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## Nursing Home Quality and Financial Performance: Does the Racial Composition of Residents Matter?

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### Abstract

**Objective**—To examine the effects of the racial composition of residents on nursing homes' financial and quality performance. The study examined Medicare and Medicaid certified nursing homes across the United States that submitted Medicare cost reports between the years of 1999 and 2004 (11,472 average per year).

**Data source**—Data were obtained from the Minimum Data Set (MDS), the On-Line Survey Certification and Reporting (OSCAR), Medicare Cost Reports, and the Area Resource File (ARF).

**Study design**—Panel data regression with random intercepts and negative binomial regression were conducted with state and year fixed effects.

**Principal findings**—Financial and quality performance differed between nursing homes with high proportions of Black residents and nursing homes with no or medium proportions of Black residents. Nursing homes with no Black residents had higher revenues and higher operating margins and total profit margins and they exhibited better processes and outcomes than nursing homes with high proportions of Black residents.

**Conclusion**—Nursing homes' financial viability and quality of care are influenced by the racial composition of residents. Policymakers should consider initiatives to improve both the financial and quality performance of nursing homes serving predominantly Black residents.

### Keywords

nursing homes; racial composition; quality; financial performance; Blacks

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Between 2010 and 2050, the minority population age 65 and older is expected to increase from 20% to 42% of the total population of those 65 and older (U.S. Census Report, 2008). This suggests that the racial composition of nursing home residents will become more

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diverse over time. While recent studies point to increased nursing home use among Blacks (Smith et al., 2008; Ness, Ahmed, and Aronow 2004; Feng et al., 2011), Konetzka and Werner (2009) have documented through a systematic literature review that there are disparities in the quality of nursing home care for minority residents.

Racial/ethnic disparities in quality of care may arise from minorities being concentrated in lower performing nursing homes in terms of both quality and financial performance. While overt segregation, such as the Jim Crow laws, has been abolished in the United States for more than 40 years, de facto segregation continues to exist in the U.S. healthcare system. Prior research indicates that nursing home segregation exist (Smith, 1990; Smith et al., 2007; Fennell et al., 2000) and various factors may contribute to U.S. nursing home segregation. One contributing factor may be geographic/residential segregation, which may limit nursing home choice for minorities. Black nursing home residents tend to follow residential housing patterns, residing in nursing homes located in their communities (Reed and Andes, 2001; Smith et al., 2007; Smith et al., 2008; and Fennell et al., 2000). But these nursing homes may be lower performing facilities in part as a result of lower socioeconomic conditions of minority communities. Another potential contributor of nursing home segregation is the admission process of residents into nursing homes. Better performing nursing homes may selectively admit residents based on payer status and/or race. Medicaid reimbursement is generally less attractive than private pay reimbursement to nursing homes. Since minorities are disproportionately covered by Medicaid, this may further limit nursing home choice and further contribute to nursing home segregation.

Nursing homes that disproportionately serve Black residents tend to be heavily dependent on Medicaid. As such, they are considered part of the lower tier in what has been described as a two-tiered system of nursing homes in the U.S. (Mor et al., 2004). Medicaid-dependent facilities are more likely to encounter financial challenges due to lack of other revenue sources (e.g. other payers or philanthropy) needed to overcome Medicaid shortfalls (Weech-Maldonado et al. 2012). As a result, nursing homes with higher proportions of Black residents may lack the resources needed to invest in staffing, training, and quality improvement initiatives to promote quality of care in nursing homes.

The financial resources available to nursing homes may contribute to racial/ethnic disparities, since the quality of nursing home care has been associated with the availability of resources. Previous studies have used payer mix as a proxy to describe the financial resources available to nursing homes (Mor et al., 2004; Smith et al., 2007; Cai, Mukamel, & Temkin-Greener, 2010). However, this approach does not provide a complete assessment of financial performance (revenues and costs) of nursing homes. While studies suggest that a higher proportion of Black residents is associated with lower quality and financial performance in nursing homes, little is known about how financial performance affects the relationship between the racial composition of residents and the quality of care. The study reported here therefore expands on the current literature by using actual measures of financial performance (revenues, expenses, operating margin, and total margin) to examine the relationship between the racial composition of nursing home residents and nursing home financial performance. In addition, the study examined whether financial performance mediates the relationship between the racial composition of residents and the quality of care in nursing homes.

## METHODS

### Data

Four data sets were used for this study: the On-Line Survey Certification and Reporting (OSCAR) data, Medicare Cost Reports, the Minimum Data Set (MDS), and the Area

Resource File (ARF). The OSCAR dataset provides information on facilities structure (propriety status, chain affiliation, number of beds), staffing, case mix and operations. Surveyors evaluate nursing homes' structural features to ensure that minimum standards are being met (Mor et al., 2004). The information is routinely collected through the Medicare and Medicaid certification process by state licensure and certification agencies. As a part of the recertification process for nursing homes, the data are updated annually. Medicare cost reports provides data on revenues and expenses for nursing homes that have Medicare beds. The MDS is a resident level dataset that provides demographic information, along with an assessment of activities of daily living, medications, and outcomes for treatment planning. Data are collected on all residents in Medicare and Medicaid-certified facilities at the time of admission to the nursing home; thereafter, long-stay residents are then reassessed each quarter. ARF provides information on census, health, and social resources in counties in the United States.

## Sample

The sample consisted of Medicare and Medicaid certified nursing homes in the United States between the years of 1999 and 2004. Hospital-based (an estimated 2200 facilities per year) facilities were excluded from this study because they may behave differently from free-standing nursing homes as result of their focus on post-acute care. Government facilities (an estimated 700 facilities per year) were also excluded because public facilities may be shielded from market forces compared to non-governmental facilities. Financial data were obtained from Medicare cost reports; therefore nursing homes that had no Medicare beds were also excluded. The final sample included approximately 11,472 nursing home facilities in each year.

## Dependent Variables

**Financial Variables**—Financial performance measures included operating profit margin, total profit margin, operating revenue per patient day (PPD), other revenue PPD, operating cost PPD, other cost PPD, and percent of Medicaid residents. The operating margin measure focused on core business operations and excluded the influence of non-operating income like endowments and non-operating expenses such as interest expense. It was calculated as follows:

Operating profit margin:  $\text{operating revenue} - \text{operating expenses} / \text{operating revenue}$

Total profit margin was the overall measure of financial performance. It included all revenues (operating and non-operating) and all expenses (operating and non-operating).

Total profit margin =  $\text{net income} / \text{total revenues}$ .

Net income was defined as what remained available to the business after subtracting all costs including taxes.

Operating revenue PPD consisted of income derived from the firm's core business operations, and it was calculated by dividing operating revenues by total patient days. Other revenue consisted of non-operating income, such as interest income, gain on sale of assets, and charitable contributions; it was calculated by dividing non-operating revenue by total patient days. Operating cost PPD consisted of expenses incurred by a firm in discharging its normal business operations, and it was calculated by dividing operating expenses by total patient days. Other cost PPD included expenses incurred in operations outside the firm's mainline of business such as loss on sale of assets, interest payments, and depreciation, and it was calculated by dividing non-operating cost by total patient days. Finally, the percent of

residents whose primary support was Medicaid was included as a financial dependent variable.

**Quality Variables**—Donabedian's (1988) structure-process-outcome (SPO) framework was used to guide the selection of quality variables. In this framework, structure refers to the professional and organizational resources associated with providing care; process refers to actions that are performed on or done to patients; and outcomes are the states that result from care processes (Kane, 2006). Good structures increase the likelihood of good processes, and good processes increase the likelihood of good outcomes. Good structure can also directly lead to good outcomes.

Structural measures of quality included where nurse staffing variables: certified nurse aide (CNA), licensed practical nurse (LPN), and registered nurse (RN) hours per resident day. Inadequate staffing levels has been associated with poor quality in nursing homes (Bliesmer et al., 1998; Harrington, et al., 2000a; Harrington et al., 2000b; Weech-Maldonado et al., 2004). OSCAR data was used to calculate the staffing variables.

Process measures of quality included pressure ulcer prevention, restorative ambulation, and total catheter use. Pressure ulcer prevention was operationalized as a facility composite score (0–4) of pressure ulcer prevention processes derived from four MDS dichotomous (yes/no) items: turning/repositioning program, pressure relieving seat, pressure relieving mattress, and ointment application. These four variables were selected based on factor analysis with varimax rotation of all skin care processes captured by the MDS. The pressure ulcer prevention composite had adequate internal consistency with a Cronbach's alpha of 0.82. Restorative ambulation was a continuous MDS variable that measured the average number of days in a week that residents in the facility walked using restorative nursing aides. Nursing home residents on a restorative program are more likely to maintain functional mobility because they walk on a regularly basis. Use of catheters, another CMS quality measure, a continuous variable that explained the percentage of residents who had a catheter inserted and left in their bladder. Use of catheters has been associated with higher rates of nosocomial urinary-tract infections in nursing home patients (Wagenlehner et al., 2011).

Outcome measures included quality of care deficiencies and actual harm citations reported in OSCAR. Quality of care deficiencies were defined as the number of deficiencies cited in the state survey. Quality care involves appropriate treatment to prevent and treat pressure sores and urinary tract infections and resident freedom from unnecessary drugs and significant medication errors. Actual harm citations were coded as a dichotomous variable (1 for deficiencies 'F' or higher and 0 otherwise) following Stevenson and Grabowski (2008).

In addition, two risk-adjusted quality measures from the MDS were included as outcome measures: ADL worsening and pressure ulcers- low/high-risk prevalence for long-stay residents. These measures of nursing home quality have been validated by Abt Associates (2004), are part of the *CMS National Nursing Home Quality Measures*, and are currently used on the CMS Nursing Home Compare website. ADL worsening was defined as the percent of residents who declined 4 points or more in the activities of daily living (ADL) scale over a 90-day period. The ADL scale assigns a score on a scale from 0 (independent) to 4 (total dependence) for each of the following: bed mobility, transfer, walking in the room and corridor, locomotion on and off the unit, dressing, eating, toileting, and personal hygiene, for a maximum total score of 28. Higher scores reflect greater dependence on nursing home staff to perform each task and indicate poorer ADL status (Gozalo et al. 2012). Pressure ulcers-high/low risk prevalence was operationalized as the percent of residents who had pressure sores (Stage 1–4). The risk-adjusted quality indicator score is a

facility-level score adjusted for the risk for that specific quality indicator (QI) in the nursing facility. The risk-adjusted QI score can be thought of as an estimate of what the nursing facility's QI rate would be if the facility had residents with average risk. ADL worsening was risk adjusted using multivariate regression models, and covariates include having short-term memory problem, dressing problem, or bladder incontinence in the prior assessment. Pressure ulcer prevalence was risk adjusted using a stratification method: first, a weighted average per quarter was created for high-and low risk measures; then, an average was obtained across quarters. Residents considered high risk for pressure ulcers if they met any of the following criteria: impaired in mobility or transfer, comatose, suffer malnutrition, and end stage disease.

### Independent Variables

The primary independent variable was the racial composition of residents in nursing homes. This information was obtained from the MDS. The racial/ethnic categories included in the MDS are Black, not of Hispanic origin; White, not of Hispanic origin; Hispanic; American Indian/Alaskan Native; and Asian/Pacific Islander. Categories were created based on analysis of the proportion of Black nursing home residents, with the lower 23% of nursing homes representing facilities with no Blacks, the top 10% representing nursing homes with a high proportion of Blacks (more than 32% of the residents are Black), and the medium group representing nursing homes between these two categories.

### Control Variables

Control variables were selected to adjust for factors that might influence the quality or financial performance of nursing homes. These variables included bed size, occupancy rate, payer mix, case mix, chain status, ownership, Herfindahl-Hirschman (HHI) Index, metropolitan location, and per capita income. Nursing home size was operationalized as number of beds. Occupancy rate was measured as the percentage of nursing home beds occupied by residents. Larger nursing homes may benefit from economies of scales, while nursing homes with higher occupancy rates may have higher revenues. Payer mix variables included percent Medicaid and Medicare. The Acuiindex in OSCAR was used as a case mix measure at the facility level; this is based on resident mobility and nursing factors such as the proportion of residents who are bedfast, require assistance with ambulation or transfers, or receive suctioning or intravenous therapy. A facility with higher resident acuity may have higher revenues, but at the same time, is likely to face higher costs than facilities with lower resident acuity.

The literature on quality of care in nursing home chains has had mixed findings; some research indicates that nursing home chains are associated with higher deficiencies (Harrington et al., 2001); higher percentages of residents with pressure ulcers (Kamimura et al., 2007); and more restraint use (Castle & Fogel, 1998). However, Banaszak-Holl et al., (2002) conducted a longitudinal study to examine quality of care in relation to the acquisition of nursing home facilities by chains. The investigators found that chains usually acquired nursing homes that were performing poorly, so initial performance of chain-affiliated nursing homes might appear poor; however, over time, chain-affiliated nursing homes were associated with improved resident welfare. While the relationship between chain-owned nursing homes and quality is not clear, it is evident that nursing home chains have some effect on nursing home quality. Chain operations may reduce administrative costs by serving as a central pool of managerial talent and by centralizing management functions, such as marketing. In addition, input sharing arrangements, such as common information systems, may lower costs in chain-affiliated facilities.

Ownership was defined as for-profit or not for-profit. Ownership status has been associated with both the quality and financial performance of nursing homes. For example, for-profit nursing homes have been found to have poorer quality of care (Hillmer et al., 2005) and a higher proportion of Medicaid residents than not for-profit nursing homes (Mor et al., 2004; Weech-Maldonado et al. 2012).

The Herfindahl-Hirschman (HHI) Index was used to measure competition among nursing homes. The HHI index was constructed by summing the squared market shares (based on residents) of all facilities in the county using OSCAR data. The index ranges from 0 to 1 with, with higher values indicating less competitive environments. Location was a dichotomous variable that identified whether a nursing home was located in a metropolitan area or not. Finally, county per capita income was included to control for socioeconomic differences across counties that could influence nursing home quality and financial performance.

## ANALYSIS

Bivariate analyses were conducted using analysis of variance (ANOVA) for continuous variables and chi-square analysis for categorical variables. Multivariate linear regressions with random intercepts were conducted with the financial variables and with all the quality measures except actual harm citations and quality of care deficiencies. A multivariate logistic regression with random intercepts was conducted with the actual harm citation dependent variable because of the dichotomous nature of the variable. A negative binomial regression, with Hubert-White correction for clustering, was conducted with quality of care deficiencies because of the count nature of the data and the large number of zeros observed in this variable. State and year fixed-effects were included in all models.

To explore the pathways of potential racial disparities in quality (process and outcomes), we conducted a mediation model analysis, using multivariate linear regressions with random intercepts to assess: 1) whether the inclusion of financial variables in our primary regressions reduces the effect of resident racial composition on quality; and 2) whether the relationship between quality measures and racial composition of residents is affected by percent of Medicaid residents. The proportion of Black residents was measured as continuous variable for mediation models. The software statistical program used for the analysis was STATA 10.0.

## RESULTS

Descriptive statistics are presented in Table 1. Nursing homes with a high proportion of Blacks had lower costs but these facilities also had lower revenues PPD and lower total and operating profit margins than nursing homes with no Blacks. Nursing homes with high proportions of Black residents on average had a higher percent of Medicaid residents (81%) and a lower percent of Medicare residents (9%) than nursing homes with no or mixed proportions of Black residents. For-profit nursing homes accounted for an estimated 85% of the nursing homes that had high proportions of Blacks; only 15% of those with high proportions of Blacks were not for-profit. The average occupancy rate across the facilities was approximately 84%. Approximately 84% of nursing homes with high proportions of Blacks were located in metropolitan areas, compared to 43% of nursing homes with no Blacks and 71% with medium proportions of Blacks. Nurse staffing was not significantly associated with the proportion of Blacks in nursing homes.

Among the process measures, pressure ulcer prevention and restorative walking were lower in nursing homes with high proportions of Blacks than in homes with medium or no Black residents. Nursing homes with no Black residents had lower total catheter use than nursing

homes with medium and high proportions of Black residents. Nursing homes with high proportions of Black residents had a greater prevalence of low/high-risk pressure ulcers, greater ADL declines, and more quality of care deficiencies and actual harm citation than nursing homes with no Blacks. Nursing homes with high proportions of Blacks were also larger and located in more competitive environments (lower HHI).

### Multivariate Results

Table 2 presents multivariate regression results, not adjusting for payer mix but including percent Medicaid as a dependent variable. Although nursing homes with no Black residents or medium proportions of Black residents had higher operating costs and other costs PPD than nursing homes with high proportions of Black residents, these homes benefited from higher operating revenues PPD, higher other revenues PPD, higher operating margins and higher total profit margins. Nursing homes with no Black residents and medium proportions of Black residents had lower percent of Medicaid residents than nursing homes with high proportion of Black residents.

Nursing homes with no Black residents and medium proportions of Black residents exhibited better outcomes in terms of quality process measures, such as pressure ulcer prevention, restorative walking, and total catheter use. Nursing homes with no Black residents and medium proportions of Black residents had a lower prevalence of low/high-risk pressure ulcer, fewer quality of care deficiencies and fewer actual harm citations than nursing homes with high proportions of Blacks. However, nursing homes with no Black residents and medium proportions of Black residents showed higher ADL declines than nursing homes with high proportions of Black residents. Nursing homes with no Black residents had more CNAs per 100 residents than nursing homes with high proportions of Black residents.

### Mediation Analysis

Prior literature suggests financial differences between nursing homes with higher proportions of Black residents and other facilities, which may affect the quality of care provided to residents. Table 3a, presents our models with and without financial variables as mediators. The effect of proportions of Black residents on restorative walking and ADL decline are partially mediated by the financial variables; this finding is indicated by the reduced coefficients in model two compared to coefficients in model 1 for these variables. The proportion of Black residents' variable continues to be significant in model 2 for restorative walking and ADL decline. This finding indicates disparities in quality of care persisted, after adjusting for financial variables. The relationship between low/high-risk pressure ulcer and proportions of Black residents is significantly mediated by the financial variables but the effect between the two variables is not reduced upon the inclusion of the mediators, which suggest an inconsistent mediation. This effect may be due to a negative direct effect relationship between the dependent and mediator variable. The effects between the proportion of Black variable and pressure ulcer prevention and total catheter use were not mediated by financial variables; this finding is indicated by the insignificant p-value. While, financial performance factors partially mediate the relationship among some quality variables, racial/ethnic disparities in quality continue to persist after adjusting for financial performance factors.

Table 3b, presents our models with and without Medicaid as a mediator variable. The effects of the proportion of Black residents' variable on total catheter use and low/high-risk pressure ulcer are inconsistently mediated by the percent Medicaid variable. The effects of proportion of Black residents' variable on pressure ulcer prevention, restorative walking, and ADL decline are partially mediated by the percent of Medicaid residents in nursing

homes. Racial/ethnic disparities in quality continue to persist after adjusting for the percent of Medicaid residents in nursing homes.

## DISCUSSION

This study examined the financial challenges of nursing homes with high proportions of Blacks and the quality of care in nursing homes serving high proportions of Blacks. The findings indicate nursing home performance differs between nursing homes that house predominantly Black residents and nursing homes with no or medium proportion of Black residents. As in other studies, nursing home quality was generally lower in homes that served high proportions of Black residents (Mor et al., 2004, Smith et al., 2007 & 2008). However, nursing homes with no Black residents and medium proportions of Black residents had greater ADL declines. Minority residents are on average younger than White residents when they are admitted to nursing homes, thus ADL decline may be slower in this population (Jones et al., 2009). Similar to the findings of other studies, nursing homes with high proportions of Black residents also had a higher percent of Medicaid residents, than other nursing homes (Mor et al., 2004; Garbowksi, 2004; Grunier et al., 2008). Nursing homes with high proportions of Black residents also had poorer financial performance. Nursing homes with no Black residents had higher other revenues PPD, indicating their ability to secure revenue from other sources (e.g., endowments and investment income), which may allow these homes to invest in innovations and quality improvement initiatives to provide better care for residents.

Study results suggest that the proportion of Medicaid and financial performance indicators partially mediate the relationship between the proportion of Black residents and some quality variables. Nursing homes with a high proportion of Black residents have lower quality as a result of higher Medicaid census and lower financial performance. This suggests that these nursing homes lack the resources needed to invest in staffing, staff training, and quality improvement initiatives to promote quality of care in nursing homes. However, adjusting for financial factors had little or no effect on differences in the quality of care between nursing homes with no Blacks and nursing homes with higher proportions of Black residents; nursing homes with higher proportions of Black residents continued to show poorer quality on most measures. This finding suggests that while financial factors may contribute to the relationship between racial composition and nursing home quality, other factors may also influence racial/ethnic disparities in quality of care.

## POLICY IMPLICATIONS

Nursing homes with high proportions of Black residents had lower non-operating revenues than nursing homes with no Black residents. This finding suggests that nursing homes with high proportions of Black residents may lack the ability to obtain revenue from other sources to compensate for Medicaid shortfalls. One potential mechanism to reduce disparities in care would be to increase Medicaid payments to nursing homes. Higher Medicaid payments have been associated with better quality of care among nursing homes (Grabowski, Angelelli, & Mor, 2004; Grabowski & Angelelli, 2004; Grabowski, 2004), including Medicaid-reliant nursing homes (Grabowksi, Angelelli, 2004). While across the board increases in Medicaid payments may not be politically viable given current federal and state budget deficits, more targeted efforts may be feasible. For example, higher Medicaid reimbursement rates may be targeted at nursing homes with a high proportion of Medicaid residents. Similarly, federal-state partnerships may be developed to increase Medicaid funding to low resource facilities that are willing to commit to better management practices and quality improvement activities (Mor et al. 2004). While increased Medicaid reimbursement may provide additional resources to facilities with a high proportion of Black



residents, there may still be other challenges that may contribute to poor quality of care, such as nursing shortages and declining occupancy rates.

Another mechanism may be pay-for-performance systems, with the goal of improving resources and quality of care in nursing homes with high proportions of Black residents. The pay-for-performance system has been described in the nursing home literature as a possible mechanism to improve the quality of care in nursing homes. With pay-for-performance, reimbursement to providers is in part determined by their performance on certain quality measures. Theoretically, if higher quality is rewarded with substantiality higher payment, providers will strive for high-quality care. Arling et al. (2009) have noted that the typical pay-for-performance incentive is a bonus or add-on to a facility's per diem rate. Nursing homes with high proportions of minorities might benefit from such pay-for-performance programs. Since the additional reimbursement could provide these homes with the funds to invest in improving quality of care. There are concerns that pay-for-performance may exacerbate racial/ethnic disparities in care. Better performing nursing homes may be at an advantage of reaching quality targets and reaping the benefits of pay-for-performance relative to low-performing nursing homes that serve minority residents. In addition, the initial cost of improving quality may be a challenge for nursing homes with high proportions of minority residents. Further, pay-for-performance programs that reduce rates for low-performing nursing homes may deny these homes the resources that could be used to improve quality. Nursing homes with high proportions of Black residents may continue to encounter financial challenges relative to other nursing homes, which could exacerbate or maintain racial/ethnic disparities.

There are environmental trends in terms of residential segregation and nursing home occupancy that may influence nursing home segregation in the future. From 1989–2000, residential segregation between Blacks and Whites living in metropolitan areas has been declining (Iceland, Weinberg & Steinmetz, 2002). As communities become more racially/ethnically diverse there is an opportunity for more resident diversification in nursing homes. Similarly, declining occupancy rates of nursing homes may result in less selective admission practices by better performing nursing homes, and as a result increase resident diversity. Future research is needed to examine how these environmental changes may impact the relationship between racial mix and performance.

While regulators have traditionally focused on quality of care issues, this study suggests that monitoring financial performance is also critical. Declining occupancy rates coupled with persistent quality and financial problems may put nursing homes at risk of closure, and this may affect minority communities disproportionately. With a proper monitoring system, regulators could identify nursing homes requiring early intervention. This may include management training, a business turnaround plan, or appointing a third party to manage the facility (Mor et al. 2004). In extreme cases where closure is the only viable option, then a plan should be in place to allow for appropriate relocation of displaced residents.

## LIMITATIONS

There are some potential limitations with this research. A limitation that is inevitable in all cross-sectional studies is inability to infer causality. However, while the data used here were cross-sectional, the authors did examine the data over multiple years, which allowed facilities to be tracked over the years. Nevertheless, a causal relationship between residents' racial mix and nursing home performance cannot be determined from this study. However, this study does indicate that Blacks are at greater risk of being in nursing homes with lower financial viability and poorer quality of care.

Measurement error is always a threat to observational studies, particularly those that rely on self-report. Although data collected for the MDS are reported by the nursing staff and not self-reported by residents, bias may still occur in reporting. Indeed, use of the MDS has been associated with systematic differences in reporting the assessment of patients in nursing homes, which can have an effect on the reliability of the measurement (Mor et al., 2005; Mor et al., 2003). However, when nurses are properly trained to complete this assessment, the MDS may resemble the “gold standard” (Mor et al., 2003). Similar issues may occur with the OSCAR data.

## CONCLUSION

Quality has been a long-standing issue in long-term care. As such, policies have been implemented over time to counter quality issues in nursing homes; the most recent initiatives have been market-driven. While these initiatives are focused on improving quality in nursing homes, less is known about their influence on racial/ethnic disparities in nursing homes. Market-based initiatives may favor higher performing facilities, since lower performing nursing homes may not have the financial resources to invest in quality improvement. This may only perpetuate the two-tiered system in nursing homes, creating additional challenges to access and quality care for minority residents.

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**Table 1**

Descriptive Statistics of Nursing Homes with No, Medium, and High Proportion of Black Residents from 1999–2004

	No Blacks (N = 7,641)	Medium Proportion of Blacks (N = 52,430)	High Proportion of Blacks (N = 6,675)	F- and chi-statistics/p-values
Financial Performance				
Operating Revenue PPD <sup>‡</sup>	149.7 (102.1)	142.4 (60.4)	134.9 (53.3)	37.4 ***
Other Revenue PPD <sup>‡</sup>	20.4 (81.4)	8.1 (45.5)	3.8 (17.4)	249.4 ***
Operating Cost PPD <sup>‡</sup>	149.66 (1.17)	152.92 (0.31)	145.78 (0.71)	34.5 ***
Other cost PPD <sup>‡</sup>	20.8 (39.00)	17.7 (23.3)	14.6 (10.6)	114.3 ***
Operating Profit Margin <sup>‡</sup>	-1.1 (0.43)	-2.2 (0.90)	-1.6 (0.19)	0.7
Total Profit Margin <sup>‡</sup>	-5.5 (0.46)	-9.6 (0.82)	-9.7 (0.22)	10.0 ***
Payer Mix <sup>‡</sup>				
Medicare	9.7 (13.5)	11.7 (12.1)	9.1 (8.4)	216.5 ***
Medicaid	54.0 (22.5)	63.5 (20.9)	81.0 (15.1)	3185.4 ***
Structure (Staffing)				
RNs/100 residents <sup>‡</sup>	11.3 (0.47)	13.1 (1.63)	11.1 (1.29)	0.88
LPNs/100 residents <sup>‡</sup>	18.3 (1.13)	21.6 (1.69)	22.3 (1.22)	1.60
CNAs/100 residents <sup>‡</sup>	57.0 (2.61)	56.2 (3.53)	53.4 (1.92)	0.24
Ownership (%) <sup>‡</sup>				2300 ***
For-profit	55.3%	78.7%	85.3%	
Not for-profit	44.7%	21.3%	14.7%	
Occupancy rate	.84 (.18)	.83 (.17)	.84 (.14)	16.70 ***
Chain Affiliation (%) <sup>‡</sup>				258.09 ***
No	43.5%	34.9%	40.3%	
Yes	56.5%	65.1%	59.7%	
Total Beds <sup>‡</sup>	81.5 (39.9)	119.8914 (56.8)	136.7521 (72.2)	1960.5 ***
Case mix index <sup>‡</sup>	9.7 (1.3)	10.3 (1.3)	10.7 (1.6)	1173.1 ***
Process				
Pressure Ulcer Prevention Process <sup>‡</sup>	1.1 (0.7)	1.0 (0.7)	0.82 (0.7)	293.1 ***
Restorative Walking <sup>‡</sup>	0.78 (0.9)	0.56 (0.7)	0.37 (.5)	602.2 ***
Total Catheter Use <sup>‡</sup>	5.3 (4.7)	6.5 (5.2)	6.5 (5.6)	183.8 ***
Outcomes				
Low/High Risk Pressure Ulcer <sup>‡</sup>	0.10 (0.1)	0.12 (0.1)	0.14 (0.1)	597.7 ***
Activity of Daily Living Decline <sup>‡</sup>	0.17 (0.08)	0.18 (0.08)	0.18 (0.08)	66.0 ***

	No Blacks (N = 7,641)	Medium Proportion of Blacks (N = 52,430)	High Proportion of Blacks (N = 6,675)	F- and chi-statistics/p-values
Actual harm citation (%) <sup>†</sup>				137.15 ***
Yes	17.6%	23.6%	23.0%	
No	82.4%	76.4%	77.0%	
Quality Care Deficiencies <sup>‡</sup>	1.3 (1.6)	1.9 (2.0)	2.3 (2.2)	422.2 ***
Location (%) <sup>†</sup>				3200 ***
Metropolitan	43.0%	71.4%	83.5%	
Non-Metropolitan	57.0%	28.6%	16.5%	
Market Factors				
Per capita income <sup>‡</sup>	26038.62 (6353.1)	28276.9 (8265.0)	28618.72 (9794)	259.3 ***
HHI <sup>‡</sup>	0.3 (0.02)	0.2 (0.2)	0.1 (0.2)	694.8 ***

<sup>†</sup>Categorical variables have percentages and Chi-square tests

<sup>‡</sup>Continuous variables include means and standard deviation, F-statistics based on ANOVAs

\* p < .05

\*\* p < .01

\*\*\* p < .001

**Table 2**

Regression Results for Financial and Quality Performance of Nursing Homes with No, Medium, and High Proportions of Black Residents

Variables	No Blacks <sup>1</sup>	Medium Proportion of Blacks <sup>†</sup>
	Beta (S.E.)	Beta (S.E.)
Financial Performance		
Operating Revenue PPD	3.29 (1.13) **	3.38 (1.01) ***
Other Revenue PPD	2.72 (0.82) ***	2.80 (0.73) **
Operating Costs PPD	2.47 (1.07) *	1.66 (0.95)
Other Costs PPD	1.49 (0.45) ***	1.25 (0.40) **
Operating Margin	0.05 (0.01) ***	0.02 (0.01) *
Total Profit Margin	0.06 (0.01) ***	0.25 (0.01) **
Percent of Medicaid	-9.00 (0.36) ***	-6.81 (0.32) ***
Structure (Staffing)		
RN per 100 residents	2.23 (2.01)	2.52 (1.66)
LPN per 100 residents	-2.77 (1.74)	-1.09 (1.42)
CNA per 100 residents	6.61 (3.27) *	0.52 (2.68)
Process		
Pressure Ulcer Prevention Process	0.06 (0.01) ***	0.07 (0.001) ***
Restorative Walking	0.10 (0.01) ***	0.08 (0.01) ***
Total Catheter Use	-0.54 (0.11) ***	-0.12 (0.10)
Outcomes		
Low/High Risk Pressure Ulcer	-0.007 (0.001) ***	-0.004 (0.001) ***
Activities of Daily Living Decline (ADL)	0.01 (0.001) ***	0.01 (0.001) ***
Actual Harm Citation	-0.38 (0.05) ***	-0.19 (0.04) ***
Quality Care Deficiencies	-0.31 (0.02) ***	-0.15 (0.02) ***

\* p < .05

\*\* p < .01

\*\*\* p < .001

<sup>†</sup>Reference group is high proportion of Blacks

Model adjusted for ownership, occupancy rate, chain affiliation, total beds, HHI, per capita income, location, and case mix index

**Table 3a**

Mediation Analysis The Relationship between Percent Black Residents and Quality: without and with Financial Performance Mediators

	Model 1: Percent Black ( ) without financial performance variables	Model 2: Percent Black ( ) with financial performance variables	p-value <sup>±</sup>
Quality Variables			
Process			
Pressure Ulcer Prevention Process	-0.236 <sup>***</sup>	-0.226 <sup>***</sup>	0.079
Restorative Walking	-0.351 <sup>***</sup>	-0.325 <sup>***</sup>	< 0.001
Total Catheter Use	0.510 <sup>*</sup>	0.630 <sup>**</sup>	0.204
Outcomes			
Low/High Risk Pressure Ulcer	0.014 <sup>***</sup>	0.020 <sup>***</sup>	< 0.001
Activities of Daily Living Decline (ADL)	-0.022 <sup>***</sup>	-0.018 <sup>***</sup>	< 0.001

\* p < .05

\*\* p < .01

\*\*\* p < .001

<sup>±</sup> p-value represents the difference between the two models based on bootstrapping for the mediation models

Model 1 adjust for ownership, occupancy rate, chain affiliation, total beds, HHI, per capita income, location, and case mix index

Model 2 adjust for ownership, occupancy rate, chain affiliation, total beds, HHI, per capita income, location, and case mix index, percent Medicaid, percent Medicare, operating margin, total profit margin, operating cost, non-operating cost, operating revenue, other revenue



**Table 3b**

Influence of Percent Black on Quality: without and with Proportion of Medicaid Mediators

	Model 1: Percent Black ( ) without Proportion Medicaid	Model 2: Percent Black ( ) with Proportion of Medicaid	p-value <sup>±</sup>
Quality Variables			
Process			
Pressure Ulcer Prevention Process	-0.236 ***	-0.217 ***	< 0.001
Restorative Walking	-0.351 ***	-0.324 ***	< 0.001
Total Catheter Use	0.510 *	0.950 ***	< 0.001
Outcomes			
Low/High Risk Pressure Ulcer	0.014 ***;	0.022 ***	< 0.001
Activities of Daily Living Decline (ADL)	-0.022 ***	-0.017 ***	< 0.001

\* p &lt; .05

\*\* p &lt; .01

\*\*\* p &lt; .001

<sup>±</sup> p-value represents the difference between the two models based on bootstrapping for the mediation models

Model 1 adjust for ownership, occupancy rate, chain affiliation, total beds, HHI, per capita income, location, and case mix index

Model 2 adjust for ownership, occupancy rate, chain affiliation, total beds, HHI, per capita income, location, and case mix index, percent of Medicaid