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Fall 10-21-2008

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# The Percentage of Beds Designated for Medicaid in American Nursing Homes and Nurse Staffing Ratios

Christopher Donoghue, PhD

**ABSTRACT.** Previous analyses of the inverse relationship between a nursing home's Medicaid census and its quality of care have been based on samples limited to specific geographic regions, for-profit entities, or only skilled care facilities. The present study uses national-level data from the 1999 National Nursing Home Survey to examine the association between the proportion of beds designated for Medicaid residents and nurse staffing ratios. The results indicate that homes which designate a higher proportion of their beds for Medicaid recipients maintain lower ratios of registered nurses and nurse's aides to residents, even when key facility characteristics are controlled. It was also found that nursing homes with a higher proportion of Medicaid beds offer lower nursing ratios regardless of their profit status or the difference between private pay rates and Medicaid reimbursement rates. Since lower nursing ratios have been previously linked to negative outcomes, these findings suggest that homes which rely more heavily upon Medicaid recipients may be using cost-cutting strategies which have negative implications for quality. *[Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.HaworthPress.com>> © 2006 by The Haworth Press, Inc. All rights reserved.]*

**KEYWORDS.** Nursing homes, Medicaid, staffing ratios

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Journal of Health & Social Policy, Vol. 22(1) 2006  
Available online at <http://jhsp.haworthpress.com>  
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doi:10.1300/J045v22n01\_02

The quality of care in American nursing homes has been under the microscope of social scientists now for at least 25 years. Fears of negligence and mistreatment first led to a public outcry in the 1970s and '80s. The severity of those concerns was confirmed by reports from the Institute of Medicine and the General Accounting Office, both of which provided empirical evidence that the quality of nursing home care needed immediate attention (IOM, 1986; USGAO, 1987). Congress responded by passing the Omnibus Budget Reconciliation Act of 1987 (OBRA) to set up and enforce strict standards of quality nursing home care (OBRA, 1987). This law mandated that nursing homes be periodically inspected and sanctioned for quality deficiencies. The Center for Medicare and Medicaid Services (CMS) is the government body now in charge of setting guidelines and standards of quality care to be enforced at the state level. Recent reports have shown that progress has been made but that quality is still a major problem (USGAO, 2003, 1999).

These concerns have also led to a significant amount of empirical research devoted to the identification of nursing home characteristics and state regulatory strategies that may affect the quality of care (Davis, 1991; Grabowski, 2001). Implicit in much of this literature has been the negative association between a nursing home's Medicaid census and its quality of care; yet there are few recent studies of this relationship and none that have used national level data. It is also unknown whether this association exists among for-profit and non-profit facilities alike; or if it diminishes when Medicaid rates are more similar to private pay rates. The primary goal of this study is to explore the association between the proportion of beds a nursing home designates for Medicaid recipients and its nurse staffing ratios.

Recent estimates indicate that private pay rates remain much higher than Medicaid reimbursement rates (Jones, 2002). The rationale for not raising Medicaid rates relative to private pay rates may stem from early nursing home research which suggested that an increase in Medicaid reimbursement would lead to lower quality care. This was anticipated because a smaller gap between private pay rates and Medicaid rates may reduce the incentive for nursing homes to compete for privately paying residents by improving their standards of quality (Scanlon, 1980; Nyman, 1988; Gertler, 1989, 1992). This association has been cast into doubt, however, by more recent research which indicates that declining occupancy rates have contributed to a more competitive nursing home market where higher Medicaid reimbursement rates have a small but positive effect on quality (Grabowski, 2001, 2004).

A secondary goal of this analysis is to determine whether the difference in the nursing ratios between facilities with high and low proportions of beds designated for Medicaid, varies by either the gap between private pay rates and Medicaid reimbursement rates or a facility's profit status. These two factors may be influential because they represent the extent to which nursing homes stand to profit by admitting privately paying residents instead of Medicaid recipients. For-profit homes that designate more beds for Medicaid recipients may be more likely than their non-profit counterparts to employ fewer nurses per resident because of their greater desire to contain costs when accepting lower paying residents. The difference in the nursing ratio among facilities with higher and lower proportions of beds designated for Medicaid recipients may also be enlarged in facilities where the gap between private pay rates and Medicaid rates is wider.

## ***METHODS***

### ***Data***

All of the data have been extracted from the 1999 National Nursing Home Survey (NNHS). This dataset is a valuable source of information that has been frequently used in studies of nursing homes and their residents for over twenty years (Corder and Manton, 1996). The survey has been conducted by the National Center for Health Statistics (NCHS) six times since 1977. The NNHS is based on questionnaires administered to large nationally representative samples of nursing homes, current residents, and recently discharged residents, selected by a stratified two-stage probability design (Jones, 2002). 18,400 nursing facilities were stratified by their geographic region and type (hospital or non-hospital based) before their random selection; and then weighted in proportion to their number of beds. The specific weighting procedures are described in the NNHS documentation; however, they were not used for this analysis because no efforts are made here to produce national estimates. Only facilities certified by Medicare or Medicaid with at least three beds were entered into the sample. Of them, a small number were removed because they had ceased operations or because they refused to participate. 1,423 nursing homes were then selected to make up the nursing home sample.

In the present analysis, 512 nursing homes were removed because they were missing data on either the proportion of beds designated for Medicaid or the difference between private pay rates and Medicaid rates.

This yielded a sample size of 912 nursing homes. In a separate analysis (not shown) mean substitution was used to fill in all of the missing data. No significant differences were observed in the results.

### *Variables*

Table 1 displays the operationalization methods and the descriptive data for all of the variables in the analysis. The independent variables include the nursing home's proportion of beds designated for Medicaid, profit status (for-profit or non-profit), total number of beds and the rate differential. The proportion of beds designated for Medicaid refers to the number of beds in the home designated for Medicaid residents only, divided by the total number of beds in the home. Using residents instead of beds, Grabowski (2001) estimated that 73% of all current residents are

TABLE 1. Operationalization Methods and Descriptive Data (n = 912)

Variable	Description	Mean	Standard Deviation
Registered Nurse to Resident Ratio	the number of full-time equivalent (part-time counted as one half) registered nurses divided by the total number of residents.	.10	.09
Licensed or Vocational Nurse to Resident Ratio	the number of full-time equivalent (part-time counted as one half) licensed or vocational nurses divided by the total number of residents.	.13	.11
Nurse Aide to Resident Ratio	the number of full-time equivalent (part-time counted as one half) aides divided by the total number of residents.	.40	.27
Total Nursing Ratio	the number of full-time equivalent (part-time or vocational, and aides) divided by the total number of residents.	.62	.41
Medicaid Designated Beds	(the total number of beds certified for Medicaid minus the total number of beds dually certified for Medicare and Medicaid) divided by the total number of available beds.	.33	.37
Rate Differential	the private pay per diem rate for skilled care minus the Medicaid per diem rate.	42.12	58.42
For-profit	1 = Proprietary, 0 = Non-profit, Federal, State and Local Facilities	.66	
Total Beds	the total number of beds set up and staffed for use by residents only	159.59	106.79

covered by Medicaid. Nyman (1988) found a proportion of 72% in a sample of Wisconsin nursing homes. In the present study, beds are used instead of residents because the 1999 NNHS did not probe for the number of Medicaid recipients in a facility. The rate differential represents the actual dollar difference between the room rates charged for skilled care among privately paying residents and the state Medicaid rate.

Four dependent variables are used to represent the nurse staffing levels. Previous research has indicated that the ratio of nurses to residents is highly correlated with positive resident outcomes (Bliesmer, Smayling, Kane, and Shannon, 1998; Cohen and Spector, 1996; Harrington and Swan, 2003; Spector and Takada, 1991). The first is the ratio of full-time equivalent registered nurses (part-time nurses counted as one half) divided by the total number of residents in the home. The second is the ratio of full-time equivalent licensed or vocational nurses divided by the total number of residents in the home. The third is the ratio of full-time equivalent nurses' aides divided by the total number of residents in the home. Finally, the total nursing ratio is a composite ratio of all the full-time equivalent nurses (registered, licensed/vocational, or aide) divided by the total number of residents in the home.

### *Analysis Strategy*

The results are generated from two sets of multivariate analyses using the ordinary least squares method. Both sets feature regression models designed to test the first hypothesis which suggests that homes with a higher proportion of beds designated for Medicaid residents are more likely to have fewer available nurses per resident. In the first set, the proportion of Medicaid designated beds and other facility characteristics are regressed onto the ratio of registered nurses to residents, the ratio of licensed or vocational nurses to residents, and the ratio of nurses' aides to residents. Similarly, the first model of the second set regresses the proportion of Medicaid designated beds and other facility characteristics onto the total nursing ratio.

In the second and third models of the latter set of equations, two interaction terms are tested, the first between profit status and the proportion of Medicaid designated beds; and the second between the rate differential and the proportion of Medicaid designated beds. The first interaction term (profit status\*Medicaid designated beds) is utilized to test the second hypothesis which suggests that for-profit and non-profit homes are equally likely to offer lower nurse to resident ratios when a higher proportion of their beds are designated for Medicaid. If the interaction term is not signif-

icant, this will indicate that the hypothesis has been supported because there is no difference between for-profit and non-profit homes in the relationship between the proportion of Medicaid designated beds and the nursing ratio.

The second interaction term (rate differential\*Medicaid designated beds) is utilized to test the third hypothesis which suggests that a greater difference between the private pay rate and the Medicaid rate will make homes more likely to offer a lower nursing ratio when a higher proportion of their beds are designated for Medicaid recipients. If the interaction term is positive and significant, this will indicate that the hypothesis has been supported because an increase in the rate differential results in an increase in the significance of the negative relationship between the proportion of Medicaid designated beds and the nurse to resident ratio.

## **RESULTS**

The first set of multiple regression analyses for the association between the facility characteristics and the three nursing ratios can be found in Table 2. The results show that the facility characteristics are significantly related to the ratio of aides to residents and to the ratio of registered nurses to residents, but not to the ratio of licensed or vocational nurses. Nursing homes with a higher proportion of beds designated for Medicaid residents are significantly more likely to have both lower ratios of aides and registered nurses to residents. Similarly, for-profit homes are more likely than non-profits to offer both lower ratios of aides to residents and registered nurses to residents. It should be noted, however, that the  $R^2$  values are low for all three models which indicates that only a small amount of variation has been explained.

Table 3 displays the results of the second set of regression analyses. Here the nursing ratio includes all types of nurses (aides, licensed/vocational, and registered). As expected, an increase in the proportion of beds designated for Medicaid is related to a significant decrease in the ratio of all nurses to residents. Thus, the first hypothesis is confirmed when using the ratio of aides, registered nurses, and all nurses as the dependent variable. In the second and third models, the two interaction terms are introduced to test prior assumptions in the literature about the relevance of profit status and the rate differential to the association between payment type mix and the quality of care. Both were conducted to probe for variation among different types of facilities, in the strength of the correlation between the proportion of beds designated for Medicaid and the nursing

TABLE 2. Unstandardized Partial Regression Coefficients for the Effects of Facility Characteristics on the Ratio of Aides, Licensed or Vocational Nurses and Registered Nurses to Residents (n = 912)

Variable	Aides	Licensed or Vocational Nurses	Registered Nurses
<i>Facility Characteristics</i>			
Medicaid Designated Beds	-.08**	-.01	-.03***
Total Beds	.07E-3	.09E-4	-.07E-4
For-profit	-.05*	-.04E-1	-.02***
Rate Differential	.02E-2	.01E-2	.02E-3
Constant	.45	.14	.12
R <sup>2</sup>	.03***	.07E-1	.04***

\*p &lt; .05 \*\*p &lt; .01 \*\*\*p &lt; .001

TABLE 3. Unstandardized Partial Regression Coefficients for the Effects of Facility Characteristics on the Ratio of All Nurses to Residents (n = 912)

Variable	Model 1	Model 2	Model 3
<i>Facility Characteristics</i>			
Medicaid Designated Beds	-.12**	-.20**	-.17***
Total Beds	.07E-3*	-.08E-3	-.07E-3
For-profit	-.08*	-.11**	-.07*
Rate Differential	.03E-2	.03E-2	.06E-2*
<i>Interaction Terms</i>			
Profit*Medicaid Designated Beds		.11	
Rate Differential*Medicaid Designated Beds			.01E-1
Constant	.71	.73	.72
R <sup>2</sup>	.03***	.03***	.03***

m p &lt; .1 \*p &lt; .05 \*\*p &lt; .01 \*\*\*p &lt; .001

ratio. The insignificance of the first term (profit\*Medicaid Designated Beds) confirms the second hypothesis. This suggests that there is no difference between for-profit and non-profit nursing homes in the extent to which a higher proportion of Medicaid designated beds is related to a lower total nursing ratio. The non-significant effect of the second interaction term (rate differential\*Medicaid Designated Beds) shows that the relationship between the proportion of beds designated for Medicaid and the total nursing ratio, does not vary by the rate differential. Thus, the third hypothesis is rejected.

### DISCUSSION

The results of the analysis confirmed that the negative association between beds designated for Medicaid and the nursing ratio is present among nursing homes at the national level. This relationship was also found to exist even when controlling for profit status, the total number of beds, and the difference between private pay rates for skilled care and the Medicaid rate. Nevertheless, the total nursing ratio represents only the structural dimension of quality care. More research is needed to determine if the relationship would be the same when using process or outcome standards of quality care such as the number of citations for health deficiencies or the prevalence of pressure sores among the residents.

The negative association between the proportion of beds designated for Medicaid and the nursing ratio was also found to exist in both for-profit and non-profit homes. Previous research has been guided by the notion that for-profit homes will more aggressively seek to maximize their potential for higher revenues by maintaining lower costs on resident care (Davis, 1991). Instead, the results of this study suggest that profit status alone may not be a reliable indicator of a facility's nursing ratio.

Finally, the results indicate that the size of the difference between private pay rates and Medicaid rates does not influence the negative association between the proportion of beds designated for Medicaid and the nursing ratio. Meyer's (2001) finding that the difference between private pay rates and Medicaid rates leads to a lower probability of admission for Medicaid recipients, suggests that nursing homes do exercise a preference for privately paying residents that is moderated by the rate differential. Yet the current analysis indicates that homes with a higher proportion of beds designated for Medicaid employ fewer nurses per resident, regardless of the relative disadvantage associated with accepting a Medicaid recipient instead of a privately paying resident. A possible explanation for this effect is that nursing homes with a higher proportion of privately paying residents are advantaged not only due to the current difference between the two rates, but also due to the longer term benefits of admitting a privately paying resident. Such benefits may include a longer period of time during which the higher rates are collected, or a greater amount of income derived from the provision of additional services.

Alternatively, if Nyman's (1988) assumption was correct that the rate differential is of secondary importance to the level of excess demand for nursing services, then these results should not be surprising. According to this interpretation of the nursing home market, excess demand must be present if nursing homes are to pursue privately paying residents instead

of Medicaid recipients. Since the current nursing home market is now characterized by lower occupancy rates, nursing homes may be more willing to accept Medicaid recipients regardless of the reimbursement rate, in order to avoid losing income on empty beds. More national-level research with local indicators of excess demand is needed to test the continuing relevance of this assertion.

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