Published in final edited form as:

Med Care. 2010 March ; 48(3): 233–239. doi:10.1097/MLR.0b013e3181ca2810.

Pressure ulcer prevalence among Black and White nursing home residents in New York State: Evidence of racial disparity?

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Abstract

Objective—The occurrence of pressure ulcers (PUs) in nursing homes (NHs) is a marker for poor quality of care. We examine whether differences in PU prevalence between Black and White residents are due to within- or across-facility disparities.

Methods—2006–2007 Minimum Data Sets are linked with the Online Survey Certification and Reporting (OSCAR) database. Long-term care (LTC) residents with high risk for PUs are identified. The dependent variable is dichotomous, indicating PU presence/absence. Individual race and facility race-mix are the main variables of interests.

The sample includes 59,740 LTC high-risk residents (17.4% black & 82.6% white) in 619 NHs. We fit three risk-adjusted logit models: base, conditional fixed-effects, and random-effects.

Results—Unadjusted PU prevalence is 14.5% (18.2% for Blacks and 13.8% for Whites). Overall, Blacks are more likely to have PUs than Whites, controlling for individual risk factors. We find no such effect within facilities after additional controlling for facility fixed effect. The effect of race is significantly different between the base and the conditional fixed-effects logit model. The random-effects and conditional fixed-effects logit models show similar results, demonstrating that higher PU presence among Blacks is associated with greater facility-specific concentration of Black residents.

Conclusion—Greater PU occurrence among Blacks may not result from differential within-facility treatment of Blacks versus Whites. Rather, Blacks are more likely to reside in facilities with poorer care quality. To improve PU care for Blacks, efforts should focus on improving the overall quality of care for facilities with high proportion of Black residents.

Keywords

nursing home; racial disparity; quality

This study does not have any potential conflicts of interest in the past three years.

This study was presented at AcademyHealth Annual Meeting 2009 Chicago and will be presented at APHA 2009 Philadelphia.

INTRODUCTION

In long-term care, as in other health care settings, evidence of racial disparities is unmistakable (1–3). Blacks are 26% less likely to access a nursing home than Whites (4). Compared to Whites, Black nursing home residents are more likely to be un-treated or under-treated. For example, Black residents are less likely to receive analgesics for pain management (5) and less likely than Whites to receive pneumococcal vaccinations (6).

Presence of pressure ulcers is considered to be an important quality indicator in nursing homes since it is closely related to quality of life, mortality, and morbidity (7–9), yet it is potentially preventable (10–12). The occurrence of pressure ulcers among nursing home residents is common (7, 13). The Centers for Medicare and Medicaid Services (CMS) consider pressure ulcer rates to be a quality indicator, and they publish facility-specific prevalence data on the Nursing Home Compare quality report card website.

Black nursing home residents have been found to have a higher prevalence of pressure ulcers than White residents (2, 14, 15). However, the reasons behind this phenomenon are not clear. It may be the result of unequal treatment within the same facility. Nursing homes may provide unequal care to Blacks and Whites in the same facility because of persistent social stereotypes and biases among care providers. They may also discriminate due to financial reasons. Stays of Black residents, for whom Medicaid is disproportionately the primary payer, are reimbursed at a lower rate on average than stays of White residents. Alternatively, it is possible that the disparity between Blacks and Whites is not the result of differential care within the facility, but rather due to differences resulting from the unequal quality of care across facilities. A number of studies have shown that Blacks are more likely to congregate in nursing homes with fewer financial resources and with poorer quality of care (1, 16–19).

It is important to disentangle the source of disparities in quality of care in order to determine the appropriate corrective actions. Disparities resulting from unequal within-facility treatment and disparities due to differences in quality across facilities require substantially different strategies.

To date, to the best of our knowledge, the within versus the across facilities' variations in the relationship between race and quality of care have not been examined (20). The main objective of this study is to disentangle the source of racial disparity in the risk of pressure ulcers in nursing homes. We address two questions. 1) Is the prevalence of pressure ulcers the same for Blacks and Whites within the same facility, adjusting for residents' health status? 2) Is the observed higher prevalence of pressure ulcers among Black residents caused solely by across-facility variations?

STUDY DESIGN

Data and population

Two data sources are employed: the Minimum Data Set (MDS) for all New York State (NYS) nursing facilities during a one year period (06/01/2006–07/01/2007), and the Online Survey Certification and Reporting (OSCAR) file for the same period.

OSCAR data contain information about nursing home characteristics (e.g. facility size, staffing hours, proportion of Medicare/Medicaid residents). The MDS is a federally mandated process for clinical assessment of residents in Medicare or Medicaid certified nursing homes. It contains detailed information about residents' health status. Long term care (non-Medicare) residents are assessed at admission and quarterly thereafter, or when

health status changes significantly (21). The reliability and validity of the MDS data in recording residents' clinical health conditions is generally considered to be high (22–26).

We focus on long-term care (LTC) residents who are at high risks for pressure ulcers. We define LTC residents as individuals with either quarterly or annual MDS assessments, thus ensuring that their length of stay is at least 90 days (approximately). For residents who have more than one quarterly assessment during the year, we randomly select one to avoid within-individual correlation.

The reason we focus on LTC residents is because the prevalence of pressure ulcers among LTC residents is likely a reflection of the quality of care provided in the facility, while the prevalence of pressure ulcers among residents admitted for short-term post-acute care is more likely to be present at admission, reflecting the care received at the hospital.

The definition of high-risk for pressure ulcers is based on the CMS criteria used in the Nursing Home Compare report card. Residents with any of the following conditions at the time of assessment are considered as having high risks for pressure ulcers: (1) impaired in bed mobility or transfer; (2) comatose; or (3) malnutrition (27). The reason that we only focus on high-risk residents is because the prevalence of pressure ulcers is very low among residents who are not at high risk for pressure ulcers (~3% in NYS).

We identify 122,222 unique LTC residents with 68,872 (56%) at high-risk for pressure ulcers. After linking the MDS and OSCAR data, and excluding observations with missing values, the final analytic sample includes 59,740 unique LTC high-risk residents (17.4% Black & 82.6% White) in 619 nursing homes in NYS.

Variables

Outcome variables—Following the CMS' definition, the outcome variable is dichotomous, indicating presence or absence of any stage pressure ulcers (27).

Key variables of interests—The key variables of interests are individuals' race and facility race-mix. We only include residents with race identified as "White" or "Black"; their ethnicities are not considered. Race-mix is calculated as the proportion of Black residents to all residents in that facility during the observational period. The facility race-mix is constructed as 0–10 scale in increments of 10% (we divide the original scale, which ranged from 0–100%, by 10).

Other control variables—Based on the literature, we identify a set of risk adjustors for pressure ulcers from the MDS (8, 28, 29). All the risk adjustors entering the final model are listed in Table-1. In order to account for different effects of risk adjustors on the prevalence of pressure ulcers across age groups (29), four age groups (≤ 65 , 66–75, 76–85, and ≥ 86) are created (represented by three dichotomous variables, ≤ 65 as the reference group) and interacted with all the risk adjustors. In addition, we also use these age groups (main effect) to account for the potential non-linear relationship between age and the prevalence of pressure ulcers. Residents' bed mobility and transfer restriction are categorized as: dependence, extensive assistance, and the reference (independent/supervision/limited assistance). Loss of voluntary movement is defined as a dichotomous variable (=1 if any of the following functions is fully lost: arm voluntary movement, hand voluntary movement, leg voluntary movement, and foot voluntary movement). Body weight is categorized as low (BMI<18.5), undefined (no measurement available, which may be due to residents' being bed-bound) or other (as a reference). We also include dichotomous variables for presence/absence of bedfast, diabetes, peripheral disease, bladder incontinence, bowel incontinence, weight loss, end-stage disease, hip fracture (in the last 180 days) and edema.

Facility level characteristics are obtained from OSCAR and include: ownership (for-profit vs. nonprofit); facility size (number of beds); staff hours (registered nurse, licensed practical nurse, and certified nurse aide) per resident per day; occupancy rates; and percentage of Medicare and Medicaid patients (both on 1–10 scale in increments of 10%). We also control for location of each facility (Upstate vs. Downstate) since practice patterns in NYS nursing homes may be vastly different between these regions.

Statistical analysis

The analysis is done in three steps. The first step is to select risk adjustors and their interaction terms. The second step is to fit three sets of models to investigate the within-facility versus across-facility racial disparity in the prevalence of pressure ulcers. Individuals are the units of analysis for these two steps. The third step is to fit a regression model to examine the relationship between facility race-mix and other facility characteristics. Facilities are the units of analysis for this step.

Step 1 - Selecting risk adjustors—In order to avoid over-fitting the model, we randomize the data into two datasets: a training sample (used to develop the risk adjustment model) and a validation sample (used to validate the risk adjustment model developed from the training sample). This is a standard approach in developing risk-adjusted outcomes (30, 31). We first fit a random-effects logit model in the training sample with all individual level characteristics (including interaction terms) and a random facility intercept to account for the potential clustering of residents within facilities (29). We only keep variables that are significantly associated with the outcome at the 0.2 level (listed in Table-2). A joint likelihood ratio test is performed to compare the reduced model with the full model to confirm that the potentially important variables/interactions are not excluded. We then apply the estimated model to the validation sample and calculate the C statistic for both the training and the validation samples to evaluate the goodness of fit in both models.

Step 2 - Within-facility versus across-facility racial disparity—In order to investigate the relationship between race and the prevalence of pressure ulcers, three types of regression models are fit with the selected risk adjustors. First, a base logit regression is fit to examine the overall difference in the risk of pressure ulcers between Blacks and Whites, controlling for individual-level risk factors. Then a conditional fixed-effects logit model is fit. Conditional fixed-effects models account for the heterogeneity of facilities and provide consistent estimates, regardless of the distribution of the facility effect or the correlation between the facility effect and individual characteristics(32). The likelihood function for this model is conditional on the number of events (pressure ulcer) in the facility. As for a logit model, the number of events in the facility is a minimal sufficient statistic for the facility effect (32, 33). The effect of race estimated from the conditional fixed-effects model represents the within-facility difference in risk of pressure ulcers between Black and White residents. However, the conditional fixed-effects model does not provide the estimation of facility characteristics, which are invariant for residents in the same facility.

The effect of race is then tested between the base logit model and the conditional fixed-effects model by the Wald statistics. The covariance between the two estimates is accounted for in the test since these two models are fit for the same data. If the facility effects are homogenous, i.e. there are no across facility differences in the prevalence of pressure ulcers, then the estimates of the base logit model should not be significantly different from the estimates of the conditional fixed-effects model. The difference in the estimates between these two models indicates the existence of heterogeneity across facilities.

Finally, in order to examine the facility characteristics that may contribute to the risk of pressure ulcers, we estimate a random-effects model, which includes facility as well as individual level characteristics. The effect of facility race-mix from this model indicates across-facility variations that could contribute to the difference in the prevalence of pressure ulcers between Blacks and Whites. A random-effects model requires the assumption of independence between unobserved facility characteristics and other control variables. If any unobserved facility characteristics are correlated with the explanatory variables and with the outcome variable (risk of pressure ulcers), the estimates of all covariates (including individual level covariates) from random-effects logit model will be inconsistent. However, conditional fixed-effects logit model gives consistent estimates regardless of the correlation between facility characteristics and outcome variable. Therefore, random-effects and fixed-effects models are compared to examine the potential inconsistency of the estimates from the random-effects model. If the assumptions for the random-effects model are met, the random-effects logit model estimates (for individual characteristics) should not be very different from the conditional fixed-effects logit model estimates (33).

In order to compare across these three models, we exclude facilities that could not be matched with OSCAR data as the random-effects model requires facility level characteristics. We also exclude facilities with pressure ulcer prevalence of 0% or 100% since those facilities would not be used for conditional fixed-effects models.

Step 3 - Race-mix & facility characteristics—A logit model is estimated to examine the relationship between facility characteristics and concentration of Black residents in a facility. In order to compare the effect sizes of facility characteristics on racial congregation, we standardize the coefficients of the continuous independent variables (i.e. the independent variables are divided by their standard deviation).

RESULTS

Descriptive statistics

In NYS, the prevalence of pressure ulcers among high risk LTC residents is 14.5%. The unadjusted prevalence of pressure ulcers among high risk LTC residents is 18.2% for Blacks and 13.8% for Whites. Table-1 shows the distributions of individual characteristics, stratified by race, and of facility characteristics. Blacks and Whites seem to differ with regard to health status. The distribution of race-mix (proportion of Blacks) in facilities is highly skewed, as illustrated in Figure-1. Only 6% of facilities have race-mix over 50%.

Racial disparity and risk of pressure ulcers

The final model contains all selected individual risk adjusters and interaction terms that are significant at 0.2 the level. The C-statistic of the reduced model is 0.77 in the training sample, and 0.75 the validation sample, suggesting that the selected risk adjusters fit the data well.

The second column of Table-2 depicts the results from the base logit model. Black residents are more likely than Whites to develop pressure ulcers, controlling for other risk factors (OR=1.203, $P<0.01$).

The third column of Table-2 presents the results from the conditional fixed-effects logit model. After accounting for facility fixed effects, we do not detect statistically significant differences in pressure ulcer prevalence between Blacks and Whites. The odds ratio declines from 1.203 ($P<0.01$), in the base logit model, to 0.970 ($P=0.47$), in the conditional fixed-effects logit model. The difference in the odds ratio between the two models is statistically

significant ($P<0.01$), suggesting that the differences in pressure ulcer risks detected in the base logit model are due to heterogeneity of facilities rather than to differential treatment of Blacks and Whites within the same facility.

The fourth column of Table-2 represents the results from random-effects logit model. Consistent with the results from the conditional fixed-effects logit model, individual's race does not seem to have a significant effect on pressure ulcer risks. After accounting for other facility characteristics, facility race-mix is independently significantly correlated with pressure ulcer prevalence: every 10% increase in the proportion of Black residents is correlated with 4% increase in the odds of having pressure ulcers ($OR=1.04$, $P<0.01$). Residents in for-profit facilities or facilities located in Downstate NY have higher odds of pressure ulcer prevalence compared with their counterparts in not-for-profit facilities or facilities located in Upstate. In addition, residents in facilities with higher RN hours are less likely to develop pressure ulcers than their counterparts in facilities with lower RN hours.

The coefficient estimates of individual characteristics from the random-effects logit model (column-4) are similar to the estimates from the conditional fixed-effects logit model (column-3). This suggests that the random-effects model does not suffer extensively from inconsistency.

In order to test the robustness of our findings, we also repeat the analyses with the outcome variable defined as pressure ulcers with stage 2 or higher (penetrating the skin), since these stages of pressure ulcers are more likely to lead to clinically important complications such as infections. Our findings with regard to racial disparity remain unchanged: the difference in the prevalence of pressure ulcers with stage 2 or greater between Whites and Blacks are due to across facility variations rather than within-facility disparity.

Race-mix & facility characteristics

Facilities with higher proportion of Blacks are more likely to be not-for-profit, have more beds, be located downstate, and have higher proportion of Medicaid residents; and the effect sizes are not trivial (Table-3). For example, the odds ratio of being Black in a for-profit facility is 0.83 compared to a not-for-profit facility. We note, however, these results only provide information about the associations between facility characteristics and race-mix, not causal relationships.

DISCUSSION

This study finds that Blacks have higher odds of experiencing risk adjusted pressure ulcer outcomes than Whites in NYS nursing home. Furthermore, we find that the higher rates of pressure ulcers experienced by Blacks can be attributed to their disproportionate congregation in facilities with lower quality of care rather than within facility disparities. That is, all residents in such facilities have higher risks of pressure sores, regardless of race.

The within-facility racial disparities in treatment have not been previously studied (20). However, studies that did examine the within-facility disparities in quality of care delivered to Medicaid and private-pay residents also found no significant within-facility differences (34). These findings suggest that daily care staff are not likely to systematically render better or worse care to residents on the basis of race or insurance status. Similarly, consistent with other studies (20), we find that residents in facilities with higher proportion of Blacks have higher risk of pressure ulcers than their counterparts from facilities with lower penetration of Blacks. This may be explained by the fact that Blacks are more likely to reside in nursing homes with higher percentage of Medicaid residents. Such facilities have been shown to have fewer resources and poorer quality of care (18).

Since the disparity we observed is mostly due to variations across facilities, it may be necessary to improve overall quality in facilities serving a large percent of Blacks in order to bring about equality in outcomes. Such efforts may require a substantial influx of new resources to facilitate upfront investments necessary to institute quality improvement processes in these facilities. In recent years, a number of state Medicaid agencies started to implement Medicaid pay-for-performance (P4P) strategies in nursing homes, using either a bonus or an add-on to facility daily rate based on quality improvement (35, 36). Such strategies may provide some financial incentives for nursing homes where Blacks tend to congregate to improve their quality of care. However, whether as a result of such incentives the differential in quality of care between these facilities and those with mostly White residents will narrow, remains to be seen. Furthermore, P4P alone may not be sufficient to bring about quality improvement. Blacks are more likely to congregate in facilities with Medicaid concentration, which tend to be more strapped for resources. Moreover, as suggested by Mor et al (18), poor-quality facilities are not randomly distributed, but rather they are aggregated in poor communities. Therefore, such facilities may require additional funding to bring them up to par, so that eventually they may be able to successfully compete for P4P rewards and produce better outcomes. A simple subsidy of these poor quality facilities is, however, costly and inefficient. A better approach may be a subsidy based on the continuous evaluation of quality of these facilities (18).

The congregation of Blacks into “poorer” quality nursing homes may also be the result of “better” quality nursing homes denying or delaying admissions based on individual’s race (37). Although nursing homes in New York State are required not to discriminate against Medicaid residents with regard to admission (New York regulation section 415.3), perhaps not all facilities faithfully follow this regulation. This may be true especially of those homes that have long waiting lists are also the one “better” quality. Additional research is needed to prove or disprove this supposition. It has been suggested that higher Medicaid payments, on behalf of the access-disadvantaged populations, may more equitably redistribute them across facilities (36). However, the impact of such a strategy has not as yet been tested.

Several limitations should be mentioned. First, we only examine racial disparity with regard to the risk of pressure ulcers in nursing homes. CMS measures nursing home quality of care using nineteen quality indicators. It has been shown that there is no association between quality performance in one area with that of another (31). For example, a facility that provides poor quality of care in prevention of pressure ulcers may have average or good performance with regard to a different quality indicator. It would be prudent to examine the relationship between race and other quality indicators before concluding that there is no within-facility disparity in the overall quality of care provided to Blacks and Whites in other dimension of care. Second, this study is only focused on facilities in NYS. Therefore, its findings might not generalize to other states.

In conclusion, we find that in New York State higher odds of risk adjusted pressure ulcers among Black nursing homes residents are largely a function of differences across facilities rather than of within-facility discrimination. To improve the quality of pressure ulcer care for Black nursing home residents, efforts should focus on improving the overall quality of care in facilities with higher proportion of Black residents.

Acknowledgments

We gratefully acknowledge funding from the National Institute on Aging, Grant R01 AG23077.

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Figure 1.
Distribution of concentration of Blacks in the facility in NYS

Table 1

Characteristics of LTC residents with high risk for pressure ulcers in NYS: descriptive statistics

Individual characteristics (N=59,740)		
	White(N=49,324)	Black(N=10,416)
Sore (%)	13.8%	18.2%
Age group1 (<=65) (%)	8.2%	18.7%
Age group2 (66–75) (%)	9.1%	17.9%
Age group3 (76–85) (%)	29.7%	30.9%
Age group4 (>=86) (%)	53.0%	32.6%
Male (%)	25.7%	32.2%
Bed mobility: extensive assistance (%)	52.0%	35.2%
Bed mobility: total dependence (%)	26.4%	37.7%
Transfer restriction: extensive assistance (%)	51.1%	36.8%
Transfer restriction: total dependence (%)	44.5%	62.1%
Loss of voluntary movement (%)	14.2%	27.4%
Bedfast (%)	2.3%	2.8%
Diabetes (%)	29.3%	47.4%
Peripheral vascular disease (%)	17.4%	16.7%
Bladder incontinence (%)	77.0%	82.0%
Bowel incontinence (%)	67.2%	80.6%
Indwelling catheter (%)	8.0%	6.1%
BMI<18.5 (%)	8.6%	8.3%
BMI (undefined) (%)	2.3%	2.5%
Weight loss (%)	10.0%	8.8%
End-stage disease (%)	1.6%	0.7%
Hip fracture in last 180 days (%)	2.1%	0.5%
Edema (%)	14.3%	8.7%
Facility characteristics (The following statistics is based on 619 facilities)		
Profit (%)	50.1%	
Downstate (%)	48.5%	
Number of beds in the facility (Mean, SD)	188.50 (130.59)	
RN hours per resident per day (Mean, SD)	0.59 (0.27)	
LPN hours per resident per day (Mean, SD)	0.77 (0.29)	
CNA hours per resident per day (Mean, SD)	2.26 (0.43)	
Occupancy rate ¹ (Mean, SD)	92.84 (7.13)	
Race-mix:proportion of black residents in the facility (Mean, SD) ²	1.25 (1.85)	
Proportion of Medicare residents in the facility (Mean, SD) ²	1.31 (1.11)	
Proportion of Medicaid residents in the facility (Mean, SD) ²	6.99 (1.77)	

¹ On 0–100 scale

²On 0–10 scale

Table 2

Estimates from three sets of models for LTC residents with high risk for pressure ulcers in NYS

Independent variables (Number of individual=59740; Number of facilities=619)	Base logit model	Conditional fixed-effects logit model	Random-effects model with Bootstrapping SE
	Odds Ratio	Odds Ratio	Odds Ratio
Black +++	1.203***	0.970	0.976
% black residents (0–10 scale)	-	-	1.036***
Age group1 (<=65)	reference	reference	reference
Age group2 (66–75)	1.295***	1.227***	1.245***
Age group3 (76–85)	1.281***	1.269***	1.274***
Age group4 (>=86)	1.211***	1.200**	1.203**
Male	1.253***	1.248***	1.253***
Bed mobility-extensive assistance	1.428***	1.564***	1.546***
Bed mobility-total dependence	1.844***	2.072***	2.022***
Transfer restriction-extensive assistance	1.380***	1.272***	1.268***
Transfer restriction-total dependence	2.231***	2.065***	2.056***
Transfer restriction-total depend.×group3	1.169***	1.162**	1.166**
Loss of voluntary movement	1.496***	1.500***	1.503***
Loss of voluntary movement* group3	0.911	0.889*	0.893*
Bedfast	1.927***	1.875***	1.941***
Diabetes	2.047***	1.941***	1.969***
Diabetes×group2	0.741***	0.770**	0.764**
Diabetes×group3	0.696***	0.719***	0.716***
Diabetes×group4	0.649***	0.671***	0.664***
Peripheral vascular disease	1.247***	1.342***	1.310***
Bladder continence	0.622***	0.618***	0.616***
Bladder continence×group4	1.181***	1.158**	1.170***
Bowel incontinence	1.460***	1.333***	1.345***
Indwelling catheter	2.805***	2.906***	2.921***
BMI<18.5	1.956***	1.942***	1.939***
BMI (undefined)	1.128	1.201**	1.198**
BMI<18.5 ×group4	0.708***	0.684***	0.686***
Weight loss	1.929***	1.900***	1.928***
Weight loss×group4	1.115	1.149**	1.137*
End-stage disease	1.581***	1.698***	1.704***
Hip fracture in last 180 days	2.532***	2.590***	2.609***

Independent variables (Number of individual=59740; Number of facilities=619)	Base logit model	Conditional fixed-effects logit model	Random-effects model with Bootstrapping SE
	Odds Ratio	Odds Ratio	Odds Ratio
Fracture×group2	0.504 [*]	0.527 [*]	0.506 [*]
Edema	1.496 ^{***}	1.669 ^{***}	1.641 ^{***}
Edema×group3	0.933	0.907	0.921
Profit			1.067 ^{**}
Number of beds (facility size)			1.000
Registered nurse hours/resident/day			0.877 [*]
Licensed practical nurse hours/resident/day			0.997
Certified nurse aide hours/resident/day			1.012
Occupancy rate			0.998
% Medicare residents (0–10 scale)			1.026
% Medicaid residents (0–10 scale)			1.021
Downstate			1.415 ^{***}

p<0.01,

**
p<0.05,

*
p<0.1;

+++ The effect of race from base logit (1.203) model is significantly different from that from conditional fixed-effect (0.970) log model, with P<0.01.

Table 3

The association between facility characteristics and facility race-mix (the proportion of Black residents) among NY nursing homes: **results from a logit model**

Facility Characteristics	Odds Ratio	Standardized Estimates (Odds Ratio)
Profit	0.830***	$\sqrt{3}$
Number of beds (facility size)	1.001***	1.101
Registered nurse hours/res/day	1.120***	1.016
Licensed practical nurse hours/res/day	1.077***	1.012
Certified nurse aide hours/res/day	0.923***	0.982
Occupancy ¹	0.995***	0.983
% Medicare residents ²	1.073***	1.047
% Medicaid residents ²	1.417***	1.386
Downstate	3.795***	$\sqrt{3}$
Intercept	0.006***	-

¹ is on 1–100 scale. One unit increase=1% increase

² is on 1–10 scale. One unit increase=10% increase

³ the categorical independent variables are not standardized

p<0.01,