	174.56
18	VT	140.21	CO	153.27	MS	162.73	NJ	174.08
19	AL	140.18	NC	153.06	CO	162.36	WV	172.00
20	CO	139.04	ND	151.21	WA	161.65	ID	171.29
21	CA	137.36	MN	150.78	ND	159.02	<b>OH</b>	<b>167.25</b>
22	ND	130.72	IN	150.17	MN	156.37	AZ	167.09
23	NV	125.81	NH	148.39	AL	155.66	AL	166.42
24	KY	125.00	AL	148.04	CA	153.78	WA	164.93
25	AZ	124.03	PA	144.75	AZ	148.94	WI	162.79
26	MI	123.16	WY	144.01	MT	148.81	MN	162.62
27	WI	123.03	NV	141.83	MI	148.67	CA	162.45
28	WY	121.94	AZ	140.78	TN	146.87	MI	160.08
29	OR	118.87	CA	137.62	WI	146.29	MT	158.84
30	SC	117.54	MS	135.80	NM	144.28	WY	158.17
31	MT	117.14	GA	133.19	NC	142.72	NC	156.59
32	NM	115.80	VA	130.64	IN	142.38	IN	151.15
33	IN	115.63	SC	126.54	UT	141.46	VA	150.23
34	MO	114.16	KY	125.62	VA	140.07	UT	149.95
35	MS	112.58	MT	123.91	WY	138.52	SC	147.58
36	UT	112.34	UT	123.05	SC	137.75	TN	147.38
37	IL	112.18	NM	119.65	AR	133.66	AR	143.59
38	VA	111.46	NE	119.28	KS	131.21	KY	138.17
39	IA	107.00	AR	118.52	KY	130.35	GA	135.59
40	GA	104.19	IA	117.60	GA	125.03	KS	135.21
41	KS	104.05	KS	115.26	LA	119.51	LA	133.87
42	TX	104.05	MO	113.45	IA	119.27	OK	129.18
43	TN	101.84	TX	112.20	NE	115.36	MO	126.12
44	NE	101.42	TN	110.96	MO	114.86	IA	126.10
45	SD	99.15	OK	109.81	TX	112.11	TX	122.35
46	AR	86.40	SD	106.80	OK	110.22	NE	120.46
47	LA	85.91	IL	105.49	SD	107.86	IL	117.44
48	OK	82.92	LA	100.50	IL	105.08	SD	114.03
Average		128.66		145.60		154.46		164.07
Median		124.52		146.40		151.36		163.86

The table reports the average per diem reimbursement rates for nursing home care in each calendar year. Rates are adjusted for inflation and are reported in year 2009 dollars. The table excludes Alaska and Hawaii. The source of this data is Brown University LTC Focus website.

## OHIO’S PRICE SYSTEM AND FACILITY SPECIFIC RATES

Prior to the new *price system*, the majority of a specific nursing home’s reimbursement rate was determined by the costs incurred in providing care in that facility. Nursing homes that had higher staffing ratios received a higher rate of reimbursement. Under the *price system*, the majority of the reimbursement rate is determined by categorizing facilities into peer groups – with nursing homes within that peer group receiving the same base reimbursement rate. A peer group is defined using two factors – location and size. Location divides the state into three geographic groups based on the county the nursing home is located. Facilities are classified into small and large using a 100 bed cut-off. Each nursing home is then categorized into one of six peer groups.

To calculate total reimbursement rates, under the new *price system* there are five components that determine the Medicaid rate: direct care costs, capital costs, ancillary service costs, taxes, quality incentives, and franchise taxes.

**Table 2. Price System Reimbursement Components**

Reimbursement Component	How It Varies
Direct Care Costs	Peer Group*Case-mix
Capital Costs	Peer Group
Ancillary & Support Costs	Peer Group
Tax Costs	Facility-specific
Franchise Costs	No variation
Quality Incentive	Facility-specific

The largest component of the *price system* and the one with the most variation across nursing homes is the direct care costs. Direct care costs reflect the costs of nursing, nursing aide and other direct care staff in providing assistance to residents. Within each peer group, a specific adjustment factor is calculated per case-mix unit for the median nursing home in the peer group. This factor is then multiplied by the level of need (i.e. case-mix) of the average resident in the facility.

Capital costs reflect the cost of ownership, such as depreciation, interest, or rent of land and buildings. Ancillary and support services include all reasonable costs incurred that are not direct care or capital costs. These include activities, social services, laundry, housekeeping, and utilities, among other things. Both of these cost components were paid the same rate within each peer group, with each component’s rate determined by the per diem cost of the median nursing home within the peer group.

Tax costs reflect the reimbursement for real estate, commercial activities taxes, and property taxes. These rates are specific to each facility, with some nursing homes receiving no payments because they are not-for-profits. Another tax, which is broken out separately by the state

is the franchise cost (i.e. bed tax). All nursing homes in the state are required to pay the same bed tax and there should be no variation across the state. Finally, Ohio includes a quality incentive as part of Medicaid reimbursement. This rate is specific to the facility and is determined by the facility meeting a certain set of criteria.

The implementation of the *price system* was expected to decrease reimbursement rates for some facilities, and increase reimbursement rates for others. To reduce the immediate impact on facilities, the state also passed a stop-loss/gain provision to allow rates to transition slowly to the new *price system*. The provision stated that facilities could not have their reimbursement rates increased or cut by more than 2% per fiscal year. This provision was effective from July 1, 2006 to June 30, 2011 (Fiscal Years 2007 to 2011).

## **UNDERSTANDING THE LINK BETWEEN REIMBURSEMENT AND QUALITY**

The critical policy question raised by these reimbursement changes is simply: what is the link between reimbursement rate and quality? Do facilities that receive a higher reimbursement rate have higher quality outcomes? And if higher priced facilities experience reimbursement cuts, will quality be negatively impacted?

### **Do facilities with higher reimbursement rates demonstrate higher quality?**

To address this question we examined reimbursement and quality measures for the first half of fiscal year 2007; the period before any reimbursement system changes. To determine if there were differences in quality we classified facilities into one of four reimbursement groupings. Group 1 included facilities that were “close” to price in 2007. These facilities were defined as having an actual reimbursement rate that was within 5% (plus or minus) of the price reimbursement rate. A second group of facilities included those with reimbursement rates below the price rate, who would likely see reimbursement rates increase under the *price system*. These facilities were defined as having an actual reimbursement rate that was at least 5% below the price rate. Finally, two groups of facilities with actual reimbursement rates above price were identified and there was an expectation that reimbursement would decline with implementation of the *price system*. The first of these groups had an actual reimbursement rate 5 to 15% above the price rate and the second of these groups had an actual reimbursement rate 15% or greater over price. Examining these groups prior to the system changes allowed us to look at the link between level of reimbursement and quality. In conducting this analysis, average quality levels were adjusted for a host of facility characteristics and, for the resident outcome measures, resident demographic and case-mix characteristics using a statistical technique called linear regression.



Table 3 shows the actual reimbursement rate paid to facilities in Fiscal 2007 and the price rate, reflecting the rate the facility would have received in Fiscal Year 2007 if the *price system* was fully implemented. The final column under Fiscal Year 2007 reports the expected decline in the actual reimbursement the facility would be expected to receive if the *price system* was fully implemented in Fiscal Year 2007. For this column, negative numbers imply increases in reimbursement and positive numbers represent declines in reimbursement.

In Fiscal Year 2007, the average nursing home received \$160.92 but if the *price system* had been fully enacted, the average rate would have been \$1.48 lower at \$159.45. The range in the difference between daily reimbursement rates in 2007 was substantial; \$140 per day, with lowest facility reimbursement at \$112.50 and the highest at \$253.40. Almost half (45%) of facilities were found to be within 5% of price, with the average facility in this category having actual reimbursement rates within 11 cents of price. Slightly under one-quarter of facilities had reimbursement rates that were at least 5% below price. For this group, actual reimbursement rates averaged \$143.69 per day but under the *price system* these facilities would have received about \$18 more per day, to an average reimbursement of \$161.67. In contrast, more than 30% of facilities had actual reimbursement rates at least 5% over price, with 22% having actual reimbursement rates 5 to 15% over price and almost 9% having actual reimbursement rates 15% or more over price. For the 5-15% group, the average reimbursement per day would need to decline by about \$15 per day in order for actual reimbursement rates to get to price. For the facilities the furthest over price, this change would amount to a reduction of \$31.44 per day.

Table 4 presents the characteristics of all nursing homes that fall into each rate group based on reimbursement in FY 2007. Nursing homes that had actual reimbursement rates below the rates dictated by the *price system* were predominately for-profit (91.8%). Facilities that had actual rates over the price rate had a greater mix of for-profit and not-for-profit ownership. For the facilities that were 15+% above price, 55% were not-for-profit and 43% are for-profit. Given the distribution of ownership in the state, not-for-profits were considerably more likely to be above price in the 2007 system.

Also more likely to be above price are independent facilities (i.e., not part of a chain), hospital-based facilities and those with special care units. As for payer-mix and occupancy rates, we do not see any significant patterns across the four groups. Additionally, resident case-mix, which is measured at the facility level, tends to be rather similar across the four groups. The one thing that does stand out is the group 15+% above price has a smaller percentage of residents with other psychiatric illnesses, such as schizophrenia or bipolar disorder.

**Table 3. Nursing Facility Actual and Price Reimbursement Rates 2007**

<i>Rate Categorization in First Half of FY 2007</i>	Sample Size	% of Facilities		Fiscal Year 2007†		
				Actual Paid Rate	(Dollars) Price Rate	Expected Decline in Rates
All Facilities	811	100	Average	160.92	159.45	1.48
			Lowest	112.50	122.03	-45.00
			Highest	253.40	202.98	74.64
Actual Rate below Price Rate by 5%	195	24	Average	143.69	161.67	-17.98
			Lowest	112.50	133.18	-45.00
			Highest	181.66	202.98	-7.83
Actual Rate within 5% of Price Rate	371	46	Average	158.81	158.92	-.11
			Lowest	122.70	122.03	-8.97
			Highest	199.43	191.06	9.02
Actual Rate above Price Rate 5-15%	179	22	Average	174.75	159.83	14.91
			Lowest	137.42	129.42	6.68
			Highest	217.95	193.24	28.34
Actual Rate above Price Rate 15+%	66	8	Average	186.23	154.79	31.44
			Lowest	157.61	131.36	21.06
			Highest	253.40	201.47	74.64

Notes: Nursing homes are categorized based into four groups on the expected change in the facilities per diem reimbursement rate if the *Price system* was fully enacted in FY 2007. The sample is restricted to only nursing homes that had complete data for FY 2007 and 2012. The actual rate paid refers to the per diem rate paid to the facility in that fiscal year. The price rate refers to the per diem rate the facility would have received if the *price system* went into full effect in that fiscal year.

†Fiscal Year 2007 refers to reimbursement rates in the first half of FY 2007 (July 1, 2006 to December 31, 2006)

**Table 4. Facility Characteristics by Reimbursement Category (Fiscal Year 2007)**

	<b>Entire Sample</b>	<b>Actual Rate below Price Rate by 5%</b>	<b>Actual Rate within 5% of Price Rate</b>	<b>Actual Rate above Price Rate 5-12%</b>	<b>Actual Rate above Price Rate 15+%</b>
<b>Ownership (percent)</b>					
For-profit	78.0	91.8	82.9	65.8	42.5
Not-for profit	19.4	7.7	14.1	30.3	54.5
Government	2.6	0.5	3.0	3.9	3.0
<b>Facility Structure</b>					
Number of Beds	102.4	94.7	103.6	107.4	104.7
Chain Affiliation (percent)	61.8	68.7	62.4	57.3	50.0
Hospital-Based Facility	0.7	0	0.0	1.1	6.1
Dementia SCU*	21.3	17.4	22.4	21.9	24.2
Non-Dementia SCU	0.7	0	0.	1.1	6.1
<b>Payer Mix and Occupancy</b>					
Percentage Medicaid	64.5	64.1	65.9	63.3	61.2
Percentage Medicare	13.2	14.5	12.6	13.3	13.1
Occupancy Rate	88.7	88.1	88.2	90.2	89.5
<b>Resident Case-mix</b>					
Acuindex	10.1	10.1	10.1	10.2	10.2
Percentage Dementia	49.1	47.3	50.0	49.5	48.6
Percentage Depression	70.5	73.0	69.8	69.9	68.6
Percentage MR/DD	3.1	3.4	3.2	2.9	2.4
Percentage with Psychiatric Illness	29.1	29.1	29.5	30.1	24.5
Sample Size	811	195	371	179	66

Notes: The table reports descriptive characteristics of facilities in Fiscal Year 2007. These characteristics are reported for the entire sample and by each reimbursement category. \*SCU (Special Care Unit)

## Quality and reimbursement linkage

To assess the linkage between reimbursement and quality we examined a series of quality measures for each of the four reimbursement categories. Areas of quality reviewed included results of the Department of Health inspection survey, direct care staffing patterns, resident and family satisfaction scores, and Minimum Data Set quality indicators (See Table 5).

A comparative review of the number of deficiencies identified through the Department of Health Annual Survey of Facilities found that nursing homes with reimbursement rates of 5 to 15% above price had significantly fewer deficiencies than those facilities in the other price groups. Facilities in the 5 to 15% above price category averaged 4.1 deficiencies per survey, compared to 5.3 for the facilities in the below price category. Facilities in the 15% above price group and in the 5% within price category recorded an average of 4.8 survey deficiencies.

In terms of nurse staffing, facilities with actual reimbursement rates of 5% below price had 3.14 hours per resident day of total nurse staffing compared to 3.85 for facilities 15% above price. This general pattern of higher staffing levels associated with higher actual reimbursement rates relative to price is found for total direct care staff, registered nurses, licensed practical nurses, and certified nurse aide staffing levels. Additionally, this pattern is also found in other forms of staffing, such as housekeeping, food service, dietitians, and activities staff.

Resident satisfaction scores were slightly higher for the higher price facilities, but there were no statistically significant differences in resident and family satisfaction found across the four groups. Facility-level quality measures constructed from OSCAR/CASPER, such as patient restraints and pressure ulcers, showed minimal differences as well. One facility care measure of quality indicated that nursing homes who were 15% above price had more residents with feeding tubes compared to facilities within 5% of price, but all other measures of care practices were similar. Overall, for resident care practice we found no statistically significant differences across the reimbursement groups.

**Table 5. Baseline Quality in Fiscal Year 2007 by Reimbursement Categorization**

	<b>Actual Rate below Price Rate by 5%</b>	<b>Actual Rate within 5% of Price Rate</b>	<b>Actual Rate above Price Rate 5-15%</b>	<b>Actual Rate above Price Rate 15+%</b>
Number of Deficiencies	5.373	4.795	4.068**	4.758
Nursing Staffing (Hours Per Resident Day)				
Total	3.143***	3.407	3.599***	3.846***
Registered Nurse	0.274*	0.295	0.320	0.330
Licensed Practical Nurse	0.806	0.843	0.939***	1.010***
Certified Nurse Aides	2.064***	2.269	2.341	2.505***
Other Staffing (Hours Per Resident Day)				
Housekeeping	0.435***	0.502	0.564***	0.605**
Food Service	0.655**	0.709	0.769**	0.898**
Dietitians	0.023**	0.031	0.038	0.030
Activities	0.193	0.204	0.221**	0.236
Satisfaction Score (0-100)				
Resident	85.337	86.556	86.877	87.347
Family	85.641	85.878	85.651	85.416
Facility Care Practices (% of Residents)				
Facility-Acquired Physical Restraints	5.265	5.228	4.821	4.738
Facility-Acquired Catheters	2.418	1.812	1.834	1.915
Feeding Tubes	4.990	5.471	5.447	6.674**
Resident Quality Outcomes (% of Residents)				
Facility-Acquired Pressure Ulcers	2.839	2.944	2.786	3.142
Facility-Acquired Contractures	15.854	15.168	17.660	18.513

Notes: The table reports the average adjusted-quality for each payment group and statistical tests compare the average adjusted-quality in each group compared to facilities with actual reimbursement rates within 5% of the price rate. Quality is adjusted using a linear regression that controls for-profit status, number of beds, chain membership, hospital-based facilities, presence of Alzheimer's and other special care units, payer mix, occupancy rates, and facility-level case mix measures (acuindex and percent of residents with dementia, psychiatric illness, depression, MR/DD). Staffing outcome regressions exclude facilities that have staffing levels that are outside of three standard deviations from mean staffing. For deficiency, care practices, and quality outcomes higher numbers imply worse quality. For staffing and satisfaction quality measures, higher numbers imply better quality.

\*\*\*p<0.01, \*\* p<0.05, \* p<0.1

**Table 6. Quality in Fiscal Year 2007 by Reimbursement Categorization (MDS Quality Measures)**

	Actual Rate below Price Rate by 5%	Actual Rate within 5% of Price Rate	Actual Rate above Price Rate 5-15%	Actual Rate above Price Rate 15+%
MDS Resident Quality Outcomes (0-1)				
Catheter Use	5.8	6.0	4.8***	5.5
Moderate-Severe Pain	9.1	9.2	10.9**	9.2
Decline in Physical Functioning	11.9	11.2	10.5	10.5
Bowel/Bladder Incontinence	45.1	45.1	44.8	43.2
Physically Restrained	6.4	6.2	6.2	5.3
Urinary Tract Infection	8.4	8.4	9.1	8.2
Pressure Ulcers (Low Risk Resident)	1.6	1.5	1.2	1.2
Pressure Ulcers (High Risk Resident)	7.9	8.4	8.5	8.2
Falls with Major Injury	10.0	10.6	9.7	12.2*
Antipsychotic Medication	25.2	24.3	25.7	28.2***

Notes: The table reports the adjusted-quality for each payment group and statistical tests compare the average adjust-quality in each group compared to facilities with actual reimbursement rates within 5% of the price rate. Quality is adjusted using linear regression that controls for profit status, number of beds, chain membership, hospital-based facilities, presence of Alzheimer's and other special care units, payer mix, occupancy rates, facility-level case mix measures (acuindex and percent of residents with dementia, psychiatric illness, depression, MR/DD) and resident-level controls of age, gender, race, education, physical functioning (ADL index score), diabetes, cardiac dysrhythmia, heart failure, stroke, hip fracture, dementia, schizophrenia, COPD, and cancer. The decline in physical functioning outcome measure does include a control for individual ADL index score. High numbers imply worse quality. For satisfaction measures, higher numbers imply better quality.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

We also compared quality for each group using resident-level quality measures constructed from MDS (See Table 6). For all of these measures, lower numbers imply better quality. While a few groups have statistically significant differences in quality compared to the category of facilities at price, there is no discernable pattern in terms of resident outcomes across the four groups.

In summary, our analysis finds that overall higher price facilities had higher staffing levels and a lower number of survey deficiencies. There were no significant quality differences across price groupings for resident or family satisfaction measures or for the quality indicators included in OSCAR/CASPER and MDS. Overall, we find that higher priced facilities have slightly higher quality, but the differences are limited.

## PRICE SYSTEM'S IMPACT ON QUALITY

The second question for the analysis is whether the change to a *price system* had an impact on quality. In particular, one of the concerns was that reimbursement cuts to higher priced facilities might result in a decline in quality. The first step in studying this question was to examine the actual reimbursement changes between 2007 and 2012. As noted reimbursement changes from 2007 through 2011 included an annual 2% stop-loss/gain component. Effective with the start of Fiscal Year 2012, the Ohio legislation eliminated the stop-loss/gain provision over two years. In Fiscal Year 2012, rates were allowed to adjust by 10%, and additional adjustment over 10% was shared by the state and the facility on a 50% basis. For example, a facility expected to see a 20% cut would see a 15% reduction (10%, plus half of the additional 10% cut). In Fiscal Year 2013, the stop-loss/gain provision was completely eliminated. The quality analysis in this study compares Fiscal Year 2007 and Fiscal 2012. In Fiscal Year 2012, 136 nursing homes were subject to a stop-loss provision. For these 136, if the stop-loss provision had not been in place, reimbursement rates would have been \$4.90 lower, but the impact would have varied considerably ranging from as small as four cents per day to \$46.30 per day. There were no nursing homes subject to a stop-gain provision.

In looking at the actual reimbursement rates between Fiscal Years 2007 and 2011 (the last year the 2% stop-loss/gain provision was in effect), the average nursing home received \$176.17, with the range from a low of \$133.22 to a high of \$257.97 (See Table 7). All four groups had increases in actual reimbursement rates. Those expected to benefit from the transition to the *price system* (actual rate 5% below price) saw average reimbursement rates increase from \$143.69 in 2007 to \$167.41 in 2011. For the group expecting the largest decreases in reimbursement (15% or more over price), average actual rates went from \$186.23 in 2007 to \$192.58 in 2011.

Beginning in 2012, declines began to emerge. Statewide the average nursing home had a reimbursement decline of \$9 per day between Fiscal Year 2011 and 2012, from \$176.17 to \$168.00, indicating that other policy changes had an impact on facility reimbursement rates. Nursing homes who were 5% below price and thus expected to benefit from the *price system* saw virtually no change in average reimbursement between Fiscal Years 2011 to 2012, but all other groups did. The largest decreases occurred in nursing homes that were 15% above price in Fiscal Year 2007. The decrease was \$23.84 per day, going from \$192.58 to \$168.74. The range in reimbursement rates was compressed in Fiscal Year 2012. These changes reflected the near elimination of the stop-loss/gain provision and the change in how some reimbursement components were calculated.

**Table 7. Actual and Price Reimbursement Rates**

<i>Rate Categorization in First Half of FY 2007</i>	Sample Size	% of Facilities		Fiscal Year 2007†			Fiscal Year 2011†	Fiscal Year 2012†
				Actual Paid Rate	Price Rate	Expected Decline in Rates	Actual Rate Paid	Actual Rate Paid
All Facilities	811	100	Average	160.92	159.45	1.48	176.17	168.01
			Lowest	112.50	122.03	-45.00	133.22	130.89
			Highest	253.40	202.98	74.64	257.97	208.43
Actual Rate below Price by 5%	195	24	Average	143.69	161.67	-17.98	167.41	167.78
			Lowest	112.50	133.18	-45.00	133.22	134.15
			Highest	181.66	202.98	-7.83	207.09	208.26
Actual Rate within 5% of Price Rate	371	46	Average	158.81	158.92	-0.11	174.71	167.30
			Lowest	122.70	122.03	-8.97	145.79	133.79
			Highest	199.43	191.06	9.02	210.41	202.57
Actual Rate above Price Rate 5-15%	179	22	Average	174.75	159.83	14.91	182.69	169.47
			Lowest	137.42	129.42	6.68	145.74	130.89
			Highest	217.95	193.24	28.34	223.22	208.43
Actual Rate above Price Rate 15+%	66	8	Average	186.23	154.79	31.44	192.58	168.74
			Lowest	157.61	131.36	21.06	164.40	143.24
			Highest	253.40	201.47	74.64	257.97	208.26

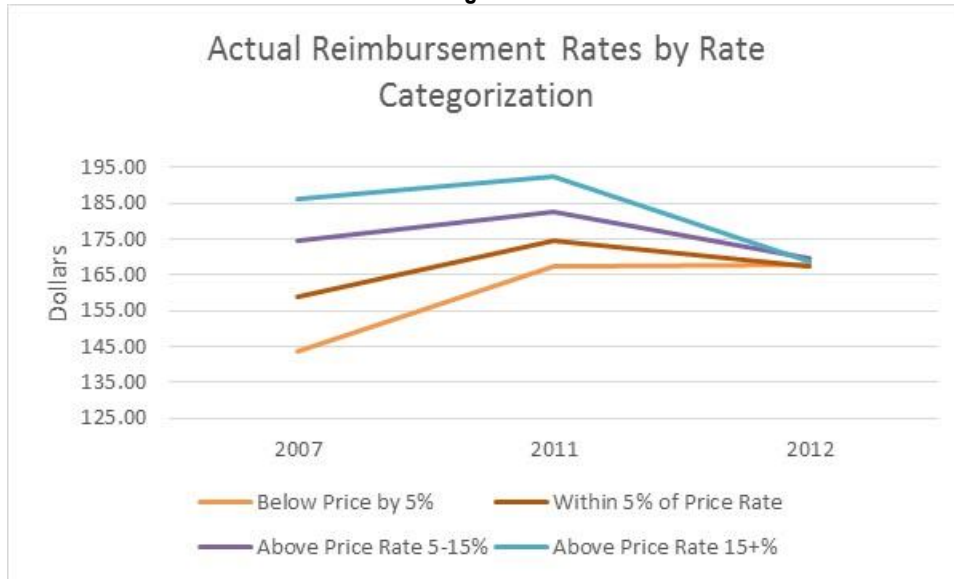
Notes: Nursing homes are categorized based on four groups based on the expected change in the facility's per diem reimbursement rate if the *Price system* was fully enacted in FY 2007. The sample is restricted to only nursing homes that had complete data for FY 2007 and 2012. The actual rate paid refers to the per diem rate paid to the facility in that fiscal year. The price refers to the per diem rate the facility would have received if the *price system* went into full effect in that fiscal year.

†Fiscal Year 2007 refers to reimbursement rates in the first half of FY 2007 (July 1, 2006 to December 31, 2006). Fiscal Year 2011 refers to the second half of FY 2011 (January 1, 2011 to June 30, 2011); and Fiscal Year 2012 refers to the second half of F2FY (January 1, 2012 to June 30, 2012).

To better show the transition to price over time, Figure 2 presents the average actual reimbursement rates paid for each of the four groups from FY2007 to FY2012. The Figure shows that in FY 2007 there was significant variation in the average rate across these four groups. By FY 2012, the average rate in all four groups converged, with rates declining for all but the group below price.



Figure 2



### Quality Changes from Fiscal Year 2007 to 2012

To determine how the *price system* impacted quality, a statistical technique (linear regression equations with facility fixed effects and a host of facility and resident controls) was used to determine how each category of facilities changed on their quality outcomes from FY 2007 to 2012. Did facilities that received cuts or increases in reimbursement show declines or improvements in quality?

Table 8 reports the change in quality between 2007 and 2012 for nursing homes based on their reimbursement category in 2007. There were no statistically significant changes in the number of deficiencies reported between 2007 and 2012. Nurse staffing and housekeeping staff increased significantly in facilities in the 5% below price group. For example, total nurse staffing increased 0.251 hours per resident day (15 minutes) and nurse aide staffing increased by 0.142 hours per resident day (8.5 minutes). Total nurse and aide staffing also increased in facilities within 5% of price slightly by about 4 minutes per resident per day. Facilities in the 5-15% above price group substituted registered nurses for licensed practical nurses and reduced housekeeping staffing levels. Facilities 15% above price lowered food service staffing levels. In looking at the remaining quality measures we found resident satisfaction was stable between 2007 and 2012, but family satisfaction scores declined for 3 of the 4 groups. Since these declines occurred even for facilities regardless of reimbursement cuts, it is difficult to explain these results. Finally, two of the quality indicators, physical restraints and contractures, showed improvement over the study period for all groups.

**Table 8. Change in Quality from FY 2007 to FY 2012**

	Trends in Quality from FY 2007 to FY 2012			
	Actual Rate below Price Rate by 5%	Actual Rate within 5% of Price Rate	Actual Rate above Price Rate 5-15%	Actual Rate above Price Rate 15+%
Number of Deficiencies (#)	0.0008	0.247	0.745	0.122
Nurse Staffing (Hours Per Resident Day)				
Total	0.251***	0.073***	0.005	-0.202
Registered Nurse	0.122***	0.062***	0.062***	0.017
Licensed Practical Nurse	-0.014	0.010	-0.052*	-0.060
Certified Nurse Aides	0.142**	0.001	-0.005	-0.159
Other Staffing (Hours Per Resident Day)				
Housekeeping	0.051**	-0.001	-0.045**	-0.075
Food Service	0.033	0.005	-0.039	-0.184*
Dietitians	0.002	-0.003	-0.005	0.000
Activities	-0.004	0.000	-0.009	-0.028
Satisfaction Score (0-100)				
Resident	0.629	-0.156	0.024	-1.382
Family	-1.094*	-0.830**	-0.952*	-0.532
Facility Care Practices (% of Residents)				
Facility-Acquired Physical Restraints	-3.035***	-2.609***	-2.751***	-1.785***
Facility-Acquired Catheters	-0.296	0.139	-0.247	-0.399
Feeding Tubes	-0.218	-0.394	-0.342	-0.814
Resident Quality Outcomes (% of Residents)				
Facility-Acquired Pressure Ulcers	0.160	0.519	0.313	-0.422
Facility-Acquired Contractures	-4.147**	-2.608**	-5.401***	-6.095**

Notes: The table reports the change (i.e. trend) in adjusted quality for each group over the FY 2007 to 2012 period. Quality is adjusted using linear regressions controlling for profit status, number of beds, chain membership, hospital-based facilities, presence of Alzheimer's and other special care units, payer mix, occupancy rates, and facility-level case mix measures (acuindex and percent of residents with dementia, psychiatric illness, depression, MR/DD) and facility fixed effects. For deficiency, care practice, and quality outcomes measures, higher numbers imply worse quality. For staffing and satisfaction measures, higher numbers imply better quality.

\*\*\*p,0.01, \*\* p,0.05, \* p,0.1

Although there are changes in some measures for all groups, Table 8 does not directly show if these changes are due to other policies that affected all nursing homes similarly or were the direct result of changes in the reimbursement rate the nursing home received. To answer this question, we compared the three groups with reimbursement changes to the group that was already at price on the quality measures. Any statistical difference is then likely to be the result of a change in reimbursement and not from other policies. These results are summarized in Table 9. If the change in quality over the period was statistically different from the group of facilities with actual rates within 5% of price (we call the reference group) the differences are noted in the table.

Our analysis of staffing levels found that facilities with actual rates 15% or above price did reduce the total nursing staff, and the 5-15% above price group reduced the number of licensed practical nurses. Staffing levels were found to decrease in the facilities above price for housekeeping and food service staff relative to the group that was at price to begin with. Staffing levels for registered nurses, certified nursing assistants and housekeepers increased in the facilities 5% below price. In reviewing the direct quality measures, relative to those facilities within 5% of price, there were no statistically significant differences in quality for the number of deficiencies and satisfaction measures. We also found that the majority of resident quality indicators, as measured by the OSCAR/CASPER showed no statistical differences relative to the group that was at price. In one case where a difference was noted, quality actually improved for facilities in the 15% over price category, a group that received the largest cut in reimbursement.

A more detailed presentation of quality changes is shown in Table 10. As noted in the description of Table 9, only the staffing measures showed statistically significant changes over time. The group under price increased the total number of nursing and nursing aide staff by 0.178 hours per resident day (about 10 minutes). The group 15% over price decreased the total number of nursing and aide staff by about 0.275 hours per resident day (16.5 minutes). These changes were statistically significant. Although there were other changes in the quality outcomes, such as the group between 5 to 15% over price showing a 0.5 increase in the number of survey deficiencies compared to the group already at price, none of these changes were statistically significant.

**Table 9. Change in Quality from FY 2007 to FY 2012 Relative to Control**

	Difference Relative to within 5% Price Rate		
	Below Rate by 5%	Above Rate by 5-15%	Above Rate 15+%
Number of Deficiencies (#)	N.S.	N.S.	N.S.
Nurse Staffing (Hours Per Resident Day)			
Total	Increase	N.S.	Decrease
Registered Nurse	Increase	N.S.	N.S.
Licensed Practical Nurse	N.S.	Decrease	N.S.
Certified Nurse Aides	Increase	N.S.	N.S.
Other Staffing (Hours Per Resident Day)			
Housekeeping	Increase	Decrease	N.S.
Food Service	N.S.	N.S.	Decrease
Dieticians	N.S.	N.S.	N.S.
Activities	N.S.	N.S.	N.S.
Satisfaction Score (0-100)			
Resident	N.S.	N.S.	N.S.
Family	N.S.	N.S.	N.S.
Facility Care Practices (% of Residents)			
Facility-Acquired Physical Restraints	N.S.	N.S.	N.S.
Facility-Acquired Catheters	N.S.	N.S.	N.S.
Feeding Tubes	N.S.	N.S.	N.S.
Resident Quality Outcomes (% of Residents)			
Facility-Acquired Pressure Ulcers	N.S.	N.S.	Lower
Facility-Acquired Contractures	N.S.	N.S.	N.S.

Notes: The table reports relative changes in adjusted-quality between FY 2007 and FY 2012 for each price group relative to facilities within 5% of the price rate group. Details on adjustment process are reported in the appendix.

N.S. = No statistically significant difference at the 10% level.

Better/Increase = Improvement in quality measure of higher staffing levels.

Lower/Decrease = Decline in quality measure or lower staffing levels.

**Table 10. Change in Quality from FY 2007 to FY 2012 Relative to Control**

	Difference Relative to within 5% Price Rate		
	Below Rate by 5%	Above Rate by 5-15%	Above Rate 15+%
Number of Deficiencies (#)	-0.239	0.498	-0.125
Nurse Staffing (Hours Per Resident Day)			
Total	0.178**	-0.068	-0.275*
Registered Nurse	0.060***	0.000	-0.045
Licensed Practical Nurse	-0.024	-0.062**	-0.070
Certified Nurse Aides	0.141**	-0.006	-0.160
Other Staffing (Hours Per Resident Day)			
Housekeeping	0.052**	-0.044*	-0.074
Food Service	0.028	-0.044	-0.189**
Dieticians	0.005	-0.002	0.003
Activities	-0.004	-0.009	-0.028
Satisfaction Score (0-100)			
Resident	0.785	0.180	-1.226
Family	-0.264	-.0.122	0.298
Facility Care Practices (% of Residents)			
Facility-Acquired Physical Restraints	-0.426	-0.142	0.824
Facility-Acquired Catheters	-0.435	-0.386	-0.538
Feeding Tubes	0.176	0.052	-0.420
Resident Quality Outcomes (% of Residents)			
Facility-Acquired Pressure Ulcers	-0.359	-0.206	-0.941*
Facility-Acquired Contractures	-1.539	-2.793	-3.487

Notes: The table reports relative changes in quality compared to the reference group of those facilities within 5% of the price rate. Statistical significance is reported relative difference compared to the control group. Quality is adjusted using linear regressions controlling for profit status, number of beds, chain membership, hospital-based facilities, presence of Alzheimer's and other special care units, payer mix, occupancy rates, and facility-level case mix measures (acuindex and percent of resident with dementia, psychiatric illness, depression, MR/DD) and facility fixed effects. Staffing outcome regressions exclude facilities that have staffing levels that are outside of three standard deviations from mean staffing. For deficiency, care practice, and quality outcome measures, higher numbers imply worse quality. For staffing and satisfaction quality measure, higher numbers imply better quality.

\*\*\* p,0.01, \*\* p,0.05, \* p,0.1

## SUMMARY AND CONCLUSION

As a result of an array of policy changes Ohio has reduced its Medicaid reimbursement rate compared to other states around the nation. In 2003, Ohio's Medicaid reimbursement rate ranked 6<sup>th</sup> in the nation, and by 2009 the ranking was 21<sup>st</sup>. One of the elements of Ohio's revised Medicaid reimbursement strategy was a move toward a *price system* implemented beginning in July 2006. A stop-loss/gain provision modified the size of changes until Fiscal 2012. With other reimbursement changes occurring and the stop-gain/loss provision in place, Ohio nursing homes, even those in the high price group, did not see reimbursement reductions until 2012. Beginning in Fiscal 2012 noticeable reimbursement changes were recorded and in this context the research questions for this study were: (1) Is there a link between reimbursement rates and quality? (2) Did reductions in Ohio's Medicaid reimbursement rate impact the quality of Ohio nursing homes?

Our analysis examined a series of quality indicators in 2007 to comparable measures in 2012. Over the six year time period direct care staffing significantly increased for the facilities in the below price grouping. Family satisfaction, even for the group below price, was reduced over the time period. We do not have a definitive explanation for this finding. When comparing quality changes to the group that was already at price we continued to find that facilities in the group that was below price in 2007 did increase direct care staffing, while the groups above price experienced staffing reductions. Our analysis across the array of quality measures did not find any significant changes in quality across the three groups compared to the group at price (the reference group).

Ultimately, decisions about reimbursement have to be about cost-effectiveness. Do the increased staffing costs generate improved outcomes for residents? While the data indicate direct care staffing has become more uniform, to this point there do not appear to be major impacts on quality. There are important provisos to this finding. First, it will be important to look at these data for Fiscal 2013, where more sizable changes may be experienced. Also, it is possible that facilities were able to call on reserves or other approaches to mitigate changes and these protections could become more limited over time. Finally, through an array of changes Ohio has been able to realign the Medicaid reimbursement system and it will be important to examine any further system cuts in the context of the overall Medicaid reimbursement changes already experienced.

## REFERENCES

- Bowblis, J. R., Crystal, S., Intrator, O., & Lucas, J. A. (2012). Response to regulatory stringency: The case of antipsychotic medication use in nursing homes. *Health Economics*, 21(8): 977-93.
- Grabowski, D. C. (2001a). Does an increase in the Medicaid reimbursement rate improve nursing home quality? *Journal of Gerontology*, 56B (2): S84-S92.
- Grabowski, D. C. (2001b). Medicaid reimbursement and the quality of nursing home care. *Journal of Health Economics*, 20:549-569.
- Grabowski, D. C. (2004). A longitudinal study of Medicaid payment, private-pay price and nursing home quality. *International Journal of Health Care Finance and Economics*, 4: 5-26.
- Harrington C., Swan J. H., & Carrillo, H. (2007). Nurse staffing levels and Medicaid reimbursement rates in nursing facilities. *Health Services Research*, 42(3):1105-1129.
- Hyer K., Temple A., & Johnson, C. E. (2009). Florida's efforts to improve quality of nursing home care through nurse staffing standards, regulation, and Medicaid reimbursement. *Journal of Aging & Social Policy*, 21:318-337.
- Intrator, O., & Mor, V. (2004). Effect of state Medicaid reimbursement rates on hospitalizations in nursing homes. *Journal of the American Geriatrics Society*, 52(3): 393-398.
- Medicaid Nursing Home Reimbursement Rates by State Available at <http://ltcfocus.org/>
- Mor, V., Gruneir, A., Feng, Z., Grabowski, D. C., Intrator, O., & Zinn, J. (2011). The effect of state policies on nursing home resident outcomes. *Journal of the American Geriatrics Society*, 59(1): 3-9.
- Nyman, J. A. (1985). Prospective and 'cost-plus' Medicaid reimbursement, excess Medicaid demand, and the quality of nursing home care. *Journal of Health Economics*, 4:237-59.
- Nyman, J. A. (1988). Excess demand, the percentage of Medicaid patients, and the quality of nursing home care. *Journal of Human Resources*, 23(1): 76-92.

Park, J., & Stearns, S. C. (2009). Effects of state minimum staffing standards on nursing home staffing and quality of care. *Health Services Research, 44*(1): 56-78.

Straker, J. K., Ejaz, F. K., McCarthy, C., Jones, J.A. 2007. Developing and testing a satisfaction survey for nursing home residents: The Ohio experience. *Journal of Aging & Social Policy, 19*(2): 83-105.

Teno, J. M., Feng, Z., Mitchell, S. L., Kuo, S., Intrator, O., & Mor V. (2008). Do financial incentives of introducing case mix reimbursement increase feeding tube use in nursing home residents? *Journal of the American Geriatrics Society (56)*:887-890.